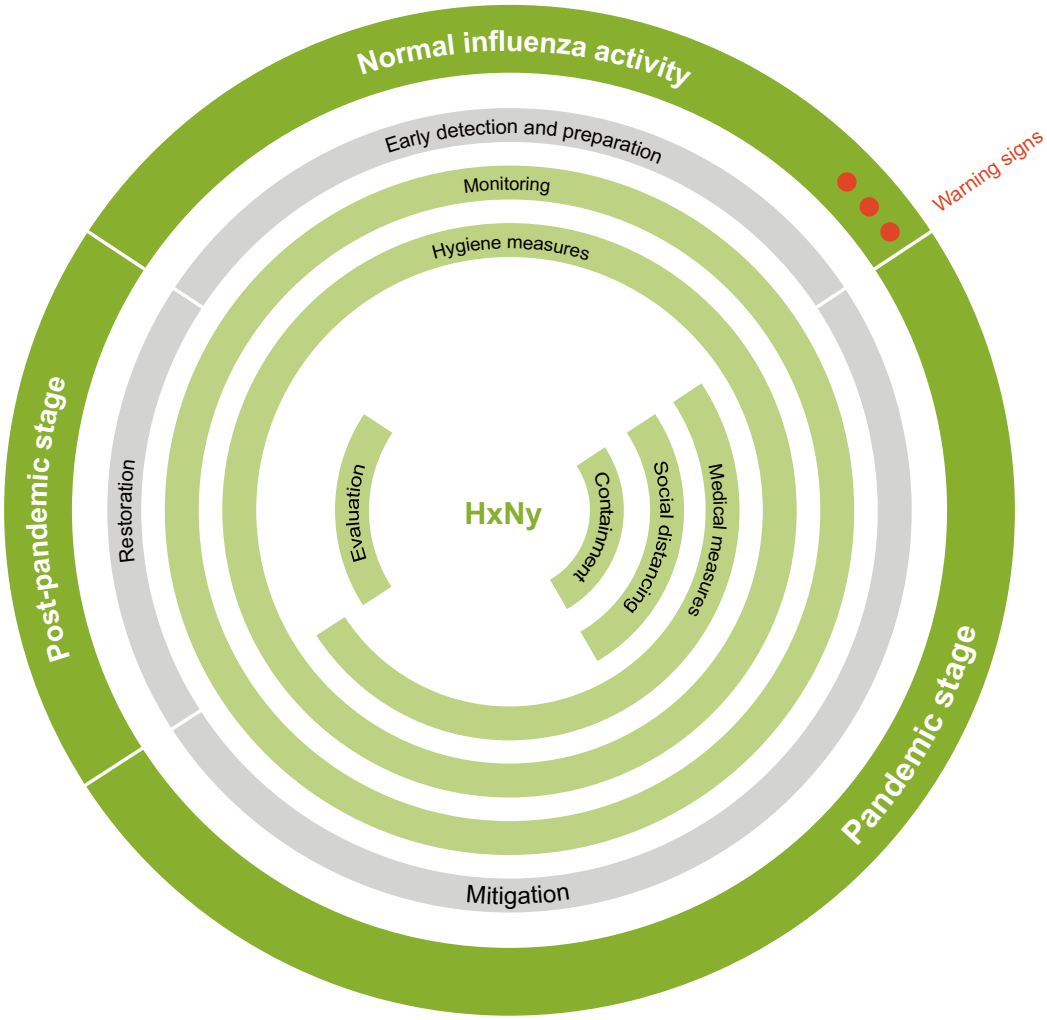
Swiss Influenza Pandemic Plan

Strategies and measures to prepare for an influenza pandemic



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Swiss Confederation

Federal Department of Home Affairs FDHA
Federal Office of Public Health FOPH

5th edition 2018

“If you fail to plan, you are planning to fail”
Benjamin Franklin

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Preface

To define the measures necessary in case of a pandemic and to contribute as efficiently as possible to its control – those are the main goals of the Swiss Influenza Pandemic Plan.

Since 1995, multiple stakeholders have participated in defining and revising the pandemic recommendations and the description and implementation of control measures. Priorities include, in particular, the monitoring system, personal protective measures, separation measures, antiviral drugs and vaccinations.

Our circumstances are in constant flux: the world population is growing, mobility is increasing, and our habits are changing. Against that backdrop, we may be unable to predict the place and time of a new pandemic outbreak, nor its characteristics (spreading rate, severity).

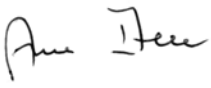
For that reason, the Swiss Influenza Pandemic Plan is regularly revised and updated to reflect the latest scientific findings, the available prevention and treatment options, statutory foundations, existing decision-making and coordination structures as well as expert opinions.

This new edition of the Swiss Influenza Pandemic Plan builds on work started more than 20 years ago. The changes involve, among other issues, communication, recommendations on medical devices such as examination gloves, and the phrasing of ethical criteria which our decisions in a pandemic are based on.

We hope that the Swiss Influenza Pandemic Plan 2018 will become a useful tool that fulfils your needs and expectations. Please don't hesitate to send us your questions and comments. Your feedback will provide a positive contribution to the next edition of the Pandemic Plan.

We would like to thank the former and current members of the Federal Commission for Pandemic Preparedness and Response, the FOPH staff and all the institutions that contributed to revising and updating the Pandemic Plan.

Happy reading!



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PART I Targets, strategies, framework conditions

1.1 Experience from the 2009 pandemic[1]

Switzerland has made systematic preparations for influenza pandemics since 1995. The first Swiss Influenza Pandemic Plan was developed in 2004 under the guidance of the Federal Commission for Pandemic Preparedness and Response (FCP). It was updated in subsequent years before being completely overhauled based on the experiences made in the 2009 pandemic.

The current Swiss Influenza Pandemic Plan is a synthesis of the obtained findings and is embedded in the International Health Regulations (IHR 2005) and the Federal Act on Combating Communicable Human Diseases (Epidemics Act, EpidA, SR 818.101).

Flexibility and the ability to take action in the face of uncertainty are the trademarks of an efficient public health system

Experience with influenza viruses and a scientific understanding of their properties show that the severity of influenza pandemics will continue to vary in future. Based on the Risk Report of the Federal Office for Civil Protection (FOCP), pandemics represent a substantial risk for people, the environment, the economy and society, with associated costs of damage in the low tens of billions. Though the 2009 pandemic was moderate in its impact, targeted pandemic preparation is of great importance and must be developed systematically based on the experience gained. Pandemic preparedness should therefore be routinely reviewed even when there is no crisis.

1.2 Purpose of the Swiss Influenza Pandemic Plan

The Swiss Influenza Pandemic Plan is designed to protect the life and health of the population, and it delineates the specific preparations made by the Swiss health system in anticipation of a pandemic. **It is aimed primarily at the competent national and cantonal authorities.** These preparations ensure that Switzerland is adequately equipped to deal with a pandemic of any degree of severity, i.e. can react in a sufficiently coordinated and efficient manner to limit the impact of a pandemic on people and society.

The Swiss Pandemic Plan is aimed primarily at the competent national and cantonal authorities

The Epidemics Act (EpidA) requires the Confederation and the cantons to prepare for pandemics.[2] This includes drawing up deployment and emergency plans to act as a foundation for preparing the control of a pandemic in Switzerland.

The Swiss Influenza Pandemic Plan is the basis for the development of deployment and emergency plans at the cantonal, regional and local levels. Based on the EpidA, it defines the division of labour between the Confederation and the cantons and allows consistent planning of measures throughout Switzerland.

The Swiss Influenza Pandemic Plan is the basis for the creation of cantonal pandemic plans

The EpidA (1 January 2016) specifies in more detail the responsibilities of the Confederation and the cantons. The Confederation takes on a stronger role in management, target-setting, oversight and coordination, while the cantons retain the responsibility for enforcement. This allows for more efficient preparation for and response to crisis situations, as well as a more effective control of epidemics:

[1] The 2009 pandemic was caused by the influenza virus A(H1N1)pdm09, a variation of the A(H1N1) subtype.
[2] Art. 8 EpidA

- **Federal tasks:** Providing of **information, strategy development,** defining **guideline values** for the enforcement of measures (guidelines, recommendations) and coordination of transcantonal processes. The Federal Office of Public Health (FOPH) is responsible for defining guideline values for the preparation for and control of a pandemic
- **Cantonal tasks: Organisation of cantonal health systems and, in particular, of the enforcement of measures.** The cantons are responsible for describing in detail the structures and processes that are required as part of their deployment and emergency plans

1.3 Principles of planning

"Plans are worthless, but planning is everything"
Dwight D. Eisenhower

Firstly, it is impossible to predict exactly when and where the next pandemic will originate, how quickly it will spread and how severe it will be for any particular age group. The severity of the most recent pandemics (Spanish flu in 1918, Asian flu in 1957, Hong Kong flu in 1968, the H1N1 pandemic in 1977 and the pandemic of 2009) has tended to diminish, but no forecasts can be made on that basis. Secondly, there are no known reliable genetic markers that would allow to predict the pathogenicity and transmissibility of influenza viruses. Furthermore, there is no connection between transmissibility and severity. For all these reasons it is impossible to estimate exactly how effective individual measures will be in the light of the current state of knowledge. Pandemics are not predictable.

Figure I.1.1 outlines the options for preparing and adjusting measures at various stages along the escalation line.

A pandemic is not predictable, so the plan must be flexible

Federal pandemic preparations are regularly assessed. As soon as the monitoring systems register explicit warning signs,[3] pandemic preparations must be examined in detail and adjusted if necessary. For it is very likely that in a crisis there need to be changes to and clarification of the processes and resources which have been prepared under normal conditions. Preparation must anticipate these adjustments and, in particular, take account of the factors affecting the efficacy of the measures – for example, assumptions as to the threat level, pandemic development scenarios, resistance to antiviral drugs, the anticipated situation with regard to resources (e.g. availability of drugs, vaccines, protective material, intensive care beds).

Unforeseen events and developments are bound to occur during a pandemic, and ad hoc solutions will have to be devised to deal with them.

- **Normal situation:** Pandemic plans are updated continually, procedural drills are carried out, cooperation between the various stakeholders is arranged and the necessary channels of communication are set up, the resources are made available, contracts are concluded with pharmaceutical manufacturers and wholesalers, new strategies and measures are trialled, post-pandemic recovery plans are devised
- The monitoring systems record **warning signs** or the World Health Organization (WHO) announces a **public health emergency of international concern** (PHEIC)[4]: The planned processes are fine-tuned and tested for fitness for purpose in the light of the current situation and the need for coordination. Contracts are implemented (e.g. for the purchase of vaccines), neglected preparatory measures are made up for
- **Particular and extraordinary situation**: Ad hoc solutions are prepared to deal with unforeseen events (e.g. viral resistance, shortage of supplies)

[3] Cf. chapters I.2.3 and I.3.1.2
[4] "Public health emergency of international concern" PHEIC, Art. 12 IHR

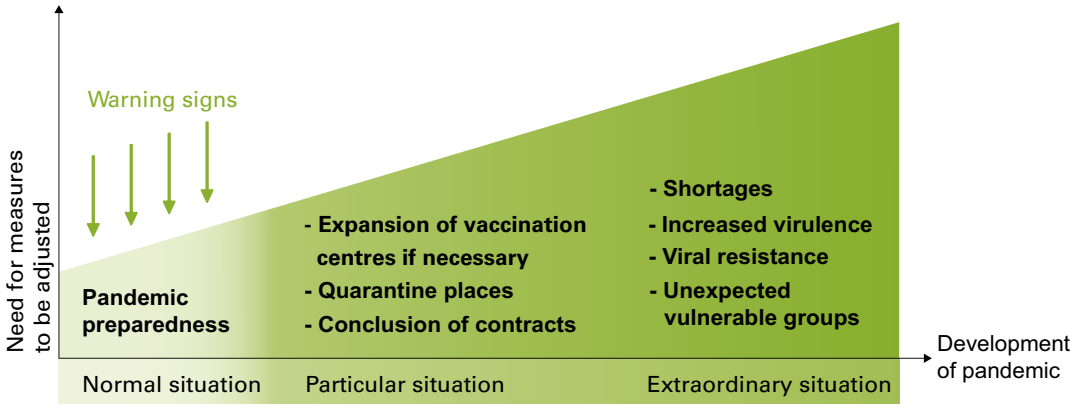

Figure I.1.1: Preparation of measures and need for adjustment

Successful preparation for and control of a pandemic depends on the flexibility of the systems involved. This is achieved by including imponderables and probabilities in the planning, thereby allowing the health system stakeholders to be adaptable and flexible in their decision-making and actions, should the need arise ("flexible mind-set").

1.4 Structure of the Influenza Pandemic Plan

Part I of the Influenza Pandemic Plan sets out the **framework conditions, targets** and strategies for controlling a pandemic in Switzerland. It describes the management and decision-making processes, defines the roles of the stakeholders involved and specifies the interfaces between the Confederation and the cantons.

Part II of the Plan describes the **measures** planned for controlling the pandemic with a view to the operative targets to be achieved.

Part III contains **fundamental and detailed information** to provide an understanding of existing structures and processes.

Part IV contains **checklists**, a **glossary** and **references**.

1.5 Online

Sources of information	
General pandemic information	www.bag.admin.ch/pandemic
Resource platform for specialists	www.bag.admin.ch/specialised-information
Information for the population in case of a pandemic	www.pandemia.ch
Downloads	
Swiss Influenza Pandemic Plan	www.bag.admin.ch/pandemicplan
Manual for workplace preparedness	www.bag.admin.ch/pandemieplan-kmu
Vaccination manual	www.bag.admin.ch/specialised-information

2 Point of departure and framework conditions

Preparedness for and response to a pandemic are global tasks, and a consistent worldwide approach is vital if they are to be successful. Cooperation is coordinated by the WHO on the basis of international agreements (International Health Regulations, IHR 2005).[5] The WHO has a leading role in this context, as it works with the member countries to define guidelines for pandemic control strategies and measures.

The Swiss Influenza Pandemic Plan is based on these guidelines as well, reflecting the global nature of a pandemic and ensuring that the Swiss Plan is compatible with the plans of other countries. But the Swiss Influenza Pandemic Plan complies in particular with national guidelines in order to ensure appropriate and proportionate implementation of measures. The national guidelines are based on the EpidA and the structure and capacities of the Swiss health system.

Switzerland maintains close ties with foreign authorities for the purpose of exchanging information in matters of drug licensing, market monitoring and the development of new regulatory guidelines in the area of therapeutic products. There has been an agreement on the exchange of information with the regulatory authorities of the EU since July 2015.[6] The agreement builds on an earlier collaboration between the European Medicines Agency (EMA) and Swissmedic during the 2009 pandemic as well as the agreement on the mutual recognition of conformity assessments that was signed in 2002.

The Swiss Influenza Pandemic Plan combines national and global perspectives

The Swiss Influenza Pandemic Plan is based on the following three framework conditions:

- WHO guidelines (e.g. pandemic phases, principles of risk assessment)
- Escalation model as per EpidA[7] (normal, particular and extraordinary situation)
- Pandemic development stages (national epidemiological situation)

Furthermore, pandemic preparation must always comply with strict conditions in respect of scientific evidence, efficacy and usefulness, proportionality and cost-effectiveness. Ethical values such as protection of life, fairness and respect for autonomy must be taken into account in all decisions (chapter III.6).

2.1 WHO guidelines

In 2013, the WHO published guidelines, which were updated in 2017.[8] The principal innovations include:

The WHO has no authority to issue instructions

- **Reduction of the number of phases** (interpandemic, alert, pandemic, transition)
- **More flexible risk management** via a risk-based approach at the national level (national risk assessment)
- Risk management with a **focus on generic planning** (all-hazard emergency risk management)
- **Strengthened approach** to pandemic preparedness and control **that involves society as a whole**[9]

[5] In force in Switzerland since 15 June 2007
[6] www.swissmedic.ch/swissmedic/en/home/about-us/collaboration/international-collaboration/bilateral-collaboration-with-partner-authorities/agreements-on-information-exchange.html
[7] Federal Act of 28 September 2012 on Combating Communicable Human Diseases (Epidemics Act, EpidA), as of 1 January 2017
[8] Pandemic Influenza Risk Management – A WHO guide to inform & harmonize national & international pandemic preparedness and response
[9] Whole-of-society approach to pandemic preparedness

The WHO phases are primarily of global significance and are thus not automatic triggers for measures in Switzerland. The Swiss Influenza Pandemic Plan is compatible with the WHO guidelines.

2.2 Escalation model

The Epidemics Act describes a three-stage escalation model, comprising a **normal situation**, a **particular situation** and an **extraordinary situation**. The Act specifies when a particular situation exists, authorising the Federal Council to order specific measures (Art. 6 EpidA). A **particular situation** exists if:

- The regular enforcement bodies are unable to prevent or control the outbreak and spread of a transmissible disease and one of the following threats is present:
  - Increased risk of contagion and spread
  - A particular threat to public health
  - Severe consequences for the economy or other areas of life
- The WHO has observed that a public health emergency of international concern (PHEIC) exists **and** Switzerland is facing a threat to public health as a result

A PHEIC only gives rise to a particular situation if public health in Switzerland is threatened

In all cases a national assessment of the potential risk serves as the basis for any strategies and measures in Switzerland (chapter 3.2.4).

The Epidemics Act also states that in an **extraordinary situation** the Federal Council is authorised to order the necessary measures without delay (Art. 7 EpidA).[10]

2.3 Pandemic development stages

There are three typical stages or national epidemiological situations, determined by the outcome of the national risk assessment (cf. chapter III.3).

Normal influenza activity, warning signs

The ongoing development of new types of viruses illustrates their rapid evolution. Even when there is no pandemic, various influenza viruses are infecting humans and animals. This is known as normal influenza activity. Normal influenza activity comprises seasonal flu and the continual appearance of new types of viruses with the potential to cause pandemics. This stage is equivalent to the normal situation as defined in the EpidA.

Viruses evolve quickly, as is illustrated by the continual appearance of new types

A certain pandemic risk exists as soon as an influenza virus that can be transmitted to humans and against which there is insufficient immunity among the population is identified. This is a possible **warning sign**.[11] There is no acute risk to public health while transmissibility from person to person remains low.

The normal influenza activity stage is equivalent to the WHO interpandemic and alert phases. The warning signs play a role similar to the WHO alert phase, but Switzerland has decided not to define an alert stage.

[10] Art. 7 EpidA reiterates at the legislative level the constitutional power of the Federal Council, by virtue of Art. 185 para. 3 Cst. (SR 101), to issue police emergency regulatory powers in an extraordinary situation even if there is no foundation for such action in federal law.
[11] Current warning signs include H5N1, H7N9.

Pandemic stage

As soon as the virus becomes better adapted to humans and person-to-person transmission increases, there is an acute pandemic risk. According to the provisions of the Epidemics Act, the situation during the pandemic stage (or "pandemic phase" per the WHO) is either **particular** or **extraordinary**.

At this early stage of a pandemic, targeted **containment measures** may be useful in limiting local outbreaks and delaying the spread of the virus. Although this can buy precious time for organisation, the pandemic can no longer be stopped.

Medical and non-medical measures are taken in an attempt to slow the spread of the virus and minimise morbidity, mortality and the knock-on effects on society at large (mitigation).

Post-pandemic stage

There is always the possibility of a **subsequent wave** occurring while the pandemic wave is subsiding. Resource requirements need to be determined at all levels, while case definitions, protocols and algorithms must be adjusted. The post-pandemic stage is equivalent to the WHO "transition phase".

Rapid **restoration** and **normalisation** of essential services must be the goal. Structures set up to deal with the crisis must be wound down in an orderly manner, and the exit from the crisis must be properly organised. It is also essential to evaluate the events.

2.4 Comparison of framework conditions

The framework conditions of the Swiss Pandemic Plan put the national epidemiological situation in a global context

Each of the "WHO pandemic phases", "escalation model situations" and "pandemic development stages" has a different focus.

The WHO pandemic phases relate to the global aspects of a pandemic. In contrast, the escalation model with its three situations (chapters I.1.3 and I.2.2) reflects the potential extent of the crisis in Switzerland and ensures that the measures taken will be efficient and effective.

Figure I.2.1 relates the "situations" of the escalation model in the Epidemics Act to the "pandemic development stages" and the "WHO pandemic phases". The transitions between pandemic development stages and situations are triggered by different factors. The framework conditions relate to different aspects of the escalating crisis and their development, and thus are not exact matches.

As the WHO applies global criteria, it can announce a public health emergency of international concern (PHEIC) before any cases have been recorded in Switzerland. The announcement of a PHEIC by the WHO only triggers a particular situation in Switzerland[12] if this emergency does in fact present a risk to public health in Switzerland.

The Risk Assessment Expert Panel is responsible for national risk assessment

By law, a **particular situation** is always determined on the basis of the national risk and situation assessment. This means that a particular situation may exist in Switzerland **before** the WHO has announced a PHEIC.

[12] Art. 6 para. 1b EpidA

An **extraordinary situation** gives the **Federal Council emergency powers** to take action in response to an acute, severe threat to public health and national security.

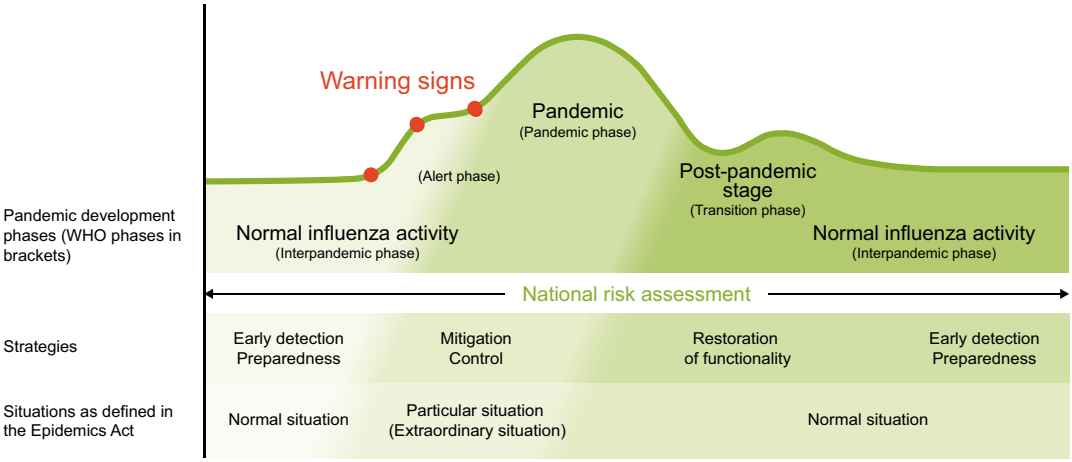

Figure I.2.1: Pandemic control framework conditions

3 Pandemic control

3.1 Strategies
3.2 Management, coordination and governance

The impact of a pandemic on society depends on its severity. The aim of the pandemic control strategies outlined below is to minimise the harmful effects. The most important goals are:

- To protect and maintain the life, well-being and health of the population (chapter III.6, "Ethical issues")
- To minimise the number of victims
- To avoid consequential damage to the economy

3.1 Strategies

The strategies used to control influenza pandemics in Switzerland are guided mainly by the pandemic development stages (chapter I.2.3) and the available measures. The current development stage and corresponding strategy are constantly being defined and communicated by the Confederation on the basis of the national risk and situation assessment.

It is impossible to predict influenza pandemics. Consequently, the implementation of a particular measure (such as vaccination) is determined largely by the situation at the time and may affect the need for another particular measure (such as antiviral drugs).

3.1.1 Vaccination as the primary intervention axis

Vaccination is the most effective preventive measure for protecting individuals against infection, and the primary intervention axis of the control strategies.

In the 2009 pandemic, the vaccine was available four weeks before the wave peaked

When a pandemic occurs, a suitable vaccine is not available until four to six months after the outbreak.[13] If no vaccine is available, antiviral drugs[14] for prevention and treatment take on greater importance. All other medical and non-medical measures must be stepped up as necessary.

Table I.3.1: Strategies during the development stages of a pandemic

Pandemic development stages	Strategies
Normal influenza activity • No threat • Warning signs (threat of a pandemic due to an influenza virus without person-to-person transmission)	**Early detection**
Pandemic stage • Small, local outbreaks among humans (with person-to-person transmission) • Widespread outbreak	**Mitigation/control**
Post-pandemic stage	**Restoration of functionality**

[13] According to today's state of the art
[14] Switzerland's compulsory stocks contain adequate quantities of antiviral drugs.

3.1.2 Early detection strategy

Normal influenza activity describes epidemiological normality

The strategy followed in times of normal influenza activity is early detection. The aim of this strategy is to monitor influenza viruses and detect at an early stage cases of influenza in humans or animals that are caused by a new influenza virus. Global monitoring systems **routinely** search for new viruses and monitor existing virus subtypes that have the potential to cause a pandemic. Since viruses with the potential to cause a pandemic have been in existence or in circulation for many years (e.g. the H5N1 "bird flu" virus since 1997, or H7N9 since 2013) and monitoring systems constantly monitor their population dynamics, it was decided not to incorporate a separate warning stage into pandemic planning. Instead, the term "warning sign" was introduced. A warning sign generally applies to a specific virus subtype.

3.1.3 Mitigation/control strategy

While the pandemic control measures available during a pandemic pursue different operative goals, the underlying strategy always has the superordinate aim of **reducing the impact** of harmful effects on people and society.

All measures are aimed at mitigating the harmful effects of a pandemic

According to our current state of knowledge, it appears unrealistic to expect that **containment measures** would be able to prevent an influenza pandemic either at global or national level. However, the selective use of containment interventions at the early stage can limit local outbreaks and, consequently, reduce transmission and in particular provide targeted protection for vulnerable individuals. While this does not prevent the pandemic, it can perhaps slow down its development and buy time. **This means that containment measures pursue local operative goals, thus supporting the mitigation strategy.**

Once the pandemic has spread to a wider geographical area, all action must continue to be focussed on slowing its progression so that **fewer people are ill at the same time** and the burden on the health system and the damage to the economy are minimised.

3.1.4 Restoration of functionality strategy

Subsequent waves must be anticipated once the first wave of the pandemic is over, and the intervening time must be used to put in place suitable measures to deal with the subsequent wave(s).

The aim after the end of the pandemic should be to return to normality as quickly as possible and restore social processes and structures. This is the aim of the restoration of functionality strategy.

3.1.5 Summary

The operative targets and possible measures are listed in table I.3.2. The individual measures are described in detail in part II.

The FOPH continues to monitor scientific developments so that the deployment of measures and the underlying strategy can be adjusted if necessary.

Table I.3.2: Strategies, operative targets and pandemic control measures[15]

Development stages Strategies	Operative targets	Possible measures
Normal influenza activity – early detection	• Principles of risk assessment	Routine human and animal monitoring
	• The population is made aware • Multipliers[16] are informed	• The general population and risk groups are encouraged to get vaccinated and to pay attention to personal hygiene • Vaccination against seasonal influenza, awareness-raising among the general population and risk groups • Basic knowledge is passed on to multipliers, the general population and risk groups
	• Preparedness	• Crisis plans and emergency plans are drawn up • If recommended: materials are purchased • If recommended: stocks of drugs and/or vaccines are purchased, placed in store or reserved • Diagnostic laboratory testing appropriate for a pandemic is established • National risk assessment (FCP expert panel)
	• Definition of criteria for suspected cases and for reporting	• Particular virus subtypes are monitored more closely • Specific laboratory tests are developed and performed

Pandemic – mitigation	• Buy time for planning measures
	• (Local) containment in the early stage
	• Protection of vulnerable individuals
		• Social distancing (school closures, bans on events)
		• Targeted information is given to risk groups
		• Sick individuals are isolated and rapidly provided treatment
		• Contact management:
		  • Contact tracing
		  • Contacts (people who have been exposed) are quarantined and provided prophylactic drug treatment if appropriate

	• Multipliers are competent and well-informed • The population is well-informed	• Specific regular communication with multipliers • Crisis communication • Behavioural recommendations are given to the population; a campaign is launched
	• Healthcare personnel are protected and cooperative	Measures for healthcare personnel: • Duty to cooperate • Prophylactic drugs if appropriate • Vaccination, possibly on a compulsory basis • If necessary, measures to prevent individual exposure
	• Reduction in transmission and disease burden • Impact on society is minimised	• Medical care for sick individuals • If necessary, additional beds and personnel resources made available in hospitals • Vaccination if available and necessary • Protective masks to be worn if necessary
	• Situation and risk are described	• Pandemic/cases of influenza are monitored
Post-pandemic stage – restoration of functionality	• Structures and processes are functional	• Restoration • Structures set up to deal with the crisis are wound down
	• Lessons learned • Preparation is improved	• Anticipation of subsequent waves • Debriefing • Crisis plans are evaluated and revised

[15] Epidemics Ordinance (EpV, SR 818.101.1)
[16] Primary care providers, media, professional medical groups, schools, event organisers, etc.

3.2 Management, coordination and governance

The cooperation between the Confederation and the cantons is regulated on the basis of the EpidA.[17] **The leadership position of the Confederation and its responsibility for devising and implementing strategic targets for the whole of Switzerland were strengthened with the coming into force of the revised EpidA (1 January 2016). The cantons remain responsible for enforcement in all situations.**

The tasks and powers of organisational units are defined by statutory mandate. An organisational unit is responsible for its own actions insofar as it holds the relevant legal powers for those actions. The Federal Council can order additional measures in **particular situations** (in consultation with the cantons) and in **extraordinary situations**.[18] The Federal Council's decisions are prepared by the competent organisational units, and implementation of the measures is coordinated by the department commissioned by the Federal Council. In a pandemic situation, the Federal Crisis Management Board takes charge, at the request of the Federal Department of Home Affairs (FDHA), of coordinating the preparation of decisions as well as of the enforcement of measures decided on by the Federal Council.[19]

The management organisation described in figure I.3.1 provides an overview of the relevant stakeholders and their support structures, along with their main tasks, powers and responsibilities. As space is limited, the figure and the descriptions below it are not exhaustive.[20]

3.2.1 Federal Crisis Management Board

According to article 55 EpidA, the Federal Crisis Management Board[21] is the Confederation's main instrument for provision and incident management in areas of relevance to civil protection efforts. Acting as the Confederation's coordinating body in particular and extraordinary situations and in the control of events of relevance to civil protection efforts affecting the entire country, its role is roughly the national equivalent of the cantons' management bodies. Civil protection is a cantonal task, which is why – unlike the Federal Crisis Management Board – the cantons have means of their own, and in many cases, far-reaching powers are assigned to the cantonal management bodies. In the case of the Federal Crisis Management Board, however, the powers rest with the original offices or organisations and are not transferred to the Board.

The Federal Crisis Management Board is the Confederation's coordinating body

The Federal Crisis Management Board is made up of the heads of the relevant federal offices, cantonal partners and other stakeholders. Its role is to prepare coordinated decision-making tools and assist the Federal Council in rapid and efficient decision-making. In the event of a pandemic, it is usually chaired by the Director of the FOPH or the Secretary General of the FDHA.

The **duties** of the Federal Crisis Management Board are as follows:

[17] Art. 75–77 EpidA
[18] Art. 6 para. 2 EpidA
[19] Ordinance on the Federal Crisis Management Board (SR 520.17); under development at the time the Influenza Pandemic Plan was going to print
[20] For example, many federal authorities are involved in the running of the systems used in the early detection and monitoring of communicable human and animal diseases and, consequently, also in creating the basis for risk and situation assessment. The same applies to monitoring the enforcement of measures in the cantons and evaluation of control measures.
[21] Ordinance on the Federal Crisis Management Board (SR 520.17): This ordinance regulates the relevant principles of federal provision and deployment in events of relevance to civil protection efforts affecting the entire country.

- Exchanging information and coordinating with other federal and cantonal staff offices, the competent offices abroad and operators of critical infrastructure
- Aggregating sector and partial statuses to a comprehensive overall situation
- Developing problem determination and situation assessment
- Preparing decision-making tools for the Federal Council or the competent department or office
- Coordinating expert knowledge at the federal level and the deployment of available national and international resources
- Ordering and coordinating measures to be taken

3.2.2 Federal Office of Public Health (FOPH)

The FOPH is responsible for **preparing pandemic control** and, should the situation arise, for the medical aspects of pandemic control. In a normal situation, its main **activities** are:

- Creating the basis for Swiss pandemic planning
- Defining pandemic control strategies
- Operating an information and communication system, operating the national IHR point of contact (National Focal Point)
- Ensuring the provision of laboratory analytical capacities
- Running the seasonal influenza campaign

In a pandemic situation, the FOPH concentrates on the following activities:

- Assessing the situation and developing strategies to control the spread of the epidemic
- Deciding on measures affecting individuals or the general population where there is a particular risk to public health (bans on events, school closures, quarantines, etc.)
- Imposing a ban on participation in events for people arriving from affected foreign countries (in accordance with WHO and EU recommendations)
- Ordering, implementing and monitoring measures relating to individuals at national borders and in the context of international passenger transport (businesses are required to cooperate)
- Updating guidelines and recommendations on the implementation of measures affecting the general population, healthcare personnel and facilities (such as airports). Obtaining the technical decision-making tools for the coordinating bodies (FOPH or Federal Crisis Management Board)
- Running the technical aspects of communication in cooperation with the Federal Chancellery and the communication core group. Running the public information campaign
- Operating an information pool that is regularly updated with data from an established information exchange network involving the FOPH, the military surgeon general, the Armed Forces Pharmacy, Swissmedic, expert panels and committees. Information for cantonal medical services is issued at regular intervals in three national languages
- Operating a hotline for the general population and doctors

	Normal situation	Particular situation	Extraordinary situation
Federal Council	T: Setting targets and strategies to prevent and control a pandemic P: Issuing rules, ordering measures affecting individuals and the population as a whole		
Federal Chancellery		T: National information coordination (Federal Council – departments – cantonal chancelleries) P: Overseeing communication, maintaining the one-voice principle	
Federal Crisis Management Board	T: Devising scenarios, coordinating provision planning P: Coordinating training and verifying readiness	T: Presenting the overall situation, requesting action to be taken by the Federal Council, coordinating resources and measures at international and national levels and with cantonal leadership organisations P: Issuing orders to laboratories and specialised units of the Confederation and the ETH as well as to civil and military deployment units	
FOPH Management: Directorate of Public Health	T: National pandemic preparedness, early detection, campaigns P: Instructions/recommendations for an adequate state of preparedness	T: Assessing the situation, devising strategies and measures P: Main unit entrusted with all or part of the business. Instructions to cantons, orders to supporting structures (KOr EpG), technical management KOM; control of the pandemic in the area of public health, international cooperation	
FCP	T: Revising the pandemic plan P: Providing expertise and advice, updating the pandemic plan	T: Risk assessment P: Providing expertise and advice	
FCV	T: Creating the national vaccination policy P: Providing expertise, advice, vaccination recommendations		
KOr EpG Management: Federal Office of Public Health	T: Meeting the need for coordinating agreements and vertical coordination needs between the FOPH and the cantons. Supporting cooperation between the Confederation and the cantons, ensuring uniform enforcement of laws, supporting the Confederation in its leadership role P: Providing expertise and advice		
Swissmedic	T: Testing, registering and issuing marketing authorisation for drugs (vaccines, antivirals, etc.). Monitoring drug effects P: Drug marketing authorisation and supervisory authority, measures to ensure that current quality and safety standards are upheld		
FSVO	T: Monitoring influenza activity in animals, providing status reports, issuing recommendations to protect staff working in animal disease control. Coordinating veterinary measures P: Animal health centre of competence, ordering veterinary measures for animals, enforcement of veterinary measures		
Armed Forces Pharmacy DDPS	T: Procurement, logistics and storage of drugs (e.g. vaccines). Holding and using emergency reserves (antivirals). Subsidiary support of the cantons P: Procurement and logistics centre of competence		
FONES	T: Ensuring that the country is supplied with goods that are essential to life P: Issuing orders	T: Assessing the supply situation, evaluating appropriate management measures P: Enforcement of legislation, releasing items from mandatory stockpiles and taking other actions to control supply and demand	
CMS Management: Person designated by the Federal Council to run the CMS	T: Provision and deployment planning, resource management P: Issuing instructions and recom. for national and cantonal scenario-based preparedness status	T: Operative implementation of measures decided at national level, assessment of the health services situation, IES resource management/monitoring, tracking individuals P: Federal Council decision with extraordinary powers, convening SANKO, coordinated enforcement of health service measures	
ZIVI Central Office for Civilian Service	T: Contribution of human resources to nursing and care P: Mobilisation of civilian service members		
Cantons CMOs, KFO, project teams	T: Pandemic preparedness P: Implementation of national strategies and management of enforcement	T: Enforcement and coordination of pandemic control measures in the cantons	
CMPH	T: Political coordinating body of the Cantonal Ministers of Public Health. Promotion of cantonal cooperation P: As per membership in the National Crisis Management Board		

Figure I.3.1: Management and coordinating bodies
T = tasks, P = powers
Other abbreviations and acronyms are explained in the text.

3.2.3 Swissmedic

Swissmedic is the licensing and supervisory authority; it monitors drug quality

As the **Swiss licensing and supervisory authority for therapeutic products**, Swissmedic is part of the FDHA. Its responsibilities include ensuring that licensed drugs are of impeccable quality, safe and effective. The responsibilities of, and cooperation between, Swissmedic, the FOPH and the Federal Commission for Vaccination (FCV) in matters relating to the procurement and distribution of vaccines have been clearly defined in the context of the National Vaccines Project (NVP).

Swissmedic operates a monitoring system that also allows adverse effects to be recorded (pharmacovigilance) in a pandemic situation. Swissmedic additionally monitors the quality of vaccines (batch release and quality deficiency notifications).

3.2.4 Federal Commission for Pandemic Preparedness and Response (FCP)

The FCP is the body advising the national authorities in matters relating to pandemic preparedness and risk assessment

National situation and risk assessment in an international context has grown in importance as a result of the changes introduced to make pandemic planning more flexible. In a pandemic situation, **risk assessment** is supported by an FCP expert panel. It analyses the current threat potential, describes the possible extent of damage to public health (severity) and estimates the likelihood of a pandemic occurring. The risk assessment should be based on comprehensive information and consider the local, national and international economic and political situation in addition to epidemiological factors.

3.2.5 Coordinating bodies

The more prominent **management role** given to the Confederation has led to an increased need for vertical coordination and consultation between the FOPH (Communicable Diseases Division) and the cantons (cantonal medical officers). This need for consultation relates to both technical and political structures and is handled by the following bodies:

Epidemics Act Coordinating Body (KOr EpG)

The permanent Epidemics Act Coordinating Body improves cooperation between the Confederation and the cantons and helps ensure uniform enforcement, among other things

The Epidemics Act Coordinating Body was set up by the Confederation, with members drawn from the Confederation (FOPH) and the cantons (cantonal medical officers). It acts as the **permanent technical authority** with regard to communicable diseases **in areas covered by the Epidemics Act**. It is run by the FOPH, and its principal stakeholders are representatives of the FOPH (Communicable Diseases Division) and the cantonal medical services. A number of articles in the EpidA explicitly define the cooperation between the Confederation and the cantons and implicitly require that cooperation to be substantial. The KOr EpG can offer support in all these cases.

Its main activities are:

- Coordinating preparatory measures
- Supporting cooperation between the Confederation and the cantons
- Improving uniform enforcement of the law
- Supporting the Confederation in its management role
- Simplifying the Confederation's oversight function

The primary role of the KOr EpG is to enable **consultation with a view to simplifying preparations for decision-making**. It has no political decision-making or enforcement powers – those remain with the competent national and cantonal bodies. The KOr EpG is not a crisis-response agency or a management body. In particular situations, where the Federal Crisis Management Board (chapter I.3.2.1) is called into action, the KOr EpG provides crisis control support within its remit.

The KOr EpG complements the Swiss Conference of the Cantonal Ministers of Public Health (CMPH) and the Swiss Association of Cantonal Officers of Health (VKS), which are the existing coordination platforms of the cantons.

Coordinated Medical Services (CMS)

Within the CMS, the Medical Services Coordinating Body (SANKO) is the federal body that **coordinates medical services provision by hospitals and sociomedical institutions** directly with national and cantonal civilian and military agencies whenever necessary (chapter I.3.2.6).[22]

The Coordinated Medical Services (CMS) ensures that all patients receive the best possible medical care in all situations

The main tasks of the CMS are to coordinate the deployment and use of all resources available from civilian and military agencies that are responsible for planning, preparing and carrying out medical service measures in a manner appropriate to the current stage. The CMS is headed by the Federal Council's CMS officer.

The CMS officer is supported by **SANKO**. SANKO is the coordinating and decision-making body for **particular and extraordinary situations** and supports the CMS officer in all medical service matters. In case of a pandemic, SANKO takes on a coordinating role at the federal level if so instructed by the Federal Council. However, the Coordinated Medical Services Ordinance of 27 April 2005 states that the responsibilities rest with the individual CMS partners; consequently, the deployment of the Federal Crisis Management Board during an influenza pandemic is unaffected. The FDHA remains the competent body in relation to technical leadership during a crisis. The Federal Crisis Management Board can ask the CMS for assistance at any time. In this context, the CMS (or SANKO) is a divisional organisation and, as an operational governance body, functions at the federal level.

3.2.6 Civilian service

Civilian service[23] is a federal civilian measure that is tasked with contributing to the improvement of the situation of those requiring care, help or nursing, as well as contributing to the Swiss Security Network (specifically in the areas of health care and social services). Pandemics lead to an increased demand for care and assistance services, and the civilian service can contribute to meeting that demand.[24]

It commands thousands of civilian service personnel that are trained and experienced in nursing and care services. In a pandemic, the Central Office for Civilian Service (ZIVI) can mobilise the civil service personnel within four to six weeks for multi-month deployments.

ZIVI develops the concepts for readying the civilian service personnel in consultation with the cantons and additional stakeholders.

3.2.7 Cantons

The cantons are responsible for setting up the cantonal health system (e.g. bed capacity and staff levels, administrative checklists) and, subsequently, for managing enforcement (canton–commune or region). Enforcement organisation varies from one canton to another. The EpidA states that within the cantons, the cantonal medical officers (CMOs) and their services, together with the cantonal CMS officers, are responsible for coordinating medical measures to combat a pandemic. They act as a link between the Confederation (FOPH) and the cantons, and between public health and individual health. They are in direct and regular contact with the FOPH via teleconference in all situations. The Swiss Conference of the Cantonal Ministers of Public Health (CMPH) serves as the hub for coordinating fundamental questions with the Confederation and other stakeholders at the national level.

The cantons remain responsible for enforcing the measures

[22] Ordinance on the Coordinated Medical Services (CMedSO, SR 501.31)
[23] Cf. Federal Act of 6 October 1995 on Alternative Civilian Service (SR 824.0) and Ordinance of 11 September 1996 on Alternative Civilian Service (SR 824.01).
[24] Cf. final report "Need for deployment of civilian service members in the event of (natural) disasters and emergency situations": www.admin.ch/gov/en/start/documentation/studies.survey-id-528.html.

Table I.3.3: Tasks and responsibilities of the cantons (KAD, KFO)[25]

Tasks and responsibilities
Preparatory measures: • Helping to set targets and strategies to prepare for or control a pandemic • Pandemic preparedness in line with cantonal pandemic plans, checklists for public authorities (commune/canton) • Preparing the cantonal health system for an influenza pandemic (e.g. bed capacity and staff levels) • Coordinating healthcare services and pandemic planning with neighbouring cantons
Enforcement of measures: • Implementing and/or ordering the necessary measures (e.g. quarantine, isolation, bans on events and school closures) in accordance with current strategic targets • Coordinating enforcement activities with communes, neighbouring cantons, the Confederation and neighbouring countries • Supporting communes • Supporting national activities (e.g. by promoting vaccination)
Communication: • Alerting communes • Exchanging information with the Confederation, cantons and communes • Providing information to local populations about canton-specific structures and procedures • Communicating with cantonal doctors' and pharmacists' associations, hospitals, retirement and nursing homes, Spitex
Monitoring, reporting requirement, laboratory diagnostics: • Performing epidemiological investigations of known and/or suspected cases of influenza • Reporting known influenza cases, suspected cases and/or clusters • Laboratory primary diagnostics
Carrying out contact management (contact tracing, dealing with contacts, etc.)
Drugs: • Distribution of antiviral drugs • Distribution of vaccines, vaccination campaign
Evaluating preparedness and control

Other bodies (cantonal leadership organisations [KFO], project teams) are activated according to the prevailing conditions and needs in the cantons and depending on the escalation stage. They are responsible for managing and coordinating the enforcement of measures at the cantonal level. The CMS will be involved in coordinating medical care at every escalation stage.

There are no clearly defined or fully developed processes for intercantonal cooperation outside the CMS (see the consultation and coordination mechanism of the Swiss Security Union, KKM SVS[26]). Consequently, the conditions for intercantonal cooperation in particular and extraordinary situations must be created through enhanced coordination at the federal level and related Confederation services (e.g. national response group, training offers, drills and material for use in drills). Mutual assistance, based partly on intercantonal agreements, has established itself in the context of transcantonal emergencies. Since autumn 2009, intercantonal cooperation has also taken place in the context of the conference of cantonal chiefs of staff, of which all KFO chiefs of staff are members.[27]

[25] EpV
[26] Unlike the Federal Crisis Management Board, the KKM SVS is a superordinate platform for security policy coordination and dialogue which in a normal situation primarily acts as a platform for the Confederation and the cantons to discuss strategic and operational issues. The Confederation and the cantons have equal numbers of representatives on the KKM SVS.
[27] Report by the Federal Council on population protection and civil protection 2015+

PART II Control measures

1 Introduction

This part describes the **tasks** and **powers** of the federal authorities and cantonal stakeholders in planning and implementing control measures (cf. chapter I.3.2), which are dependent on the domestic and international situations. The **proportionality** of the measures must be considered in advance of their deployment according to the fundamental principles of the rule of law.[1] The risk assessment relevant for the decision-making process is developed by the National Risk Assessment Expert Panel, which is a working group of the Federal Commission for Pandemic Preparedness and Response (FCP).

The measures are weighted in the light of the current knowledge regarding efficacy and strategic benefits. Vaccines continue to be the most effective weapon against a pandemic.

The procedures, administrative management processes and cooperation between the stakeholders within and between the various cantons are described in the cantonal pandemic plans.

[1] Art. 5 of the Federal Constitution

2 Communication

2.1 Introduction

2.1.1 Point of departure

Communication is an important element in preparedness for and control of health emergencies, where it plays a crucial role. It comprises two priorities: **coordinating communication** to support enforcement, and **informative and behaviour-guiding communication** with various stakeholder groups.

The coordination of information among the stakeholders becomes noticeably more demanding as the situation escalates, and the need for clear communication management increases. It is vital that the channels of communication, responsibilities and interfaces are clear; all groups must speak with one voice. This is the purpose of the Confederation's "**communication core group**", which includes the Armed Forces Pharmacy, the FOPH, the Federal Chancellery, the FCV, FMH, the GS FDHA, the military surgeon general/CMS officer, Swissmedic and cantonal representatives.

Stakeholders involved in communication belong to a "communication core group". This core group is part of the FOPH's crisis management structure

Depending on the escalation stage, responsibility for managing communication lies with the FOPH or the FDHA, or with the Federal Chancellery if several departments are involved. The decision is taken by the Federal Council. However, technical communication management is a matter for the FOPH in all situations.

There is a primary duty of information vis-à-vis the general public and all other stakeholder groups.[2] The purpose and content of informative and behaviour-guiding communication varies according to the stage:

- **Awareness-raising** during normal influenza activity (seasonal flu): planning the necessary communication measures and channels. This might include making the general population aware of behavioural measures or vaccination
- **Risk communication** in the early stage of a pandemic (warning signs): comprehensive, clear and ongoing information – under consideration of associated uncertainties – via the internet, social media, factsheets, bulletin articles, a hotline, press releases (involving multipliers such as the cantons, cantonal medical services, communes, professional medical groups and in communication with the public, especially primary care services and pharmacies, the media, etc.)
- **Crisis communication** during the pandemic: ongoing and timely information for all stakeholder groups by means of specific campaigns. Information is provided about all measures put in place to control the pandemic in order to maintain and increase public acceptance of and confidence in official decisions, thus creating a good foundation for implementation. Furthermore, the ethical foundations undergirding the distribution of limited – i.e. insufficient for protecting the entire population – health resources (vaccines, drugs, intensive care beds etc.) must be set forth. To avoid creating the impression that the law is being circumvented, continual communication is required to ensure the transparency of such distributions. The population will, in particular, be asked to understand why specific professionals (nursing staff, police officers, agents of services indispensable to the public, politicians, etc.) are given priority and how the prioritization within these professions is being justified.

[2] Art. 9 EpidA

2.1.2 Challenges for communication

The most important aim of communication is to give the people living in Switzerland the information needed to guard against illness as soon as possible and to encourage people to take action to protect themselves and others.

The paramount communication challenge in a pandemic consists in creating and preserving a climate of trust in official decisions. This requires that the public be considered a partner in crisis control. Above all, no information should be withheld from the public, and uncertainties must be addressed in the interest of scientific transparency.

The challenges facing communication in the event of a pandemic include in particular:

- Uncertainty as to the extent and severity of the threat
- Ensuring that the public quickly achieves an adequate level of information about the current crisis
- Rumours, inaccurate information, which are propagated through social media, among others
- Stigmatisation of and discrimination against sick people and their environment
- Adequate solidarity with regard to protective measures (getting vaccinated to protect others)

These challenges are magnified by the fact that the conventional means of communication are increasingly displaced by social media and other channels: Facebook, Twitter, Snapchat, YouTube, dailymotion, etc. The rise of more and more different means of communication makes the conveying of messages increasingly complex and the control over a country's means of communication increasingly difficult. This aspect needs to be the subject of separate considerations, and new tools for the health authorities will need to be defined in that regard.

Institutions speak continually and with one voice through the communication core group, putting across information that can be understood by the stakeholder groups

The communication furthermore needs to explain the ethical values undergirding the control of the health crisis. These include solidarity, nonstigmatisation of ill or at-risk persons and the protection of life (cf. chapter III.6, "Ethical issues").

2.2 Strategy

2.2.1 Targets

Targets relating to knowledge
In order to communicate facts and address uncertainties, refute rumours and conspiracy theories, correct misinformation and minimise the risk of a panic, the Swiss population needs to be informed about:

- Pathogens, infection routes, symptoms and treatment options, as soon as such information is available
- Protective measures (vaccination, hygiene, proper behaviour)
- The current state of research
- The health authorities' point of view and work
- Existing sources of information

Targets relating to attitudes and behaviour
The aim of putting across appropriate messages is to ensure that:

- The Swiss population has confidence in the health authorities and accepts its own responsibility by supporting and following the key behavioural recommendations
- Members of risk groups take protective action and/or get vaccinated
- Individuals who come into contact with members of risk groups show solidarity with them by taking protective action to guard against infection and/or get vaccinated
- The multipliers disseminate the key behavioural recommendations to a wider audience
- The population's behaviour remains marked by solidarity, and any type of violence triggered by shortages or a decline in solidarity is prevented

2.2.2 Stakeholder groups

The FOPH is responsible for informing the people living in Switzerland. It relies on support from multipliers in order to get its messages out to the various affected population groups. The most effective multipliers are the cantonal medical services and the communal authorities as well as doctors, primary care providers and all nursing staff trusted by their patients, professional medical groups and medical societies along with the media, particularly public radio and television as well as social media. It is therefore important that these groups are given comprehensive information without delay. Where necessary, the FOPH can provide information directly to doctors throughout the country.[3] Additional stakeholder groups can also be of particular significance in communication. For example, educational establishments can become multipliers for the authorities by providing information directly to students, pupils and parents.

Important stakeholder groups for the FOPH are presented in table II.2.1.

[3] In consultation with the Swiss Medical Association (FMH) through its channels

Table II.2.1: Stakeholder groups

Main group	Examples
People living in Switzerland	Population, high-risk individuals, travellers
Public administrations	Public administrations at national, cantonal and communal levels, intercantonal associations and advisory bodies, Epidemics Act Coordinating Body (Federal departments, Federal Chancellery, FSVO, FONES, SDC, SECO, DDPS, FOPER, Suva, Swissmedic, Armed Forces Pharmacy, cantonal directorates, Coordinated Medical Services [CMS], Swiss Association of Cantonal Officers of Health [VKS], cantonal veterinary officers, cantonal pharmacists, federal committees
Professional medical groups	Swiss Medical Association (FMH), College of Primary Care Medicine (KHM), Spitex, Swiss Association of Pharmacists pharmaSuisse, Swiss Association of Druggists (SDV), Federation of Swiss Associations of Medical Practice Assistants (BSMPA), Swiss Nursing Association (SBK), Swiss Association of Medical Practice Assistants (SVA), santésuisse, hospitals, H+, Association of Swiss Paramedics (VRS), Swiss Red Cross (SRC), National Reference Centre for Influenza (NRCI), Swiss Veterinary Society (SVS), Swiss Veterinary Services
Media	News agencies, print media, audiovisual media, new media (social media, news portals, etc.). Given the growing significance of these channels, the health authorities are called on to introduce a system for crisis talks with such media companies as Facebook, Twitter, Google, etc., and set up collaborations with all other states affected by the respective health emergency. The FOPH must develop its own strategy for the new media and, in particular, designate trustworthy interlocutors.
International partners	WHO, EU, ECDC, neighbouring countries, diplomatic corps
Institutions	Educational institutions, crèches, nursery schools, kibesuisse, Spitex CURAVIVA Switzerland (Federation of Care Homes and Institutions)
Politics	Federal, cantonal and communal parliamentary and executive bodies, intercantonal conferences such as CCG, CMPH, political parties, non-governmental organisations
Business community	Businesses (e.g. life science and pharmaceutical companies, financial service providers, insurance providers, retailers, SMEs, shipping companies, telecommunication companies, travel companies, airlines, multinationals), associations (e.g. economiesuisse, Confederation of Swiss Employers, Swiss Union of Crafts and Small and Medium-sized Enterprises, Swiss Retailers' Association, Foundation for Consumer Protection (SKS), Swiss Federation of Travel Agencies (SFTA), Switzerland Tourism, Swiss Hotel Association, trade unions, Swiss Farmers Union, Interpharma, scienceindustries, food industry, Swiss Farmers Union producers
Others	Organisers of sporting and other large-scale events such as concerts, religious assemblies, exhibitions

2.2.3 Messages

There should be no communication without a message for the stakeholder groups at issue. The messages must be short, simple, easy to understand and memorable and should be disseminated, in the language of the target audience, as early as the awareness-raising stage (e.g. during the seasonal influenza information campaign).

Some examples:

- Protect yourself and others
- Avoid the risk of serious complications
- Vaccination costs less than catching flu

Messages disseminated before or during the pandemic include information about the pathogen, how to protect against it, the current international and national epidemiological and epizootic situation (see also the "Contents" column in table II.2.2).

But the messages include in particular general information to the population. The following examples are to be weighted according to the specific situation:

- There is no threat / a moderate threat / an acute threat to the population of Switzerland
- Medical care in Switzerland is / is not ensured
- The measures taken thus far ensure the protection of the people living in Switzerland
- The FOPH provides regular information updates and is in constant contact with the WHO and other international and national healthcare stakeholders
- Follow the instructions issued by the health authorities

In order to preserve the trust of the population, the message must reflect the facts and scientific findings in a fully transparent way. Exaggerating or playing down the facts in order to reassure the population or get their support for the proposed measures is counterproductive.

2.2.4 Approach to communication

The FOPH communicates actively and accurately and provides information at the appropriate time and for the relevant stakeholder groups. All information is clear and as brief as possible, based on objectivity and transparency. Any uncertainty is disclosed in order to counter speculation and rumour. Switzerland's cultural and linguistic diversity is respected and reflected without losing sight of the international nature of a pandemic. Communication planning is flexible and ongoing and takes account of new evidence or measures.

It is important that communications are always released by the same individuals so as to establish a level of familiarity during the crisis. If multiple agencies issue communications at the same time, coordination of crisis communication by federal bodies (Federal Chancellery, communication core group) has top priority from the start. The content of information given by all communicating agencies must be consistent.

All measures taken to control the pandemic, as well as their outcomes, must be communicated in order to foster acceptance and trust in official decisions and create a good foundation for implementation.

Communication is based on a comprehensive assessment of the threat situation in line with the recommendations of the National Risk Assessment Expert Panel, the World Health Organization (WHO) and the European Centre for Disease Prevention and Control (ECDC).

The FOPH distinguishes between four stages of communication:

The primary aim during the **awareness-raising stage**, when there is no pandemic, is to address several aspects relevant to a pandemic via the annual seasonal flu communication. This provides the Swiss population with basic information about influenza, behavioural and protective measures and risk groups. Individual stakeholder groups (such as the cantons, primary care providers and pharmacies) already play an important role at this early stage. They actively help increase public understanding via joint or separate information platforms. At the same time, this stage is used to plan or set up the communication measures and resources that will be needed in a pandemic.

The **risk communication** stage starts immediately before a pandemic threatening the population of Switzerland. Where appropriate, it is based on and linked to the proven intervention approach followed during the seasonal flu campaign. At this time, information that is clear, ongoing and as comprehensive as possible is communicated about facts relating to the imminent pandemic, building on the knowledge acquired during the awareness-raising stage. Communication must reflect the fact that reliable data is slow in coming but that the need for information is great. This is why uncertainty is communicated clearly as well. The planned communication measures and resources are implemented, introduced and prepared in anticipation of a dynamic increase in communication (e.g. a sharp rise in media interest). The Confederation presents the information electronically (via the internet) and on paper (via factsheets, etc.) as well as via a hotline. At the same time the multipliers (professional medical groups, media, etc.) do their share to further disseminate the information. The FOPH is in close, regular contact with these groups through appropriate channels of communication (teleconferences, press releases, etc.). To that end, the FOPH keeps an updated list of publishing directors and editors-in-chief, including their contact information, so the managing bodies of the media in the four language regions of Switzerland can be reached without delay.

The actual **crisis communication** stage takes place during the pandemic. It benefits from well-established structures and processes in cooperation with key stakeholder groups, smooth channels of communication and a basic understanding among the population. The mass media have an important multiplier role during this stage, and constant contact with the media is therefore essential. A mass-media campaign using conventional channels of communication (spots, posters, videos, tutorials, etc.) also allows important information about protection and behavioural recommendations to be transmitted directly to the population. This campaign is carried out on the basis of close consultation between the Confederation and the multipliers in order to ensure uniformity of communication. The aim is to ensure that all participants put across the same messages and have the same level of knowledge. The Confederation is responsible for coordinating communication. The end of the pandemic is officially announced by the Confederation.

The **post-pandemic stage** starts after the pandemic, and the same goes for communication. During this stage, communication is reviewed to ascertain which resources and measures were successful and which need to be amended for a future pandemic.

2.3 Measures and implementation

2.3.1 Measures and means of communication

Measures and means of communication are adapted to reflect the target groups and the current epidemiological or epizootic situation in Switzerland.

Table II.2.2: Conceptual frameworks of communication

	Measures	Most common resources	Contents
Awareness-raising stage	In a normal situation, when there is no pandemic, basic information about the topic is provided to the population as part of the annual seasonal flu communication. Information about seasonal flu, "bird flu" and the pandemic is provided on the FOPH website and updated regularly. The measures and means of communication for a pandemic have been defined and introduced.	• Annual seasonal flu campaign, including media activities (e.g. internet, social media, brochures, factsheet, checklists, national vaccination day, posters) • Website • Channel FOPH–FMH–doctors	• Infection routes • Treatment • Hygiene measures • Vaccinations • Risk potential/risk groups • Symptoms
Risk communication stage	Immediately prior to a pandemic threatening Switzerland, the FOPH issues information about facts and recommendations as well as uncertainties. Constant communication with professional medical groups and the media allows content to reach a wider audience. The communication takes account of the stakeholder groups' varying needs.	• Bulletin articles • Factsheet • Technical articles • Frequently asked questions (FAQs) • Website • Hotline • Press release • Channel FOPH–FMH–doctors	• Infection routes • Treatment • Information for lay and professional audiences about the epidemiological (FOPH) and/or epizootic (FSVO) situation • Hygiene measures • Vaccination recommendations • Recent research findings • Risk potential/risk groups • Protective measures • Symptoms
Crisis communication stage	Other means of communication are used during the pandemic, and the frequency of communication is stepped up. The population will likely make particular use of trusted medical contact points (attending doctors, cantonal medical officers, etc.), which will put increasing strain on them. Documents are provided to ensure intensified communication by cantonal medical officers and other medical professionals, as members of the public will be trying to contact their doctors directly. Possible launch of a mass-media campaign. In this stage, the authorities should take advantage of the media, in particular public radio and television, to quickly and comprehensively inform the public.	• Arguments • Brochure • Bulletin articles • Factsheet • Technical articles • Frequently asked questions (FAQs) • Hotline • Website • Campaign: radio and/or TV spot, dissemination through social media, smartphone alert, internet banner, information notice, leaflet, poster, etc., in order to reach the entire target audience, including those who do not use the conventional media • Media conference • Press release • Social media • Language convention • Channel FOPH–FMH–doctors	• Infection routes • Treatment • Technical information about the epidemiological (FOPH) and/or epizootic (FSVO) situation • Hygiene measures • Vaccination recommendations • Recent research findings • Risk potential/risk groups • Protective measures • Symptoms

2.4 Responsibilities, tasks and powers

Table II.2.3: Responsibilities, tasks and powers

Responsibility	Tasks	Powers
Confederation	**Management and coordination of communication:** FOPH communication is coordinated with the various federal agencies concerned, the cantons (cantonal medical services) and other important stakeholder groups. This task is carried out by the "communication core group" in all situations.[4] Where possible, information is given to the cantonal medical services and professional medical groups before being released to the public. Assistance is provided by the Epidemics Act Co-ordinating Body and the Federal Crisis Management Board, creating the conditions for ensuring that the information and messages issued are uniform and consistent at all levels of the system.	The Confederation is responsible for official communication about the pandemic and its control.
Confederation	The FOPH **monitors topics relevant to public health** in addition to its national and international epidemiological pathogen-monitoring activities carried out via the Sentinella reporting system, the WHO, etc. The aim is to analyse various channels (e.g. media monitoring) to assess the public mood and quickly identify growing concerns and fears, rumours and speculation as well as inaccurate statements and contrary opinions and information so as to be able to respond promptly.	The FOPH uses appropriate methods of coordinating communication with the main stakeholder groups (e.g. cantonal medical officers). Information is exchanged via consultations, meetings, teleconferences, emails and extranet in order to ensure uniform communication with uniform content and messages.
Confederation	**Response to the crisis is evaluated.** Evaluation can cover either the entire process of crisis response or selected aspects. The aim of the evaluation is to formulate practical recommendations for action, especially regarding the refinement of pandemic plans, crisis communication, crisis management structure, etc., for improved handling of a future crisis.	The measures taken during the crisis and their effect can be analysed and assessed by internal or external experts. This work is commissioned by the Confederation.
Cantons	• Supporting or implementing the communication measures specified by the Confederation (e.g. using the messages) • Managing canton-specific communication • The competent cantonal agencies will be required per the EpidA to exchange their knowledge and information with the Confederation. The aim is to ensure optimum usage of the considerable body of knowledge that exists at cantonal level, the expertise of the FOPH and of other federal agencies (e.g. the Coordinated Medical Services CMS). • The cantons ensure the vertical coordination and communication with the cities and communes.	Decentralised communication by regional authorities is also possible but subject to clear guidelines.

[4] The following groups and individuals are members of the "communication core group": Armed Forces Pharmacy, FOPH, FSVO, Federal Chancellery, FMH, GS FDHA, military surgeon general/CMS officer, Swissmedic, cantonal representatives.

3.1 Introduction

Reporting systems not only provide information for early detection but also help pinpoint disease development trends, risk factors and the need for action over longer periods. They provide information for prioritisation and the planning and evaluation of prevention programmes and for determining disease control measures.

Monitoring influenza activity has been a routine task for the FOPH since 1986.[5] It is based on five pillars (figure II.3.1, "Routine influenza monitoring") and is an ongoing process:

- Networking and cooperation with international monitoring systems[6]
- Monitoring influenza A subtypes in animals
- All types of influenza confirmed by laboratory analysis must be reported[7]
- Weekly reports of suspected cases of influenza by doctors involved in the Sentinella reporting system; tests of nose/throat smears at the National Reference Centre for Influenza **(NRCI)** in Geneva
- Excess mortality data from the Federal Statistical Office **(FSO)**

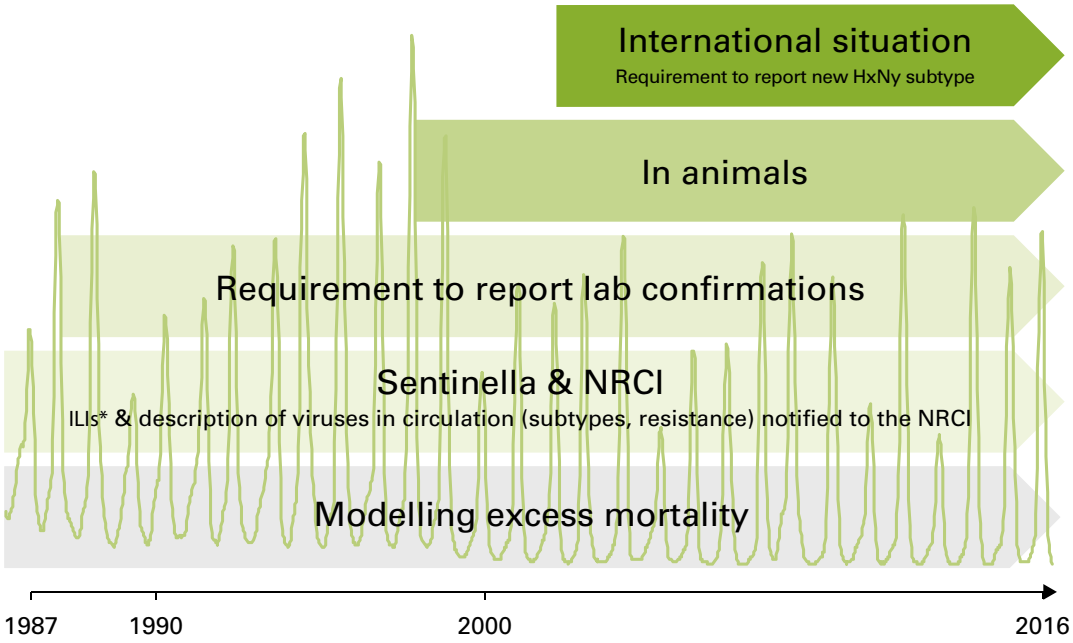

Figure II.3.1: Routine influenza monitoring

When there is no pandemic, this process concentrates mainly on normal influenza activity and its seasonal course.

[5] Art. 11 EpidA
[6] WHO Europe Influenza Surveillance (EuroFlu), Global Influenza Surveillance and Response System (GISRS), Flunet, Early Warning Response System (EWRS), Health Security Committee (HSC), Global Outbreak Alert and Response Network (GOARN).
[7] FDHA Ordinance on the Reporting of Observations of Communicable Human Diseases (SR 818.101.126)
* ILIs = Influenza-like illnesses

Another key focus is the **early detection** of new influenza virus A subtypes in humans and animals. The Vetsuisse Faculty of Zurich University (Institute of Virology ZH), the National Reference Centre for Influenza (NRCI), the Federal Office of Public Health (FOPH), the Pig Health Service (SGD) and the Federal Food Safety and Veterinary Office (FSVO) are working closely together on a pioneering project to monitor influenza viruses in humans and animals.

As soon as the first warning signs appear – in the form of novel types of the virus or types that can be transmitted to humans – the focus shifts or narrows to early detection of (imported) cases of the virus type in question through the notification requirement. If a crisis occurs, this enables rapid and targeted deployment of contact management measures (chapter II.4, "Contact management") to contain the disease and reduce its impact. The risk potential can be estimated on the basis of the monitoring data, and initial criteria for suspected cases, reporting and sampling can be set.

As the pandemic progresses, the focus moves from early detection to case monitoring through the Sentinella reporting system. On the one hand, the aims include identifying vulnerable groups and assessing the severity of cases and the efficacy and adverse effects of the drugs used. On the other hand, monitoring at this stage also serves to steer measures affecting individuals (chapter II.4, "Contact management"; chapter II.7, "Separation measures") or the population as a whole (chapter II.5, "Social distancing: School closures, bans on events").

As soon as there is an outbreak of a "new" disease, the established reporting systems play a major role as long as all cases have been diagnosed and recorded

The monitoring data provide an important foundation for risk and situation assessment (chapter I.3.2.4). They can be used to ascertain the current pandemic development stage and devise a control strategy. In turn, monitoring is adjusted to reflect the chosen control strategy.

3.2 Targets

Early detection of new threats, allowing for:

- Creation of pandemic control planning principles
- Risk assessment by the federal expert panel
- Adjustment of preparations and planning of additional measures (e.g. vaccine procurement, measures affecting international passenger transport, other resources)

Case monitoring (reporting requirement) as a basis for:

- A comprehensive situation report and description of epidemiological development
- Containment through immediate measures affecting individuals (contact management)
- Identification of vulnerable groups and determination of protective measures

3.3 Measures

Doctors who have made a diagnosis must report observations of communicable diseases to the cantonal medical services, which pass them on to the FOPH.

Routine monitoring (figure II.3.1) continues during a pandemic. A new feature at this stage is the requirement to report diagnoses.[8] All suspected cases identified by doctors must be reported, as must laboratory reports on the specific tests that have been carried out. **In the early stage of the pandemic, reports must be submitted quickly (within 2 hours)**, since they serve as the basis for immediate action, such as alerting, containment and mitigation. Later on, they are the basis for monitoring the progression of cases and of the epidemic itself.

As soon as the pandemic has spread to a wider geographical area, doctors are no longer required to report suspected cases; at this point only **confirmed cases and those involving hospitalisation** have to be reported.

Figure II.3.2 shows the pandemic reporting requirement as a pandemic wave progresses. The vertical bars show confirmed weekly case numbers during a pandemic by way of example.

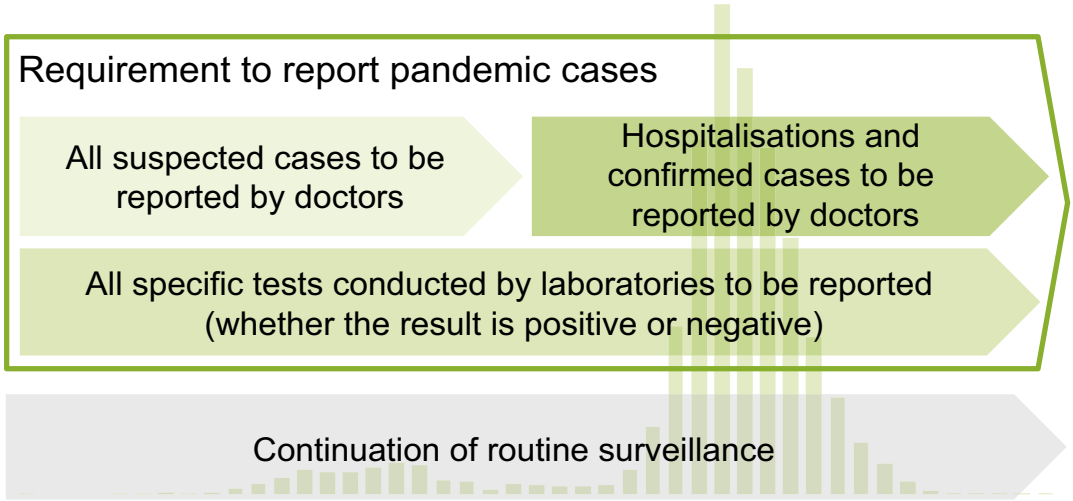

Figure II.3.2: Reporting requirement during a pandemic

There is also provision for a system for monitoring hospitalisations. The aims of this hospital monitoring scheme are to improve the exchange of data among hospitals and between hospitals and federal and cantonal authorities, and to obtain information about the clinical course of the disease and vulnerable groups.

[8] FDHA Ordinance on the Reporting of Observations of Communicable Human Diseases (SR 818.101.126)

Table II.3.1: Possible monitoring measures

Possible measure	Explanation	Stakeholders
Monitoring the international situation	• Routine monitoring • Early detection/reaction networks Focus: Risk assessment	EuroFlu, GISRS, Flunet, EWRS, HSC, GOARN, TESSy
Animal monitoring	In accordance with the Epizootic Diseases Act and Ordinance: • Monitoring wild animals • Reporting requirement for livestock • Type-testing of viruses present in animals	FSVO
Media monitoring		FOPH, DDPS (Medical Intelligence)
Compulsory reporting (reporting requirement)	In the event of clinical suspicion or after laboratory confirmation: • Initial telephone report to be submitted to the cantonal medical services within two hours[9] (→ FOPH) Focus: Immediate containment action (contact management)	Doctors who have made a diagnosis, laboratories
	• Follow-up reports by doctors to the cantonal medical services (→ FOPH) Focus: Monitoring progression, situation assessment, monitoring measures	Doctors, hospitals
	Reports on clusters Focus: Detection and containment of outbreaks (e.g. in schools, care homes, crèches)	Doctors

	• Establishment of the primary diagnosis[10]
	• New influenza subtypes to be reported to:
	  • Cantonal medical services
	  • FOPH
	• Confirmation diagnostics
		NRCI

	Diagnosis	Laboratories
Identification, notification, information	Recording personal data for contact tracing (chapter II.4., "Contact management")	Cantonal medical officers
Monitoring	• Sentinella monitoring of suspected clinical cases (ILIs): • Nose/throat smears taken from a patient sample of the Sentinella monitoring and sent to NRCI Focus: Assessing virulence, vulnerable groups, efficacy of treatment, vaccine protection (analogous to seasonal flu)	Doctors
	• Confirmation of criteria for suspicion • Assessment of the frequency distribution and characterisation of the phenotypes and genotypes of the strains in circulation • Establishing a method, comparing international methods • Monitoring the development of resistance to antiviral drugs • Monitoring vaccine cover (antigen variants) • Consultation on capacity expansion for primary diagnosis	NRCI
	• Monitoring fatalities (excess mortality) Focus: Assessing severity, mortality, proportion of vulnerable individuals	FSO
Monitoring drug effects	Reporting adverse effects and complications to a regional pharmacovigilance centre	Swissmedic

[9] FDHA Ordinance on the Reporting of Observations of Communicable Human Diseases (SR 818.101.126)
[10] The NRCI, together with the FOPH and other partners, devises a plan for organising diagnostics during a pandemic and for defining the responsibilities of laboratories in the course of the escalation.

3.4 Tasks and powers

Table II.3.2: Tasks and powers of the Confederation and the cantons[11]

Stakeholder	Tasks and powers
The FOPH in conjunction with the FSVO, the DDPS, the cantons and international partners	Establishment, operation and optimisation of systems for monitoring communicable diseases and early detection of epidemiological developments
Federal Crisis Management Board SANKO	Coordination[12] of transcantonal measures
FOPH	• Setting uniform reporting and assessment criteria • Deciding on the tests to be carried out by the authorities • Preparing and readying data for the cantons • Providing technical support to the cantons • International contacts (WHO, ECDC, VIRGIL) • Reporting to the WHO in the event of public health emergencies of international concern (in accordance with Art. 6 IHR)
Cantons	• Epidemiological monitoring with support from the Confederation (FOPH, FSVO, CMS) • Processing compulsory reports and passing them on to the FOPH • Passing on information reported by the cantonal veterinary officer, food hygiene services or cantonal pharmacy to the competent national authorities in the event of a threat to public health Coordination of intracantonal processes essential to monitoring Reporting on executed measures relating to individuals (contact management)

3.5 Diagnostics

Should a new pathogen with pandemic potential emerge, Switzerland will need to ready sufficient capacity for primary diagnostics. Laboratory diagnostics plays an important role in the fight against a pathogen, given the fact that the public health measures that need to be implemented are directly linked with the pathogen and thus with the laboratory test. The period between when the decision to develop a new laboratory diagnostic test is taken and the actual beginning of a pandemic is a trying one indeed for the NRCI. Since there is generally very little information about the new virus, be it regarding its transmissibility or its pathogenicity/lethality (or regarding its genome, which is an important point for the NRCI) and thus about its true pandemic potential, the NRCI has multiple tasks to complete in a relatively short amount of time. A partner laboratory thus needs to be designated to support the NRCI during the development and validation of the new test as well as during the lab analysis stage. Given this extraordinary workload, the services provided by the NRCI in the course of routine monitoring of seasonal flu need to be temporarily re-evaluated.

[11] Chapter 2 EpV
[12] Detailed technical and policy agreements with the cantons are needed to prepare for decisions to be taken by federal organisational units. These agreements are drawn up by the Epidemics Act Coordinating Body, SANKO (CMS) and the Swiss Conference of the Cantonal Ministers of Public Health (cf. chapter I.3.2 and the introduction to part II).

The two laboratories need to be fully equipped to tackle such an event. For without specific knowledge about the virus, and without available vaccines or drugs, the new pandemic virus will likely be assigned to group 3, which, according to the Containment Ordinance (Contain, SR 814.912), will require a laboratory of type BSL 3 (biosafety level 3). The tasks of the two laboratories, their significance as well as the planning of activities are listed below.

3.5.1 Normal influenza activity

During the period before a pandemic outbreak (figure II.3.3), the NRCI performs its usual activities in connection with the seasonal flu and also keeps abreast of the emergence of any new HxNy variants with pandemic potential.

3.5.2 Warning signs

As soon as there are unequivocal warning signs[13] for the emergence of a new influenza virus variant with pandemic potential, the NRCI's primary task is to develop a specific, sensitive and reproducible lab diagnostic test. Thanks to its international contacts, the NRCI has ready access to the information necessary for developing a new diagnostic test (virus genome, or at least parts of it) and for validating such a test (a virus, its RNA or a plasmid with the viral sequence which are used as positive controls). The partner laboratory will lend its support for this task. As soon as this preparatory stage is completed, early detection of the first cases along with active monitoring can proceed. The contact management measures (chapter II.4) are implemented to achieve mitigation and containment.[14]

In general, multiple molecular tests with differing target sequences are developed simultaneously in order to confirm the initial result. Development of a high-quality diagnostic lab test requires at least two weeks. A commercially available diagnostic lab test is unlikely to be available at the start of a pandemic, which is why the NRCI personnel's experience and expertise are crucial. Once the test has been developed and validated, it is made available to the medical-analytical laboratories throughout Switzerland. In addition to this technical task, the NRCI supports the FOPH with logistical issues connected with communicating the lab results (be they positive or negative) and with notifying the principals as well as the competent (cantonal and federal) authorities of the results.

3.5.3 Pandemic stage

Once the virus starts spreading through the population, the contact management measures are no longer effective. There is thus no longer any point in making a diagnosis in all suspected cases. The focus will now be on monitoring the cases of influenza (chapter II.3) and on directing measures related to individuals (chapters II.4 and II.7). Lab analyses are reserved for severe, usually hospitalised cases in order to monitor the evolution of the illness and the virus (development of resistance, mutations). The FOPH takes the view that the numerous medical–analytical laboratories in Switzerland are capable of offering these diagnostic analyses at this stage, be it through the method disseminated by the NRCI or through other methods provided by the industry, which tends to have a faster response time in these types of situations.

[13] Based on a joint decision by NRCI and FOPH experts as well as a detailed analysis of the international situation and the recommendations of the WHO (in particular the possibility of a PHEIC; see chapter I.2.2)

[14] According to estimates, contact management measures can be implemented for approximately the first 100 positive diagnoses; assuming that one out of every ten analyses returns a positive, this corresponds to approximately 1,000 analyses.

3.5.4 Post-pandemic stage

Once the pandemic subsides, the NRCI returns to its usual activities, and the partner laboratory's mandate ends. Structures set up to deal with the crisis are wound down and normal operations resume. This calmer period is also used to assess the correctness of the executed processes and measures as well as the efficiency of the cooperation between the various stakeholders and, if necessary, to revise the crisis plans and structures.

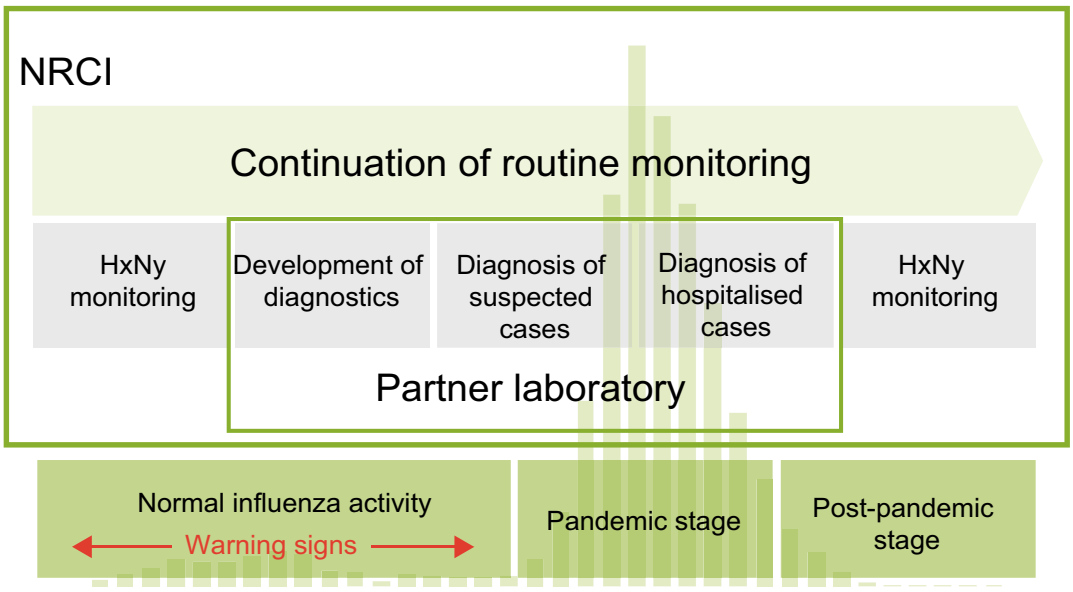

Figure II.3.3: Laboratories and diagnostics in case of a pandemic

4.1 Introduction

The operative purpose of contact management is **containment** in the early stage of a pandemic in order to limit the spread of a new pathogen in Switzerland.

A rapid response and the tracing of as many affected people as possible can be vital

Contact management consists of:

- **Contact tracing:** Finding individuals who have been in contact with a sick person (initial case), i.e. who have been exposed ("contacts")
- **Measures affecting individuals** (including quarantine, drug prophylaxis and vaccination of contacts)

Contact management consumes considerable resources and is, therefore, only sensible in the early stage of a pandemic when it is still possible to prevent transmission or slow outbreaks. When dealing with a highly communicable pathogen such as the influenza virus, **there is no longer any point in contact management once the pandemic wave has started in Switzerland**. If a pandemic is mild, contact management may sometimes be foregone.

The contact management activity carried out during the 2009 pandemic illustrated the limits of conventional contact management. Work tools such as telephones, faxes, various lists and contact forms soon reached the limits of their usefulness; an electronic solution is essential. The web-based information and deployment system (IES-CMS) is an efficient, transcantonal contact tracing tool for the Confederation and the cantons.

4.2 Targets

- Interrupting transmission chains and delay local outbreaks
- Minimising the number of transmissions caused by sick or exposed people travelling to Switzerland
- Informing doctors about measures to prevent transmission, and having these measures implemented by doctors
- Protecting individuals (especially risk groups) who have been in contact with a sick person

4.3 Measures

The most important measures in the context of contact management are:

- Contact tracing
- Quarantine (keeping contacts away from healthy people and keeping them under medical supervision, chapter II.7)
- Prophylactic provision of antiviral drugs and/or vaccines to contacts

The EpidA does not allow medical treatment to be imposed. It does not provide a statutory foundation for forcing individuals to take medication or undergo other forms of treatment

The cantons are responsible for enforcing (ordering, implementing, monitoring) contact management in Switzerland, which should happen through a standardised approach. This ensures that all individuals living in Switzerland are treated in the same way and facilitates intercantonal data exchange. The relevant measures are implemented as directed by the Confederation. The main contact management preparation measures are listed in the table below, together with the tasks and powers of the various stakeholders:

Table II.4.1: Possible contact management measures

Possible measure	Explanation	Confederation guidelines and recommendations
Preparation	Provision of resources for the implementation of contact management and necessary follow-up measures (quarantine, medical measures, monitoring) and performance of drills	FOPH recommendation
	• Developing a communication strategy for the general population and for contacts and their friends, relatives and/or people living on the same premises • Clarifying the cantonal statutory foundations for carrying out contact management (e.g. absence from work due to quarantine) • Defining processes (e.g. quarantine at hospital, quarantine at home, dispensing prophylactic drugs, vaccinations) • Training cantonal medical services personnel • Mandating and training of any subsidiary organisations	
Contact tracing	Contact tracing, e.g. using the web-based information and deployment system IES-CMS	FOPH-CMS recommendation
Contact classification	Evaluation of contacts' risk of falling ill	FOPH classification scheme
Quarantine	Quarantine at home or in a suitable facility	Chapter II.7 FOPH recommendation
Medical care	Prophylactic care of contacts and, where appropriate, of healthcare personnel: antiviral drugs and/or any available vaccines	FOPH recommendation
	Case management • Behavioural recommendations for contacts • Behavioural recommendations for relatives	FOPH recommendation
Exchange of information	The FOPH should be informed of cantonal enforcement of measures	

4.4 Tasks and powers

Decisions on implementation of contact management are taken by the Federal Office of Public Health on the basis of the outcome of the national risk assessment and are implemented by the cantons.

Table II.4.2: Tasks and powers of the Confederation, cantons and other stakeholders[15]

Stakeholder	Tasks and powers
FOPH	• Decision to start contact management on the basis of the national risk and situation assessment • Operation of the national focal point in accordance with international health regulations;[16] international cooperation
	Development of recommendations on: • Quarantine monitoring • Post-exposure prophylaxis for contacts • Pre-exposure prophylaxis for healthcare personnel (antiviral drugs and vaccines) • Behavioural recommendations for contacts and their relatives The classification scheme and related catalogue of measures are developed and updated according to the epidemiological properties of the pandemic virus
	International cooperation: • Compliance with international obligations under the IHR (notification, information) • Obtaining passenger lists from airlines and processing them; exchanging lists with other countries and sending them to the cantons concerned • Contact tracing related to international passenger transport in collaboration with airports and airlines (chapter III.9, "Measures at airports") • Submitting information to the competent authorities about the management of contacts who have travelled abroad
Federal Crisis Management Board	Coordination[17] of measures in the event of transcantonal management of contacts or in order to ensure uniform enforcement of measures
CMS	• Healthcare sector organisation – Medical Services Coordinating Body SANKO • Operation of the contact management module
FSVO	Monitoring and measures for animals and their keepers if zoonoses are involved
Cantons	• Provision of the resources needed to implement contact management measures • Devising cantonal procedures for individual measures • Ordering, implementing and monitoring measures
Airports and airlines	Passenger lists are made available as required by law[18]

[15] Chapter 4 EpV
[16] International Health Regulations (IHR 2005)
[17] Detailed technical and policy agreements with the cantons are needed to prepare for decisions to be taken by federal organisational units. The technical agreements are drawn up by the Epidemics Act Coordinating Body under article 54 EpidA, and the policy agreements are drawn up by the Swiss Conference of the Cantonal Ministers of Public Health (cf. chapter I.3.2).
[18] Art. 43 EpidA

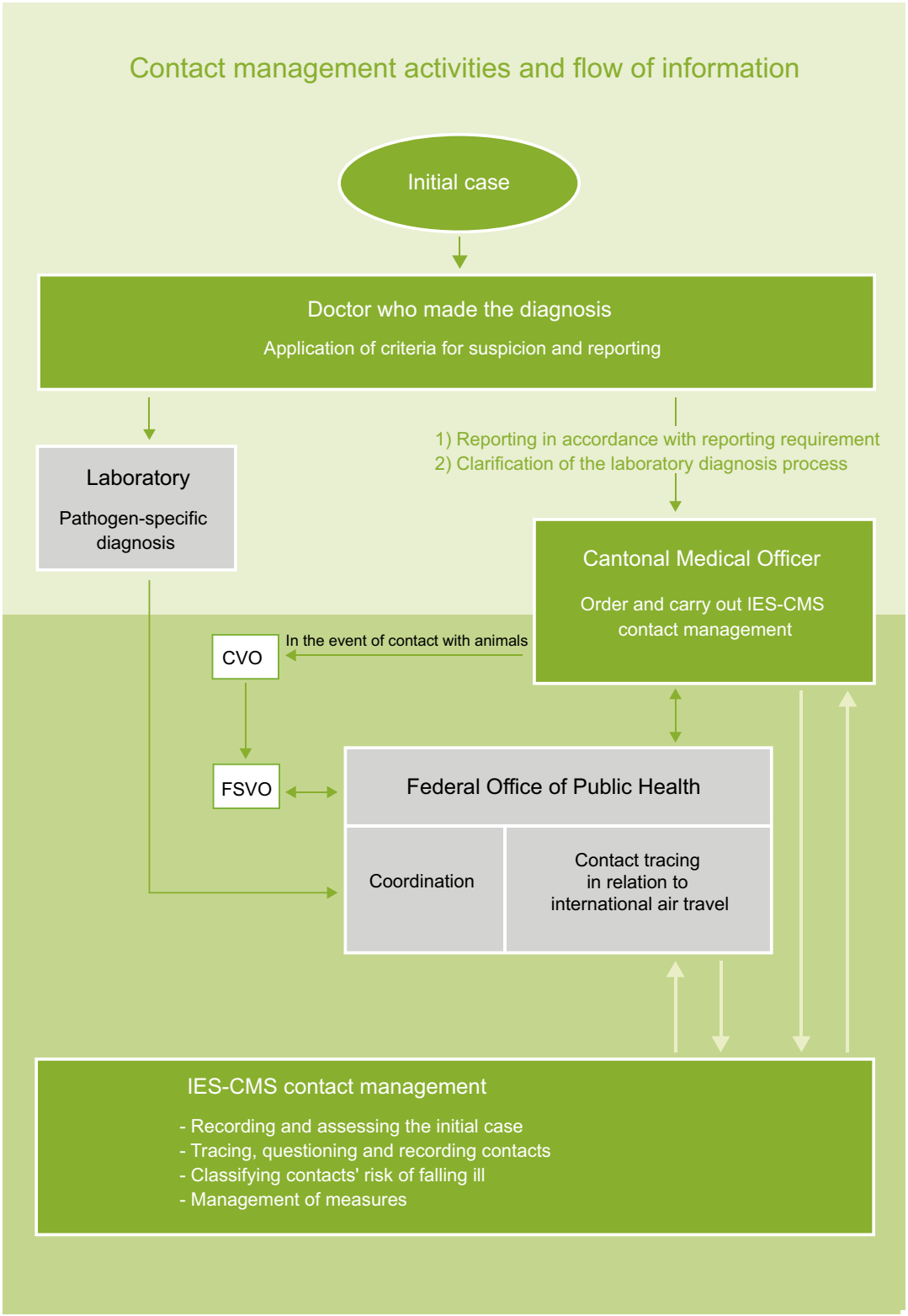

Figure II.4.1: Contact management activities and information flow

Abbreviations: FSVO = Federal Food Safety and Veterinary Office; IES-CMS = Coordinated Medical Services Information and Deployment System; CVO = Cantonal veterinary officer

5.1 Introduction

The closer people are to each other, the higher the risk of transmission. This means that crowds make it especially easy for influenza viruses to pass from one person to another. Social distancing is therefore a simple measure to contain and reduce the impact of a pandemic.

This chapter describes the possible official measures to avoid crowds, such as school closures and bans on events. In the early stage of a pandemic it is also conceivable that the Confederation may have to temporarily restrict access to an influenza-affected area. Social distancing measures affecting individuals are described in chapter II.8, "Behavioural measures".

Measures can only be ordered for as long as is necessary to prevent the spread of a communicable disease

There is no scientific consensus on how useful official social distancing measures are, and the economic consequences (of absenteeism, for example) can be significant.

A wide-ranging introduction of such measures cannot be ruled out for worst-case scenarios but is not really appropriate for moderate situations such as the 2009 pandemic.

The risks of infection must be weighed against the other effects of social distancing

The key principles for making closures or bans on events effective are:

- They should be taken **as soon as possible** at the start of a pandemic (e.g. SARS)[19]
- **Additional hygiene measures** should be adopted (chapter II.8, "Behavioural measures")

5.2 Targets

The measures are recommended, or ordered by the authorities, at the beginning of, and during, a pandemic. Their aims are:

- **Containment:** To reduce the frequency of transmission, break transmission chains and prevent or contain local outbreaks
- **To protect** particularly vulnerable individuals and especially those at greater risk of complications

[19] The problems that can arise from insistence on measures being taken early should be borne in mind here. The scientific evidence for appropriate decisions is often patchy at the early stage of a pandemic, which means that the decisions may not be appropriate.

5.3 Measures

The cantonal health authorities are responsible for investigating outbreaks and ordering the necessary measures, particularly with regard to the protection of individuals at greater risk of complications.[20] **Bans on events and/or school closures are ordered by the cantonal authorities** (cf. chapter 5.3.1, paragraph "Statutory foundations"). Businesses can be required to introduce social distancing (chapter III.8, "Businesses").

The competent cantonal authorities are required to review measures at regular intervals to see whether they are still proportionate

School closures have significant social and economic ramifications (parents having to take time off work, making up lost school time, arranging for alternative options). This measure should therefore only be introduced subject to strict conditions; both the benefits and risks to public health as well as the social and economic consequences must be considered.

Measures must be carefully reviewed beforehand to ascertain whether they are **proportionate**, and they must be uniformly implemented in the cantons. This means that the epidemiological situation in Switzerland and in the international context (location, extent and development of foci, infectivity, groups that are particularly affected), as well as the characteristics of events and schools that might be affected, must be taken into account.

5.3.1 Proactive[21] school closures

School closures can be a sensible option at the early stage of a pandemic – which is also a time when there may be only little public understanding for the measure. However, as the pandemic continues, widespread closures of schools and crèches will no longer have any significant effect on the course of the epidemic and, consequently, on the number of people falling ill.

The public's keen perception of the situation requires uniform communication and implementation of the measure according to uniform criteria. Consequently, **the need for consultation between the cantons and the Confederation** on the implementation of school closures at cantonal, regional or national level is high. The Epidemics Act Coordinating Body assists in this coordination.

Target

Restricting or stopping classes in educational facilities (school closure) is aimed at **containing** and reducing the impact of a pandemic.

Statutory foundations

Under article 40 EpidA, the cantons are responsible for ordering and enforcing school closures and for the necessary intercantonal coordination. The necessary measures can be ordered by the Federal Council, either in consultation with the cantons under article 6 EpidA or directly in an extraordinary situation under article 7 EpidA.

Criteria for widespread school closures (cantonal, regional, national)

Widespread school closures shall be considered only in the event of a severe pandemic, in accordance with the **proportionality principle**. Once the virus is affecting large areas of the country, proactive school closures no longer offer any epidemiological benefit.

The decision to enforce widespread school closures is taken by the Federal Council in response to a national risk assessment by the federal authorities and with input from the cantons.

[20] Art. 30–39 EpidA

[21] This recommendation does not relate to reactive school closures introduced on administrative grounds, for example because large numbers of teachers or pupils are ill.

5.3.2 Reactive school closures

A school closure may be ordered on organisational grounds, e.g. because many teachers and pupils are ill. But the measure should be implemented in accordance with the aforementioned criteria and uniformly communicated. The federal authorities as well as the neighbouring cantons must be involved in implementation.

5.3.3 Conditions for deployment

The following factors need to be taken into account in order for school closures to be as effective as possible:

- Uniform public communication in consultation with the Federal Chancellery
- Early deployment of the measure at the start of the pandemic
- Avoidance of short-term closures (for single days) as they are of no benefit
- Alternative care for children/adolescents must be arranged (off school premises, but preferably not collective)
- Additional hygiene measures
- A concept for making up lost school time must be in place

Table II.5.1: Possible measures relating to social distancing ordered by the authorities

Possible measure	Explanation	Confederation guidelines and recommendations
Preparation	Development of public announcement	FOPH recommendation
Proactive school closures	Proactive school closures should be ordered before significant transmission of the virus among pupils has been observed. Proactive school closures can last for two to four weeks, depending on the progression of the pandemic	FOPH recommendation
Reactive school closures	Reactive school closures occur on organisational grounds because many teachers and pupils are ill. These measures do not have epidemiological containment as their operative goal	
Bans on events	Bans on events relate to large public or private gatherings attended by more than 50 people. Collective bans on events can be ordered for individual or multiple cantons.	
Provisions affecting public-sector and private-sector firms	The competent authority can close down public-sector or private-sector firms or impose specific operational rules (e.g. hygiene measures) on them.	
Restricted areas	The competent authority can impose a ban or restrictions on access to or exit from certain buildings and areas, and on certain activities at defined locations	

5.4 Tasks and powers

The decision to implement official measures is taken by the FOPH on the basis of the national risk assessment. Out of deference to the local and regional situation, it is the cantons that order and carry out the measures. They coordinate their respective measures and implement them uniformly in accordance with the Confederation's recommendations.

Measures may only be ordered **for as long as is necessary** to prevent the spread of a communicable disease.[22]

Table II.5.2: Tasks and powers of the Confederation and the cantons

Stakeholder	Tasks and powers
FOPH	Determining the point at which official social distancing measures can be implemented
	Developing recommendations: • For the population and potential event organisers • On school closures • On authorisations of and bans on events
	Coordinating measures at international level in cooperation with the WHO and the ECDC
Federal Crisis Management Board	Coordinating[23] measures in the interests of uniform enforcement, e.g. in the case of events involving multiple cantons
Cantons	• Ordering school closures • Ordering bans or restrictions on events • Coordinating with other cantons • Providing information to the health authorities of cantons indirectly affected by an event (transit, large number of participants) • Exchanging information with other cantons and the FOPH
Organisers	• Statutory duty to cooperate with official guidelines • Finding out whether authorisation is required; timely initiation of procedure

5.5 Liability for losses in the event of measures affecting the population

The state is liable for losses incurred by private event organisers or businesses as a result of measures affecting the general population only if the conditions for state liability are met (state liability Art. 146 Cst.; cf. Art. 3 ff. of the Government Liability Act of 14 March 1958; SR 170.32).

As a matter of principle, the state is liable only for losses caused in contravention of the law. Losses caused by lawful state action must be borne by the parties concerned, unless specific compensation is provided for by law. The Epidemics Act does not contain any such provision for compensation for losses caused as a result of health measures imposed on the population.

[22] Art. 40 para. 3 EpidA

[23] Detailed technical and policy agreements with the cantons are needed to prepare for decisions to be taken by federal organisational units. These agreements are drawn up by the Epidemics Act Coordinating Body and the Swiss Conference of the Cantonal Ministers of Public Health (cf. chapter I.3.2 and the introduction to part II).

6.1 Introduction

Influenza pandemics put severe strain on various parts of the health system, and additional resources for pandemic management are required at the federal and cantonal levels. Depending on the nature of the new pandemic virus, additional intensive care beds for children may be needed in hospitals. The 2009 pandemic showed that in addition to medical services there is a massive rise in the general population's need for counselling, which can only be provided if existing staff work much longer hours or additional staff are recruited.

The cantons are responsible for implementing measures to guarantee medical care for patients. The cantons, in collaboration with the FOPH, are primarily responsible for the supracantonal coordination (regional and/or national level). The Swiss cantonal medical officers participate in the coordination efforts. The Coordinated Medical Services (CMS) ensures coordination in situations of heightened need. The CMS ensures that the wide range of organisations and institutions work together in harmony as soon as the resources normally available to deal with an event prove insufficient. The CMS is the federal competence centre for coordinating the deployment and use of resources (staff, equipment and facilities) available from civilian and military agencies that are responsible for planning, preparing and carrying out medical service measures in a manner appropriate to the current stage.

One way to determine the **medical services sector status** is through the web-based CMS application **Blue Screen Switzerland (BSS)**.[24] The system gathers the necessary data by surveying health system service providers. Where necessary, assistance can be requested from the service providers and used in strategic planning.

All involved stakeholders, in particular the cantonal medical officers, must contribute to the necessary preparation and the supracantonal coordination. The concept of such coordination as well as the roles of the respective partners remain to be resolved – they will be defined as soon as the CMS actually assumes the task of supracantonal coordination.

The purpose of the CMS coordination is to ensure that all patients receive the best possible medical services in all situations

Chapter III.7 provides more details and tools for calculating resources and capacities.

Designated hospitals: The cantonal authorities designate certain hospitals as being responsible for the care of patients thought to be infected with the new influenza virus subtype. It is not necessary for all hospitals to be equipped for this task right from the start. This transfer of responsibility to selected hospitals is intended to centralise competences and the necessary facilities and relieve the burden on the rest of the health system so that it can respond more flexibly.

In the designated hospitals, infected patients and those suspected of being infected will be kept separate from the usual chain of care for the entire period of their contagiousness.

[24] The BSS tool was successfully tested in a pilot phase in the cantons of Bern, Fribourg, Neuchâtel and Solothurn. The CMS is expected to make it available for use as from 1 January 2018.

6.2 Measures

The general measures for handling patients (accommodation, isolation and medical care) must be known and operational. Without going into any detail, they include:

- Identification of infected individuals
- Implementation of immediate measures (chapter II.7, "Separation measures")
- Transport to the designated hospitals (in consultation with the cantons)

Before a pandemic occurs, other preparatory activities for handling patients must be organised in the designated hospitals in addition to the general measures (isolation and medical care). The measures stipulated in the plan must be ensured in the other medical establishments.

Adequate capacities (i.e. inpatient treatment facilities) are needed in hospitals and sociomedical institutions during a pandemic, in the form of declared areas in hospitals or in designated hospitals (according to the cantonal plans).

As a general rule, the anticipated need for additional therapeutic products (drugs, medical devices and other items) must be taken into account in the planning.

6.3 Tasks and powers

Detailed planning is a matter for the hospitals and sociomedical institutions under the supervision of the cantonal authorities. They are responsible for taking specific factors, such as the nature and size of the institution, patient profiles, local features and cantonal instructions, into account in their planning. A checklist is provided in chapter IV.1.

7.1 Introduction

Quarantine and isolation are official measures used to contain communicable diseases. The purpose of **quarantine** is to separate individuals who have been exposed to a risk of contagion (suspected cases, contacts) but who are not sick and do not exhibit any symptoms. **Isolation** is the separation of sick or infected individuals. A person in quarantine who becomes sick should be isolated.

Separation measures can, in principle, be used for any communicable disease (especially those involving as yet unknown pathogens). Their usefulness depends primarily on the properties of the pathogen. For example, many people were placed in quarantine in Asia and Canada during the SARS outbreak in 2002/2003. Subsequent investigations showed that these measures were a crucial factor in the rapid containment of this highly infectious disease.

Individuals who need to be separated should predominantly be kept in their own home. Transfer to other suitable premises, such as hospitals, only becomes necessary if the accommodation at home is not adequate or not possible in order to effectively prevent further spread of the disease. This is particularly the case if the risk of transmission as a result of contact is high and the consequences of illness are regarded as significant.

7.2 Targets

- Protecting vulnerable individuals (risk groups) and medical personnel
- Preventing transmission in a medical setting
- Reducing the reproduction rate and, consequently, further spread
- Saving time through mitigation

7.3 Situations in which separation measures can be imposed by the authorities

Official separation measures should always be proportionate and needs-based. Separation is of little benefit in the case of the influenza virus simply because of its high reproduction rate. In addition, infected individuals are already contagious before any symptoms manifest. Separation of these individuals can therefore only be considered if the likelihood of their having been infected is actually known.

Separation measures are cost- and labour-intensive; their benefits should, therefore, be weighed on a case-by-case basis. Proportionality is determined by many factors, not simply the severity of the disease. Widespread measures should only ever be considered at a very early stage of a pandemic, when the containment of isolated outbreaks can buy time. Compulsory quarantine during a mild influenza pandemic, however, is hardly proportionate.

[25] The terms "quarantine" and "isolation", which are in common international use, are employed in this chapter. In contrast, the EpidA terms isolation "separation" and does not use the overarching term "separation measures".

7.4 Voluntary quarantine

In contrast, isolated instances of voluntary quarantine can be useful even during a mild pandemic, for example if the sick person has a vulnerable relative. Campaigns and multipliers are to be used as part of the risk and crisis communication to raise awareness among the population.

7.5 Statutory foundations: Liability for losses due to measures affecting individuals

Under the terms of article 35 in conjunction with article 31 EpidA, it is the responsibility of the cantons to order quarantine. The only exceptions to this are orders issued by the Confederation relating to individuals entering or leaving the country (Art. 41 para. 3 and 4 EpidA) and situations covered by articles 6 and 7 EpidA (particular or extraordinary situation). As part of its oversight role in the enforcement of federal law, the Confederation can specifically instruct the cantons to take certain measures in given situations. For example, in the context of containment measures in the early stage of a pandemic, it can require suspected cases to be separated or placed under quarantine according to uniform criteria. **The costs of these measures affecting individuals are borne by the authority ordering them**, unless the costs are otherwise covered, for example by social insurance (Art. 71 let. a and Art. 74 para. 2 EpidA).

The Epidemics Act contains a catch-all provision that acts as the statutory foundation for compensation of consequential losses that may arise in connection with quarantine or isolation. Article 63 EpidA allows, but does not compel, the Confederation and the cantons to pay compensation for consequential losses associated with such measures.

(Equity) compensation is to be granted if the person affected by a measure affecting individuals suffers a loss that is not otherwise covered (by the employer, healthcare insurance provider, other social insurance, etc.) and would suffer financial or social hardship if compensation were not forthcoming. The consequential losses covered by this provision include loss of salary, loss of income and other costs immediately related to the ordered measure (e.g. costs of missed flights). The consequential losses are made good by the authority which ordered the measure (competent federal or cantonal authority).

Article 328 para. 2 CO: In order to safeguard the personal safety, health and integrity of his employees [the employer] must take all measures that are shown by experience to be necessary, that are feasible using the latest technology and that are appropriate to the particular circumstances of the workplace or the household, provided such measures may equitably be expected of him in the light of each specific employment relationship and the nature of the work.

Article 324a paragraph 1 of the Code of Obligations (CO) requires employers to continue paying an employee's salary for a limited time in cases such as illness, accident or the fulfilment of statutory duties. The imposition of quarantine or isolation by government authorities comes under the heading of "fulfilment of statutory duties", and employees who contract a communicable disease are not normally at fault. According to article 324a CO, the conditions governing the obligation to continue paying an employee's salary need to be examined on a case-by-case basis.

If the employer's obligation to continue paying the employee's salary expires and neither the canton or Confederation nor any other source provides compensation for loss of earnings (e.g. depending on the situation, voluntary daily allowance insurance under the Federal Act on Health Insurance [HInsA], private insurance), such loss must be borne by the affected individual.

The terms of employment may also entitle employers to instruct ill employees to stay at home to protect the health of other employees (cf. Art. 328 CO). Employers who issue such orders must ensure that the employee continues to receive his or her pay or is compensated for loss of earnings.

7.6 Recommendations

Table II.7.1: Quarantine and isolation recommendations

	Quarantine	Isolation
Risk and crisis communication	The population is to be made aware of separation measures via: • A campaign (chapter II.2) • Attending doctors, general practitioners • Other multipliers	
Targets	Individuals who have been exposed to the risk of infection (suspected cases, contacts) but who are not sick and do not exhibit any symptoms	Sick/infected individuals, especially in sociomedical institutions used by vulnerable groups
Implementation scenarios	• Early stage of a pandemic • Severe pandemic • Depending on the situation, taking account of vulnerable individuals with whom the target comes into contact	Depending on the situation, taking account of vulnerable individuals in sociomedical institutions
Recommendation, ruling, order	• FOPH recommendation on the basis of the national risk assessment • Ruling by the cantonal medical officer • Order by the attending doctor	
Implementation	• At home • Alternatively, in a suitable sociomedical institution	• In mild cases, at home • In severe cases, in suitable isolation wards in hospitals and other sociomedical institutions
Capacities, number of places	Between a few dozen and several hundred places throughout Switzerland	
Duration of measure	• Ends with laboratory confirmation • Max. ten days[26]	Depending on the severity of the condition and the sick person's immune status
Possible behavioural measures to be taken by targets	• Stay at home and be reachable during the quarantine period • Take temperature regularly • Observe other members of the household • Adhere to behavioural measures described in chapter II.9	

[26] Depending on the incubation period of the new influenza virus and the time of likely exposure

8.1 Introduction

Individual risk reduction can also minimise the risks to family, neighbours and society as a whole

This chapter describes behavioural and hygiene measures that can be taken by anyone. Individual behavioural measures also include social distancing when not at work or school (chapter II.5, "Social distancing").

Behavioural recommendations issued by the Confederation (see pictograms) are designed to provide information and raise public awareness and personal responsibility. **Responsible behaviour is the principal contribution each individual can make to preventing and mitigating a pandemic.**

Awareness-raising measures are implemented early and continuously throughout the seasonal flu campaign, and stepped up at the first warning signs. Behavioural measures should be complied with throughout the pandemic.

For measures relating to contact with animals, see the relevant recommendations of the Federal Food Safety and Veterinary Office (FSVO).

8.2 Targets

Hygiene measures are aimed at:

- Reducing person-to-person transmission and limiting the transmission and spread of pathogens
- Individuals exhibiting personal responsibility in protecting themselves and others against infection
- Reducing the disease burden in the population
- Sparing health system resources

8.3 Measures

This chapter follows on from chapter II.2. Table II.8.1 specifies the content of crisis communication where it relates to behavioural recommendations for the population.

Hygiene pictograms

Table II.8.1: Possible contents of behavioural recommendations for the population

Behavioural aspect	Behavioural measures	Confederation recommendation
Personal hygiene	• Wash your hands frequently and thoroughly with soap and water. See chapter II.9 for the use of disinfectants • Wash your hands after sneezing, coughing or blowing your nose • Sneeze into a paper tissue if possible, or into the crook of your arm if you do not have a tissue • Use disposable tissues that you can throw away after use	FOPH recommendation Campaigns
Social distancing	• Stay at home if you exhibit flu symptoms (temperature above 38°C and a cough, sore throat or shortness of breath) • Don't shake hands when greeting someone or saying goodbye • Keep at least one metre away from others • Do not touch your own or other people's mouth, nose or eyes • Avoid crowds	FOPH recommendation
Disinfection	• Frequently and thoroughly clean objects and surfaces that may have become contaminated with the respiratory secretions of people who might have influenza, using commercial household cleaning products • Ventilate contaminated rooms to reduce the number of viruses in the air	Chapter II.9
Hygiene masks	Use hygiene masks when recommended	FOPH recommendation Chapter II.10
Vaccination	Seasonal or pandemic vaccination	Chapter II.12 Vaccination advisory

8.4 Tasks and powers

Table II.8.2: Tasks and powers of the Confederation, cantons and other stakeholders

Stakeholder	Tasks and powers
Federal Crisis Management Board	Coordination[27] of the deployment of resources and communication[28] between the cantons and the Confederation in the interests of uniform enforcement
FOPH	• Announcement of the start and end of information campaigns • Planning and execution of information campaigns • International coordination of communication in cooperation with the WHO/ECDC • Coordination within the Federal Administration. Internal links between the FOPH and affected departments (infectious diseases, campaigns, etc.), and with the FSVO in the case of zoonoses. • Involvement of partners such as Spitex, the Lung League, etc. • Development of recommendations for hygiene measures and other behavioural measures in cooperation with the cantonal authorities • Support for cantons and institutions in devising specific behavioural recommendations
Cantons	• Support for federal information campaigns, which can be adjusted to reflect canton-specific conditions • Distribution of information material • Involvement of multipliers • Implementation of cantonal information campaigns • Local and regional information campaigns in consultation with the competent cantonal medical officer and in coordination with neighbouring cantons • International coordination of behavioural recommendations in border areas
Businesses	• Statutory duty of cooperation • Additional useful measures (e.g. disinfectant hand cleansers) can be implemented in addition to the FOPH recommendations on premises where hygiene is particularly important, such as hospitals, food-handling businesses, etc.
Population	Everyone adheres to behavioural measures to protect themselves and others

[27] Detailed technical and policy agreements with the cantons are needed to prepare for decisions to be taken by federal organisational units. These agreements are drawn up by the Epidemics Act Coordinating Body and the Swiss Conference of the Cantonal Ministers of Public Health (cf. chapter I.3.2).

[28] Either the FOPH or the FDHA or the Federal Chancellery, which are members of the Federal Crisis Management Board, coordinates the information.

9.1 Introduction

This chapter describes how the population should use disinfectants in the event of a pandemic. It does not cover the use of disinfectants in institutions.

9.1.1 Hand hygiene

Thorough handwashing with soap and water is a very effective way of reducing influenza viruses.[29] Handwashing is the ideal hand disinfection method for the general public (chapter II.8), but it depends on access to suitable facilities, which are not always available. If soap and water are not available, suitable disinfectants can be considered as an alternative.

9.1.2 Household objects and surfaces

Frequent and thorough cleaning with commercial household cleaning products is sufficient to disinfect household objects and surfaces that may have been contaminated with the respiratory secretions of infected individuals.

9.1.3 Stockpiles

Switzerland has adequate production capacity for disinfectants, which can be stepped up if necessary to cover the increased demand in the event of a pandemic. Consequently, there are no compulsory stockpiles of disinfectants.

However, a sudden increase in demand for disinfectants can lead to temporary shortages because manufacturers are unable to increase production quickly enough (especially due to limited filling capacity and container availability) and logistics services need time to adjust to the increased demand.

When there is a shortage, the market will have to give priority to the healthcare sector, which can make it difficult for other institutions and the general population to obtain disinfectants. A minimum reserve, to be held by manufacturers and suppliers, should be built up ahead of a looming pandemic to help avoid a possible bottleneck. Since disinfectants have a very long shelf life, they also lend themselves to individual stock-keeping as part of a personal preparedness plan.

9.1.4 Efficacy of disinfectants in improving hand hygiene

All disinfectants that were tested on viruses and approved by the FOPH are effective against a pandemic influenza virus. Given the generally low resistance of influenza viruses, all standard alcohol-based disinfectant hand cleaners are effective, provided their composition is at least as follows:

- 70%–80% ethanol [CAS no. 64-17-5] or
- 60%–80% isopropanol [CAS no. 67-63-0] or 1-propanol [CAS no. 71-23-8]
- 60%–80% blend of these alcohols

[29] Antiviral Efficacy of Hand Hygiene, Clinical Infectious Diseases 2009: 48 pp. 285–291

9.2 Targets

The use of disinfectants can:

- Protect people from infection irrespective of the availability of suitable facilities (e.g. on public transport, at events, in public buildings)
- Achieve the same ends as other behavioural measures (chapter II.8) by
  - reducing person-to-person transmissibility
  - restricting the transmission and spread of pathogens
  - ensuring that everyone protects themselves and others against infection
  - reducing the disease burden in the population
  - sparing health system resources

9.3 Measures

Table II.9.1: Use of disinfectants when hand-washing facilities are unavailable or available in insufficient numbers

Behavioural aspect	Behavioural measures	Confederation recommendation
Hand disinfection	At least 3ml of disinfectant should be used each time. It is vital that the disinfectant is applied correctly[30] and left to work for as long as necessary	WHO recommendation FOPH recommendation
Procurement and storage for the population	• Healthy individuals can buy disinfectant from retailers (e.g. pocket-sized bottles)[31] • It may be advisable for individuals to stock up	FOPH recommendation FONES recommendation
Procurement and storage for healthcare institutions	• On the order of the FONES, importers and producers set aside minimum stocks and supply, on a priority basis, healthcare institutions in case of a pandemic	FONES order
Procurement and storage for businesses in general	• Planning and setting up stocks for hand disinfectant dispensers to protect employees who frequently come into contact with customers and in key areas, in accordance with business continuity management (BCM)	Manual for workplace preparedness; SECO

[30] WHO poster: How to Handrub: www.who.int/gpsc/5may/How_To_HandRub_Poster.pdf

[31] FONES recommendation on emergency supply: www.bwl.admin.ch/bwl/en/home/themen/notvorrat.html

9.4 Tasks and powers

Table II.9.2: Tasks and powers of the Confederation, cantons and other groups

Stakeholder	Tasks and powers
FOPH	• Recommendation on the use of disinfectants in the event of a pandemic • Planning, implementation and coordination of campaigns aimed at the population and the business community
FONES	• Manufacturers' obligation to plan resources and set aside minimum stocks • Recommendation on individual stock-keeping of disinfectants during a crisis
Cantons	• Market monitoring • Provision of information to businesses and the population
Manufacturers	• Capacity and resource planning as directed by the FONES
Businesses	• Planning the use of disinfectants to protect employees if number of available hand-washing facilities is inadequate • Giving staff information on correct use
Population	• Use of disinfectants if number of available hand-washing facilities is inadequate • Personal provision

10 Protective masks and examination gloves

10.1 Introduction

Protective masks reduce the risk of transmission and can, therefore, be used throughout the pandemic wave. However, the level of protection they provide varies considerably according to the type of mask and the nature of exposure.

A distinction is drawn between two types of masks:

- Hygiene masks (type II or IIR surgical masks). Although hygiene masks also protect the wearer, their main purpose is to protect others (collective protection effect). Their use makes sense only as an add-on in combination with other hygiene measures (chapter II.8, "Behavioural measures") and social distancing (chapter II.5, "Social distancing")
- Filter masks (FFP1, FFP2, FFP3). Filter masks are designed primarily for medical personnel exposed during the course of their work, for example in hospitals. Their main purpose is to protect the wearer from infections. This chapter touches only briefly on filter masks

10.1.1 Protective effect of hygiene masks

The use of hygiene masks in crowds offers protection in two ways. Firstly, they can reduce the spread of germs via droplet infection from people who are already infected; secondly, they can offer healthy individuals a certain degree of protection from infection. This reduces the general risk of infection.

Some experimental studies have shown that hygiene masks offer some protection from viral exposure. Experience with SARS in 2003 and an influenza outbreak at Geneva University Hospital in 2012[32] provides some indication that hygiene masks can reduce the transmission of viruses.

10.1.2 Indications

General public

Given the experience of the 2009 pandemic, acceptance of hygiene masks among the Swiss population is relatively low. This could, however, change rapidly if circumstances were different (increasing threat, use of hygiene masks in neighbouring countries). The following four factors need to be taken into account when considering the appropriate situations for the general public to wear hygiene masks:

- Availability
- Epidemiological benefit
- Mask efficacy
- Severity of the pandemic or the disease

[32] Pagani L et al. Transmission and Effect of Multiple Clusters of Seasonal Influenza in a Swiss Geriatric Hospital. J Am Geriatr Soc. 2015 Apr 63(4): 739-44

The specific situations in which hygiene masks should be used cannot be defined until the future pandemic virus and its specific transmission properties are known. If a pandemic occurs, the FOPH will inform the public about the use of hygiene masks (where, how and in what situations they should be used).

Children

Experience has shown that infants and young children do not tolerate hygiene masks. **In case of discomfort (e.g. shortness of breath), it is vital that individuals wearing hygiene masks are always able to remove their mask themselves.** In addition, since young children are able to comply with the additional hygiene measures only to a limited extent, hygiene masks are not recommended for them.

Ill or potentially ill individuals

During a pandemic, individuals who have contracted the pandemic influenza and those who might be infected should wear a hygiene mask whenever they are in contact with other people (e.g. when seeing a doctor or pharmacist).

Healthcare personnel exposed during the course of their work

Recommendations on the use of hygiene masks or filter masks (FFP1/2/3) for medical personnel are based on the degree of exposure and the epidemiological situation (cf. table II.10.1 and recommendations).

10.1.3 Stockpiles

By federal order, companies currently keep a compulsory stockpile of around 190,000 FFP2/3 masks. There is no requirement to hold stocks of hygiene masks.

Minimum requirements have been determined, and corresponding recommendations developed, to ensure supplies of hygiene masks for the health system during a 12-week pandemic. Recommendations on stock-keeping stipulate the minimum protection provided by hygiene masks. Whether a certain percentage of the recommended stockpile is kept in FFP2/3 masks, and how much, is at the discretion of the respective organisations, which will base that decision on their own experiences. Table II.10.1 summarises the recommendations for inpatient as well as outpatient use. It is in the organisations' individual responsibility to implement these recommendations.

Table II.10.1: Recommendations on stockpiling of protective masks

	Area	Recommendation
Inpatient	Hospitals	Assumption: Normal usage is reduced by 35% during a pandemic • **Inventory coverage of 4½ months of normal** hygiene mask* **usage**
Inpatient	Retirement and nursing homes, socio-medical institutions, institutions for children	Assumption: Single-bed rooms; duration of illness 7 days for adults, 21 days for children (0–14 years) • **Inventory coverage of 3 months of normal** hygiene mask **usage** • Additionally: **stockpile of 14 hygiene masks* per bed** for adults, 84 hygiene masks per bed for children (0–14 years)
Outpatient	Doctors' surgeries	Assumption: Duration of pandemic 12 weeks, 4 masks per day per person coming into contact with patients, 7 days per week • **Stockpile of 336 hygiene masks* per person** coming into contact with patients**
Outpatient	Pharmacies	Assumption: Duration of pandemic 12 weeks, 4 masks per day per person coming into contact with customers, 7 days per week • **Stockpile of 336 hygiene masks* per person** coming into contact with customers**
Outpatient	Rescue services	Assumption: Duration of pandemic 12 weeks, one quarter of trips pertaining to flu patients • **Inventory coverage of 4 months of normal usage**, of which 3 months covering normal usage, and 1 additional month for transporting flu patients
Outpatient	Spitex	Assumption: Duration of pandemic 12 weeks, duration of illness 7 days, 4 masks per person coming into contact with patients, 7 days per week • **Stockpile of 125*** hygiene masks* per person** coming into contact with clients or patients.** Need will likely increase with increased changing of masks
Others	Swiss population	**50 hygiene masks per person** as a personal emergency supply [33]

* Or FFP2/3 masks, at the discretion of the respective organisations ** Full-time position *** Number of contacts per full-time position

Table II.10.2: Summary of the use of protective masks

Group	Stage, purpose	
	Contact management, containment	Mitigation
Directly exposed medical hospital personnel	FFP2/3[a] / hygiene mask	FFP2/3[a] / hygiene mask
Community-based healthcare personnel[b]	FFP2/3[a] / hygiene mask	FFP2/3[a] / hygiene mask
Ill individuals at home and their contacts	Hygiene mask[c]	Hygiene mask
Healthy population	–	Hygiene mask[d]

[a] Healthcare personnel should always wear FFP2/3 masks, if available, whenever they are exposed to a high risk of infection throughout the pandemic (e.g. when carrying out work generating aerosols, intubation, close contact with suspected cases [transport, nursing, clinical examination, etc.]).
[b] Including pharmacies and nursing staff in sociomedical centres and facilities (retirement and nursing homes, Spitex, etc.).
[c] This applies to contacts unless the sick people have already been hospitalised/isolated by this stage.
[d] Hygiene masks are not generally needed except in specific situations where their use is recommended by the FOPH.

[33] FOPH recommendations on emergency supply and use, plus FONES recommendation: www.bwl.admin.ch/bwl/en/home/themen/notvorrat.html

10.2 Targets

Reducing the risk of transmission by reducing the number of viruses present in the environment.

10.3 Measures

Table II.10.3: Possible measures

Possible measure	Explanation	Confederation guidelines and recommendations
Preparation	• Information campaign on the use of hygiene masks; coordination with the hygiene campaign • Communication preparations have been made (shortages, prioritisation) • Needs in the event of a pandemic have been assessed	
Procurement and storage for institutions	• Adequate supplies have been secured by setting up compulsory minimum stockpiles and individual stocks • Employees are provided with protective masks by their employers (in businesses where there is a risk of exposure)	Table II.10.1: Recommendations and statutory guidelines issued by the Confederation (FONES, FOPH) on stock levels
Procurement and storage for the population	• The population should procure personal provisions of 50 hygiene masks per person	FOPH recommendations on stock levels and use

10.4 Tasks and powers

Table II.10.4: Tasks and powers of the Confederation and the cantons

Stakeholder	Tasks and powers
Federal Crisis Management Board	Coordination[34] of measures in the interest of uniform enforcement
FOPH	• International coordination of communication in cooperation with the WHO/ECDC • Coordination within the Federal Administration. Internal links between the FOPH and affected departments (infectious diseases, food safety, campaigns, etc.), and with the FSVO in the case of zoonoses • Development of recommendations on the use of protective masks • Support for cantons and businesses in the development of specific recommendations • Planning, implementation and coordination of campaigns
FONES	• Implementation and monitoring of compulsory stockpiles • Decision on purpose and target groups for FFP2/3 masks from compulsory stockpile (in collaboration with FOPH)
Cantons	• Support for federal campaigns; carrying out cantonal information campaigns and communication of canton-specific behavioural recommendations • Regulation on and monitoring of rules governing the procurement, storage and supply of various protective masks to hospitals and community-based healthcare personnel
Businesses	• Adherence to statutory duty of cooperation • Providing information to personnel regarding the correct use of the masks
Population	Compliance with the behavioural measures for individuals to protect themselves and others

[34] Detailed technical and policy agreements with the cantons are needed to prepare for decisions to be taken by federal organisational units. These agreements are drawn up by the Epidemics Act Coordinating Body and the Swiss Conference of the Cantonal Ministers of Public Health (cf. chapter I.3.2 and the introduction to part II).

10.5 Examination gloves

Examination gloves are manufactured in the Far East. In the event of a pandemic, supply of gloves is likely to be interrupted for three to six months.

Recommendations for minimum stockpile quantities have been determined in order to best ensure supplies of protective gloves during a 12-week pandemic. Decisions on size and composition of the examination gloves (latex, vinyl or nitrile) are at the discretion of the respective organisations and based on their own experiences.

The table below summarises the recommendations for inpatient as well as outpatient use. It is in the organisations' individual responsibility to implement these recommendations. In addition to the recommendations, strict adherence to additional hygiene measures is required (chapter II.8., "Behavioural measures"):

Table II.10.5: Recommendations on stockpiling of examination gloves

	Area	Recommendation
Inpatient	Hospitals	**Inventory coverage of 3 months of normal usage**
	Retirement and nursing homes, socio-medical institutions, boarding schools	Assumption: Single-bed rooms; duration of illness 7 days • **Inventory coverage of 3 months of normal usage** • Additionally: **28 examination gloves per bed for adults, 168 examination gloves per bed for children (0–14 years)**
Outpatient	Doctors' surgeries	Assumption: Duration of pandemic 12 weeks, 15 contacts with 2 examination gloves per day per person** coming into contact with patients **2500 examination gloves per person** coming into contact with patients**
	Pharmacies	No recommendation on stockpiling. Promote proper hand hygiene and general behaviour measures
	Rescue services	Assumption: Duration of pandemic 12 weeks, one quarter of trips pertaining to flu patients • **Inventory coverage of 4 months of normal usage**, of which 3 months covering normal usage, and 1 additional month for transporting flu patients
	Spitex	**Inventory coverage of 3 months of normal usage**
Others	Swiss Population	No recommendation on stockpiling. Promote proper hand hygiene and general behaviour measures

* These recommendations include adherence to additional hygiene measures in all areas. ** Full-time position

11.1 Introduction

11.1.1 Use

Antiviral drugs (neuraminidase inhibitors) can be used at any stage (start of a pandemic, pandemic) for treatment or prevention (= prophylaxis) and thus are part of the package of medical measures used to **contain** or **mitigate** the impact of a pandemic. They can be used as prophylaxis mainly in the early stages until vaccines become available.

Antiviral drugs can be supplied on prescription only. While their efficacy in controlling influenza infections and reducing the risk of complications has been established, it is limited. Guidelines issued by the WHO[35] and the Swiss Society for Infectious Diseases (SSI) recommend that they generally be used sparingly. These recommendations comprise preventive administration (to directly exposed healthcare personnel) and therapeutic administration to at-risk individuals and hospitalised patients in particular. **Widespread use of antiviral drugs should be avoided as it makes the development and spread of resistant strains more likely.[36]**

11.1.2 Fulfilment of demand, stockpiles, logistics

The aim is to meet the demand for antiviral drugs through normal distribution channels for as long as possible.

Experience during the 2009 pandemic shows that demand can rise rapidly to very high levels even in a mild pandemic. In order to cope with anticipated supply shortages in volatile situations, Switzerland has two federally managed stockpiles available: the compulsory stockpile[37] of oseltamivir and the emergency reserve (until 2019). These stocks can be dipped into when normal commercial capacity is no longer sufficient, i.e. when there is a shortage or cantonal stocks (hospital reserves) are exhausted.

Compulsory stockpile levels meet the demand for Tamiflu® throughout Switzerland in the event of a pandemic

The make-up of the compulsory stockpiles permits at any time to make large volumes of ready-for-sale ten-packs of Tamiflu® available to the market via the existing channels (non-quota-based distribution).

Tamiflu® from the compulsory stockpile will be supplied to cantons on a quota basis if prophylaxis of healthcare personnel is recommended. Procurement and coordinated distribution to a small number of selected reception points is managed by the Confederation following the logistics model for pandemic vaccines. Batches ordered are paid for in advance by the Confederation. The cantons are responsible for onward distribution from the cantonal reception points.

[35] WHO Guidelines for Pharmacological Management of Pandemic Influenza A(H1N1) 2009 and other Influenza Viruses, Feb. 2010
[36] Detailed information on the use of antiviral drugs is available in patient information leaflets and in part IV.
[37] Switzerland is the only country to hold a compulsory stockpile of Tamiflu®. The costs are reimbursed to the compulsory stockpile holder (Roche) from an industry-supported guarantee fund. The Confederation does not incur any costs as a result of the compulsory stockpile system.

The emergency reserve is held in the Armed Forces Pharmacy and consists of 40,000 packs of Tamiflu® 75mg (adults) and 9,000 packs of Relenza® 5mg (children and adults). The emergency reserve of Tamiflu® is no longer required, thanks to the flexibility of the compulsory stockpile scheme. Consequently, no new supplies will be purchased once the expiry date has passed.[38]

After consulting with the FOPH, cantonal medical officers will contact the on-call service of the Armed Forces Pharmacy to obtain supplies from the emergency reserve. Army transport units will take the drugs directly to the place designated by the canton. This will take two to four hours.

11.1.3 Efficacy

The efficacy of Tamiflu® is critically examined on a regular basis by various groups and discussed in the media. The last time the efficacy of Tamiflu® was examined was in meta-analyses published between 2012 and 2014, but this research did not present any fundamentally new facts. Those studies thus do not currently have any impact on the strategy of neuraminidase inhibitor deployment.

11.2 Targets

The aims of treatment and prophylaxis with antiviral drugs are the same in all pandemic stages:

- To delay the spread of the new virus in the early stages of a pandemic
- To protect healthcare personnel and at-risk individuals (pre-exposure prophylaxis)
- To protect individuals in direct contact with infected animals or people following exposure (post-exposure prophylaxis)
- To reduce the risk of pulmonary complications in cases of influenza
- To reduce hospitalisations and fatalities

11.3 Measures

- Treatment of individuals with suspected or confirmed infection with a new influenza subtype
- Post-exposure prophylaxis for individuals who have come into contact with a person or animal infected with a new influenza subtype (contacts)
- Pre-exposure prophylaxis of exposed individuals and, if necessary, healthcare or animal disease control personnel

[38] Expiry dates of drugs in the emergency reserve: Tamiflu® 75mg 31/01/2019; Relenza® 5mg 31/05/2019

Table II.11.1: Possible measures

Possible measure	Explanation	Confederation guidelines and recommendations
Preparation	• Provision of resources	Art. 8 EpidA
	• Communication planning (on topics such as resistance, distribution problems, destruction)	

	• Definition of distribution of material stockpile holder's central stores to the cantons
	• Definition of reception points and interfaces for logistics agreements
	• Definition of distribution channels and the directing of drug flow within the cantonal area:
	  • in the case of quota-based compulsory stockpile release
	  • when material is taken from the federal emergency reserve	

Pre-exposure prophylaxis	• Prophylactic treatment of exposed individuals and healthcare personnel	FOPH/SSI recommendation
	• Prophylaxis for animal disease control personnel	FSVO recommendation
Post-exposure prophylaxis	• Post-exposure prophylaxis of contacts in the context of contact management	FOPH/SSI recommendation
Treatment	• Inpatient treatment of individuals with suspected or confirmed infection	FOPH/SSI recommendation
Monitoring	• Monitoring the correct use of neuraminidase inhibitors • Monitoring the development of resistance to antiviral drugs	
Exchange of information/ evaluation	Information on enforcement, efficacy, adverse effects, resistance; interaction between the cantons and the FOPH is desirable	

11.4 Tasks and powers

Ideally, antiviral drugs should be supplied via the normal distribution channels for as long as possible while demand can be covered without the introduction of quotas. Once quotas are introduced, the Confederation is in charge of the distribution of Tamiflu® from the compulsory stockpiles to the cantonal reception points. The distribution process will be paid for in advance and coordinated by the Confederation.

With the advance payment the Confederation bears the financial risk (of drugs not being sold), thus ensuring accelerated delivery. It is reserved for situations where the normal supply system (the market, including release of drugs from compulsory stockpiles without a quota system) is no longer able to cover the demand from sociomedical facilities.

Table II.11.2: Tasks and powers

Stakeholder	Tasks and powers
Armed Forces Pharmacy	• Concluding contracts with manufacturers and logistics firms • Managing the emergency reserve • Transporting emergency reserve drugs to cantonal reception points • Monitoring and ensuring distribution/delivery of drugs from the emergency reserve throughout the entire logistics chain (logistics monitoring)
Federal Crisis Management Board	Coordinating[39] preparation and enforcement measures in the interests of uniform enforcement
FDHA/DDPS	• Releasing the emergency reserve • Paying for compulsory stockpile material in advance and distributing it to the cantons on a quota basis for use in healthcare personnel prophylaxis
FOPH	• Defining risk groups • Developing guidelines and recommendations, especially with regard to treatment, pre-exposure and post-exposure prophylaxis • Incorporating in the list of pharmaceutical specialties
FOPH/FSVO	Developing guidelines and recommendations • on protecting personnel deployed to control classic avian influenza • on stockpiling by cantonal veterinary services
FONES/holders of compulsory stockpiles	• Managing/monitoring the compulsory stockpile • Releasing the compulsory stockpile • Determining the volume of drugs to be allocated to each canton (cantonal ration, quota)
Swissmedic	Pharmacovigilance[40]
Logistics firms	Supplying cantonal quotas to the reception points designated by the cantons
Cantons	• Defining cantonal distribution logistics and related powers and responsibilities • Setting up reserves in hospitals and veterinary services • Monitoring and ensuring needs-based distribution within the canton if drugs are supplied on a quota basis • Distributing drugs from the emergency reserve to patients and contacts • Deploying antiviral drugs in treatment and prophylaxis

11.5 Antibiotics

The frequency of secondary infectious diseases in influenza patients is 10%–15% in adults and 50% in children under the age of three. A flu pandemic is thus likely to increase the need for antibiotics to treat secondary infections. This additional need during a pandemic is covered by the compulsory stockpile[41] of antibiotics.

[39] Detailed technical and policy agreements with the cantons are needed to prepare for decisions to be taken by federal organisational units. These agreements are drawn up by the Epidemics Act Coordinating Body and the Swiss Conference of the Cantonal Ministers of Public Health (cf. chapter I.3.2 and the introduction to part II).

[40] Cf. chapter II.12.5, "Pharmacovigilance and quality monitoring"

[41] This section deals only with the compulsory stockpile used to cover additional needs during a pandemic. See the FONES website for information about the compulsory stockpile of antibiotics to cover normal needs.

Even in the event of a pandemic, antibiotics from the compulsory stockpile are distributed via the normal channels. There are therefore no plans for quota-based allocation to the cantons.

Need during a pandemic

The additional need for antibiotics during a pandemic depends on a variety of factors, such as morbidity and hospitalisation rates, the severity and duration of the pandemic wave, age distribution of cases, complication rate in children, share of bacterial superinfections and prevention by means of vaccination. This means that the actual need can vary greatly from one pandemic to the next.

Sufficient quantities of antibiotics to prevent secondary infections are available in the compulsory stockpile

The need for antibiotics in the event of a pandemic is based on the following assumptions:

- Morbidity rate in adults: 25% of the population
- Morbidity rate in children from birth to age 13: 50%
- Rate of secondary infections in adults that require antibiotic treatment: 10%–15% of patients
- Rate of secondary infections in children under the age of 3 that require antibiotic treatment: 50% of patients
- Rate of secondary infections in children ages 3 to 13 that require antibiotic treatment: 30% of patients
- Hospitalisation rate in children and adults: 2.5% of patients

Compulsory stockpile to cover additional need during a pandemic

The additional need for antibiotics is covered partly by the compulsory stockpile of ready-to-use packs and partly by the compulsory active substance stockpile. The procedures for processing and releasing the compulsory active substance stockpile are currently being defined. Until then, at least part of the additional need is covered by the compulsory stockpile of ready-to-use packs. Another measure which should dramatically reduce antibiotic consumption during a pandemic outbreak is widespread **pneumococcal vaccination**.

Table II.11.3: Additional need for oral and parenteral antibiotic treatments for children and adults

Administration	Explanation	Children (ages 0–13)	Adults
Oral	Number of treatments needed	175 000	230 000
Parenteral	Number of treatments needed	14 000	46 000

12.1 Introduction

Vaccination is the most effective preventive measure against infection and is, therefore, the **main intervention axis** of the pandemic control strategy. However, given the current state of the art, it takes four to six months from the emergence of a pandemic virus for a suitable vaccine to be ready for use.[42] This makes the other medical and non-medical pandemic control measures all the more important at this stage.

The global demand for vaccines in the event of a pandemic will far outstrip supply

Coordinated vaccine distribution during the 2009 pandemic was a significant challenge for most countries, including Switzerland. As part of the "**Vaccine supply in the event of a pandemic**" **(VSP)** project, the process of vaccine supply during a pandemic has been improved and made more robust in the light of assessments and taking the views of stakeholders into consideration. Particularly the subprocesses pertaining to the **logistics and administration of vaccines** in case of a pandemic have been described, tasks, responsibilities and powers have been resolved and process optimisation measures have been introduced. The outcomes of the VSP project are the basis for this chapters.[43]

12.1.1 Point of departure

The Federal Council negotiated a **reservation contract** with Novartis,[44] which ensures the capacities for production of pandemic vaccines until the end of 2019[45] and thereby guarantees the availability of vaccines. In other words, Switzerland will be able to purchase the necessary quantities[46] – depending on the severity of the pandemic – of vaccines in single doses.

Where the situation is uncertain, the pandemic should be assumed to be severe and sufficient vaccine should be ordered to protect the population

Funding arrangements have been made. The process for obtaining an urgent supplementary credit, which regulates the speedy provision of funds in the event of a pandemic, has been defined. The technical and procedural provisions[47] are in place, along with checklists for negotiating contracts with manufacturers.

The **licensing** of vaccines and the relevant aspects for the application of special licensing procedures in particular have been settled.[48] Other internal Swissmedic processes (batch release, vigilance monitoring and quality and stability monitoring) have been optimised and adjusted.

The details on **specification, distribution** (logistics and calculation of cantonal contingents) and **prioritisation** of vaccines (priority list) are described in the "Vaccination Manual".[49]

[42] Most influenza vaccines are still produced on incubated hens' eggs. It is likely that new vaccines and manufacturing processes (recombinant proteins, DNA vaccines, virus-like particles [VLP], universal vaccines, etc.) will be available in the medium to long term. This will shorten the manufacturing time and bring about strategy adjustments.
[43] Details as shown in the reports on the outcomes of the "Vaccine supply in the event of a pandemic" (VSP) project on the Confederation's extranet
[44] On 31 July 2015, the sale of Novartis' flu vaccine division to Seqirus (CSL Limited) was completed.
[45] The process for developing a follow-up solution was started in May of 2017.
[46] For between 10% and no more than 80% of the population
[47] Procurement manual, Swissmedic
[48] Conditions for the rolling submission of data during ongoing proceedings, handling unlicensed drugs (Art. 9 para. 4 TPA) and the acceptance of foreign review outcomes (Art. 13 TPA)
[49] www.bag.admin.ch/specialised-information. A new edition of the "Vaccination Manual" will be published in 2018.

12.2 Targets

- Providing, in a coordinated manner, a vaccine that is well tolerated, safe and effective
- Reducing the risk of infection and complications among risk groups
- Reducing the risk of infection and complications among members of risk groups by vaccinating their families and the healthcare personnel treating them
- Reducing the risk of infection and complications among essential services staff, including healthcare personnel who come into contact with patients
- Reducing the risk of infection and complications for all people who so desire

12.3 Measures

- Preparatory measures
- Seasonal flu campaign
- Vaccination (healthcare personnel, members of risk groups, general population)

Table II.12.1: Possible measures

Possible measure	Explanation	Confederation guidelines and recommendations
Preparation	• Central vaccine reception points in the cantons have been defined • The Confederation has been notified of the vaccine reception points (or the competent agency) • The interfaces between the Confederation and the cantons (logistics and communication) have been determined and the relevant processes have been defined • Distribution key variations and principles to be used in working out quotas are known • Priority lists can be monitored and adhered to • Intracantonal distribution of vaccines and the vaccination process have been defined • Storage and supply chains meet the requirements (GDP) • Funding and legal questions have been resolved (procurement, logistics, cross-border commuters, mandatory vaccination) • The provision of additional resources for the simultaneous start of vaccination in all the cantons has been resolved • A disposal scheme has been set up • Communication has been prepared (e.g. start of vaccination, prioritisation, distribution problems, destruction) • Logistics and communication drills have been carried out • Agreements/contracts with vaccine manufacturers are in place	Vaccination Manual EpidA VSP Chapter II.2 "Communication"
Seasonal flu campaign	Increased vaccination coverage with the current seasonal flu vaccine improves protection of risk groups and helps expand global capacities for the production of the pandemic vaccine	
Storage in and return from local storage facilities[50]	Holders of central vaccine stocks have the appropriate authorisations from Swissmedic	Vaccination Manual VSP

[50] The processes meet the requirements of the Therapeutic Products Act (TPA), the current ordinances and the Good Manufacturing Practice (GMP), Good Distribution Practice (GDP) and Good Storage Practice (GSP) guidelines.

Possible measure	Explanation	Confederation guidelines and recommendations
Ordering, distribution, logistics monitoring	• Timely distribution of vaccines appropriate for the escalation stage is ensured • Checks and oversight of stocks released, stocks still in store and stocks consumed is ensured • The concept applies to the logistics of distribution of the pandemic vaccine in the event of a pandemic and is binding on all partners involved in this specific logistics chain	Vaccination Manual VSP
Repackaging	• Repackaging must be the exception • Any subsequent alteration of a vaccine brings considerable imponderables into play and will always delay the planned start of vaccination • If repackaging is necessary, it must be carried out only by the manufacturer or the Armed Forces Pharmacy	
man Vaccination	• Creation of a project structure • Coordinated communication under the guidance of the Confederation's "communication core group" • The starting date and process must be coordinated throughout all cantons • Vaccination is to be conducted as appropriate for the situation and the escalation stage, in accordance with the technical guidelines laid down by the FOPH • Cantonal legislation and logistics models must be taken into consideration • Communal partners, such as school health services and medical services of cities and communes, must be taken into consideration • Risk groups must have priority access to vaccination, in accordance with cantonal priority lists	VSP Chapter II.2 "Communication" Tasks of the Confederation's coordinating "communication core group"
Destruction/ disposal	• Performed by the Armed Forces Pharmacy and the cantons through incineration in licensed municipal waste incineration plants (MWIs) • In the case of stocks held in cantons and hospitals, funding comes from the cantons; for stocks held by the Armed Forces Pharmacy or federally commissioned contract suppliers, it comes from the Confederation	

12.4 Tasks and powers

The report on the outcome of the "Vaccine supply in the event of a pandemic" (VSP) project defines the tasks, powers and responsibilities of the stakeholders and the interfaces between them. They are shown in table II.12.2, below.

Table II.12.2: Tasks and powers of the Confederation and the cantons

Stakeholder	Tasks and powers
Federal Council	• Decision-making • Ordering measures affecting individuals and the general population
Federal Crisis Management Board	Implementing and coordinating[51] measures within the Federal Administration and in cooperation with the cantons
FOPH	• Devising a procurement and supply strategy, preparing the procurement decision • Directing and coordinating vaccine supply in cooperation with the Epidemics Act Coordinating Body and the Federal Crisis Management Board • Technical situation assessment in cooperation with the FCP • Defining the technical guidelines for the vaccination process • Management and technical direction of information and communication in cooperation with the Federal Chancellery • Hotline for doctors
Committees	• FCV: Devising vaccine recommendations, assisting in devising strategy; advising the FOPH in the choice of vaccines[52] • FCP: Advising the FOPH on issues relating to strategy development and risk assessment
Armed Forces Pharmacy	• Procurement, logistics and, if necessary, storage of the vaccines • Concluding contracts with manufacturers and logistics firms • Monitoring and ensuring distribution/delivery of vaccines throughout the entire logistics chain (logistics monitoring) • Repackaging and destruction if necessary
Swissmedic	• Reviewing, registering and licensing of vaccines • Batch release • Vigilance and quality/stability monitoring (cf. chapter II.12.5)
Cantons	• Defining cantonal distribution logistics and associated responsibilities and powers • Monitoring and ensuring needs-based distribution within the canton • Vaccination • Destruction of surplus vaccines stored in the canton • Compulsory-vaccination decree for at-risk population groups, particularly exposed individuals and individuals engaging in certain activities[53]

[51] Detailed technical and policy agreements with the cantons are needed to prepare for decisions to be taken by federal organisational units. These agreements are drawn up by the Epidemics Act Coordinating Body and the Swiss Conference of the Cantonal Ministers of Public Health (cf. chapter I.3.2 and the introduction to part II).
[52] Art. 56, para. 1, 2 EpidA
[53] Art. 22 EpidA

12.5 Pharmacovigilance and quality monitoring[54]

Even though a vaccine has to undergo extensive testing before it is licensed, rare risks may only become known after the start of the vaccination campaign, i.e. when a large, polymorbid population is exposed. Adverse effects can be monitored and/or recognised and documented at that stage, including adverse effects that only occur rarely or that may not even be related to the properties of the vaccine.

It is essential that the observed rare risks and adverse effects are recorded and assessed without delay (vigilance) so that the new risks can be characterised and, if necessary, risk-reduction measures such as adjusting the technical information for the vaccines in question can be taken. Swissmedic is responsible for the proper execution of vigilance tasks and for assessing the safety signals.

Vaccine vigilance during a pandemic places considerable demands on the capacity of the reporting system (multiple involved parties, international dimension, logistics). The existing reporting system is the main element in this process, along with regional pharmacovigilance centres:

- Any individual who administers or dispenses drugs on a commercial basis is required to report adverse effects (including suspected cases). As from October 2014 this can be done through the new electronic reporting portal "ElViS",[55] which can be accessed via the Swissmedic website as well as through a link from the medicinal product information portal, www.swissmedicinfo.ch. Hard copy reporting is also possible for the time being
- Businesses are also required to report adverse effects of drugs. They can do this via the electronic channel as well. Access is password-protected and allows two-way reporting and exchange of information

Marketing authorisation holders bear the responsibility for monitoring the quality and stability of the vaccines used. The businesses, as well as all individuals who distribute, dispense or administer vaccines, must report any quality problems to Swissmedic. The businesses must consult Swissmedic and take the necessary action, such as blocking defective batches or taking them off the market. Swissmedic is responsible for monitoring the measures and for official batch release of vaccines.

[54] For details, cf. subproject 3 in the report on the outcome of the "Vaccine supply in the event of a pandemic" (VSP)
[55] Electronic Vigilance System: www.swissmedic.ch/swissmedic/en/home/news/mitteilungen/archive/elvis-electronic-vigilance-reporting-portal.html

Part III Principles

1 Introduction

Part III of the Swiss Influenza Pandemic Plan contains principles and other information useful for understanding parts I and II:

- Current state of knowledge (epidemiology, virology)
- Statutory foundations and ethical guidelines
- Recommendations on the use of antiviral drugs
- Planning tools (calculation tools) and pandemic simulation models
- Information on pandemic planning and on the implementation of measures in businesses

Further information for experts is available on the FOPH website.[1]

[1] www.bag.admin.ch/specialised-information

2 Current state of knowledge and open questions

Influenza is an acute infectious disease. There are new outbreaks of influenza every year, known as "seasonal" influenza, the prevalence and intensity of which vary. An epidemic is defined as an unusual accumulation of an infection in a population, generally limited in space and time. A pandemic is defined as a worldwide, massive occurrence of an infectious disease for a limited time. Switzerland has been hit by five global influenza pandemics in the last hundred years: Spanish flu in 1918, Asian flu in 1957, Hong Kong flu in 1968 and Chinese-Russian flu in 1977, which only affected children. The 2009 pandemic, initially called "swine flu", fortunately turned out to be mild (20 deaths in Switzerland).

2.1 Microbiology

The WHO guidelines describe how severity is determined

The influenza virus is an orthomyxovirus. It is classified into types A, B and C on the basis of its antigenic properties; only types A and B are of epidemiological relevance to humans. Aquatic birds are the main reservoir for the type A virus – which explains its high pandemic potential – while humans are the main reservoir for the type B virus.

The influenza virus is an enveloped RNA virus with eight genome segments. It has the two surface proteins haemagglutinin (H) and neuraminidase (N), which play an important role in viral replication and proliferation in the host. Among the influenza A viruses that infect humans, three haemagglutinin subtypes (H1, H2, H3) and two neuraminidase subtypes (N1, N2) predominate. Influenza B viruses are less variable and so far have not been divided into subtypes. Various subtypes are generated by specific molecular mechanisms such as antigenic drift and antigenic shift.

2.1.1 Antigenic drift

The variability of the influenza virus is the consequence of evolutionary processes and cannot be predicted

Antigenic drift is the term given to small changes (point mutations) in the genome of the influenza virus which lead to changes in the surface proteins (haemagglutinin, neuraminidase) and thus in the antigenic properties of the virus. All these continual changes are the reason for the seasonal flu waves, because the population has only partial immunity to the altered virus.

As a result of antigenic drift, influenza vaccines have to be modified every year to reflect the characteristics of the influenza viruses currently in circulation. The composition of influenza vaccines is determined every year by a WHO expert commission using information on influenza virus strains circulating throughout the world.

2.1.2 Antigenic shift

Antigenic shift is the term used to describe a change in the genome that is more significant than the change involved in antigenic drift. Antigenic shift can lead to the creation of a new subtype and can affect haemagglutinins or neuraminidases individually or collectively. So far, antigenic shift has only been observed in the influenza A virus. There is a **strong correlation between antigenic shift and the outbreak of pandemics**, because the new virus is not recognised by the population's immune defence systems.

Two mechanisms can be involved in the drastic antigenic modifications that take place during antigenic shift:

- Crossing the species barrier, i.e. the mutation enables the virus to adapt to a new species, as in the 1918 pandemic
- Recombination (exchange) of entire gene segments: for example, in 1968 a new influenza virus subtype emerged which was composed of a human A(H2N2) virus and an avian A/H3 virus with an unknown N subtype. The resulting A(H3N2) virus caused "Hong Kong flu"

2.2 Epidemiology

Epidemiology is the study of the distribution and frequency of diseases. Some facts about and data on the epidemiology of influenza (relevance, occurrence, characteristics) are listed below.

2.2.1 Seasonal influenza (flu)

A pandemic occurs when an influenza virus subtype with new properties emerges, against which the population has little or no immunity

Each year, a wave of influenza occurs, the epidemiological characteristics of which reflect the variability of the antigenic characteristics (antigenic drift) of the influenza virus. The spread of the virus depends, among other things, on the degree of immunity in the population and on the age groups affected.

Seasonal influenza is an acute respiratory disease that occurs mainly in the winter months, i.e. from late November to early April in the northern hemisphere. It is associated with upper and/or lower respiratory tract symptoms and systemic symptoms (fever, headache, muscle pain, weakness). Influenza leads to increased morbidity and mortality rates among risk groups, such as the elderly, pregnant women, infants and people with cardiovascular, respiratory or metabolic conditions or with compromised immune systems. Additional bacterial infections (e.g. pneumonia) also affect mortality related to seasonal flu.

2.2.2 Avian influenza ("bird flu")

Influenza not only affects humans, it is also common in many mammal and bird species. Type A influenza occurs in all bird species, especially chickens and turkeys. Aquatic birds are less likely to contract "bird flu", and if they do, the condition is milder. However, they can pass on the pathogen. In addition to birds, type A influenza can also affect pigs, horses, dogs, whales and seals.

Avian influenza is a highly contagious animal disease that has been known for many years and that is still endemic in many regions with large poultry populations. The new subtype Influenza A(H5N1), commonly known as "bird flu", started to spread from Asia to many countries in 1997. "Bird flu" can occur in a less dangerous form, known as "low pathogenic avian influenza" (LPAI). However, mutations can cause the not very virulent LPAI virus to develop into the very virulent form called "highly pathogenic avian influenza" (HPAI). Certain highly pathogenic virus types also pose a risk of contagion for humans if the level of infection is very high. The disease is usually associated with flu-like symptoms but can also lead to fatal pneumonia.

The first isolated cases of H5N1 "bird flu" were observed in Switzerland in early 2006, but these affected only wild birds, not domestic fowl.

Since 1997 the H5N1 virus has repeatedly caused illness in humans. The WHO confirmed 860 infections in humans between the end of 2003 and November 2017, 454 of which had a fatal outcome. These cases occurred in 16 different countries, and almost all cases involved direct bird-to-human transmission.

Since March 2013, there have been human infections of the H7N9 virus in China. By June 2017, the WHO confirmed more than 1,533 cases, including 592 fatalities. In an overwhelming majority of cases, exposure to infected poultry or a potentially contaminated environment could be substantiated. Monitoring of the H7N9 virus is complicated by the fact that an infection in poultry is barely clinically visible, which makes infected animals difficult to identify.

Other types of influenza infections (virus types H10N8, H9N2, etc.) have been recorded sporadically. They are probably the result of improved monitoring through molecular diagnostics rather than of increased viral activity.

At the start of this century, the growing number of cases of sporadic transmission of avian influenza viruses from poultry to humans led to international and domestic pandemic preparations being intensified and accelerated. These preparations were targeted mainly at the H5N1 virus. However, contrary to all expectations, the first pandemic of this century was caused by the A(H1N1) subtype. The consequences of the pandemic turned out to be mild, but monitoring will nevertheless have to continue steadily.

2.2.3 HxNy pandemic

The development of an easily transmissible virus with high morbidity remains a likely scenario that could have severe consequences for society

HxNy is the name given to an as yet unknown influenza subtype that is created from other influenza virus subtypes through antigenic shift and able to trigger a pandemic. The avian influenza H5N1 subtype and the H7N9 subtype first observed in March 2013 both seem to meet some of the conditions for developing into pandemic viruses. However, whether they will trigger an influenza pandemic in the near future cannot be predicted.

A pandemic could develop if an antigenic shift leads to the emergence of a new or unknown influenza virus subtype and if this virus

- is pathogenic and virulent in humans,
- can be transmitted from person to person, and
- encounters a population that has no or only inadequate immunity to it

2.3 The 2009 pandemic

The first pandemic of the 21st century occurred in early 2009 and probably originated in Mexico. The first characterisations of the new virus were conducted in April of that year in the USA. Subsequently, the virus spread rapidly throughout the world.

The virus was first detected in Switzerland at the end of April 2009. In contrast to previous years, more cases of influenza were recorded in the summer months. On 11 June 2009 the World Health Organization (WHO) raised the pandemic warning level to 6, its highest level. In November 2009 the number of cases of flu in Switzerland rose dramatically, peaking in early December 2009. After that point, the numbers dropped, falling below the national threshold by the end of February 2010. Between 1.0 and 1.5 million people were infected with the pandemic virus in Switzerland throughout 72 this period; 570 of them had to be hospitalised, and 20 succumbed. This confirms the moderate nature of the virus.

The WHO announced the end of the pandemic on 10 August 2010. The pandemic virus is still present on all continents but is less dominant.

Molecular analyses have shown that while the pandemic virus is indeed an H1N1 subtype, it is phylogenetically too distant from the seasonal H1N1 virus that was previously in circulation to be detected by the immune systems of the vast majority of the global population. In fact, the phylogenetic tree drawn up on the basis of genome sequence data shows the virus to be a hybrid between a human, an avian and a porcine virus.

2.4 Current situation

The first flu pandemic of the century was caused by a low pathogenic virus and ended without significant consequences. It is, however, impossible to predict the timing and severity of the next pandemic, given that the avian H5N1 virus is still active and new flu viruses can occur suddenly, as the most recent outbreak of H7N9 "bird flu" in 2013 in China has shown. This demonstrates the need for optimum preparedness at all times.

2.5 General characteristics of influenza

Table III.2.1: General characteristics of influenza

	Seasonal influenza	Pandemic influenza
Timing	Every year in the winter months	• Unpredictable • Historically two or three times a century at any time of year, though more likely in the winter months
Duration	In Switzerland approx. 10 weeks (between late November and early April)	One or several waves in Switzerland, with each wave lasting 8 to 12 weeks
Groups with a higher risk of complications	• Infants • The elderly • People with chronic underlying conditions (cardiovascular, respiratory, metabolic, etc.) and/or a compromised immune system • Pregnant women and women who have recently given birth	Similar to seasonal flu Additional risk groups (e.g. young adults) can be affected depending on the pathogenicity of the virus
Attack rate	2%–5% of the population	15%–25% of the population
Mortality rate	6–14 per 100 000 inhabitants of Switzerland	• Highly variable and dependent on the pathogenicity of the virus and the immune status of the population • Worst case: 100 per 100 000 inhabitants of Switzerland
Genome modification	Antigenic drift	Antigenic shift

2.6 Clinical characteristics of influenza

Table III.2.2 summarises the clinical characteristics of influenza. The table provides an overview of seasonal flu and "bird flu", the most recent pandemic flu of 2009 and a hypothetical pandemic flu triggered by an unknown HxNy virus; the clinical features of the latter scenario are therefore also hypothetical.

Table III.2.2: Clinical characteristics of influenza

	Seasonal flu	Avian influenza in humans (H5N1)	2009 pandemic flu	HxNy pandemic flu
Transmission	Human to human: • Droplets • Direct contact • Possibly indirect contact or via aerosols	Bird to human: • Droplets	Human to human: • Droplets • Direct contact • Cannot be ruled out: aerosols	Human to human: • Droplets • Direct contact • Cannot be ruled out: aerosols
Diagnosis	• Clinical symptoms • Viral culture • PCR (typing), EIA, IF	• Clinical symptoms • PCR (typing)	• Clinical symptoms • Viral culture • PCR (typing) • Possibly EIA, IF	• Clinical symptoms • Viral culture • PCR (typing) • Possibly EIA, IF
Incubation period	1–4 days, 2 days on average	2–8 days, up to 17 days has been observed	Like seasonal flu	Unknown; assumption: 1–4 days
Infectivity	1 day before to approximately 5 days after outbreak of the disease; in children, up to 10 days after outbreak of the disease	Very weak (person-to-person transmission very low)	Approx. 1 day before to approx. 5 days after outbreak of the disease; in children, up to approx. 10 days after outbreak of the disease	• Unknown; assumption: about 1 day before to up to 7 days after outbreak of the disease; 5 days on average, up to 21 days in children
Clinical picture	High fever (over 38°C), pronounced malaise and weakness, myalgia or generalised pain; the following symptoms may also develop: cough, head cold, painful joints	High fever (over 38°C), cough, head cold, sore throat, shortness of breath, pneumonia, diarrhoea	Classic flu symptoms	• Unknown; assumption: variable spectrum, as with seasonal flu or H5N1 flu
Most frequent complications	• Secondary infections • Pneumonia • Bronchitis • Ear infections	• Same as seasonal flu • Viral pneumonia • Multiple organ failure (cytokine storm)	• Same as seasonal flu • Diarrhoea • Viral pneumonia	Variable spectrum of possible complications
Prevention: Vaccination	Tri-/tetravalent vaccine, new composition every year	Pandemic vaccine; to be developed as soon as pandemic virus is known	Pandemic vaccines	Pandemic vaccine; to be developed as soon as pandemic virus is known
Prevention and treatment: Antiviral drugs	Options, depending on the clinical indication and resistance situation: • Neuraminidase inhibitor • Amantadine, rimantadine	• Neuraminidase inhibitor	• Neuraminidase inhibitor	• Depending on the sensitivity of the virus • Neuraminidase inhibitor • Amantadine, rimantadine
Other treatments	Symptomatic treatment, antibiotics for secondary infections (pneumonia)	Symptomatic treatment, antibiotics for secondary infections (pneumonia)	Symptomatic treatment, antibiotics for secondary infections (pneumonia)	Symptomatic treatment, antibiotics for secondary infections (pneumonia)

3 Pandemic development stages

The course of a pandemic can be divided into three distinct stages of development. The pandemic stage in Switzerland is determined and announced by the Confederation on the basis of a comprehensive risk assessment (chapter I.3.2.4). The strategic and operative targets pursued and the measures taken to control the pandemic vary according to the development stage.

3.1 Normal influenza activity

There are various types of influenza viruses in circulation at all times, even when there is no pandemic. The dynamics of these viral populations outside of pandemics are referred to as "normal influenza activity". In this stage the focus is on monitoring influenza cases so that the first instances caused by a new influenza A subtype can be recognised quickly.

Normal influenza activity is what used to be known as the interpandemic phase = epidemiological normality

The virus in question must be observed closely by the national monitoring systems, and its possible further adaptation to humans must be carefully tracked. For example, this has been done for the H5N1 "bird flu" virus since 1997. This subtype is currently in the WHO alert phase. The H5N1 virus has caused 860 confirmed infections in humans since 2003, 454 of which had a fatal outcome.[2]

The FOPH and the FSVO work closely together on surveillance to detect new threats (HxNy) in humans and animals at an early stage. Monitoring of seasonal influenza by the FOPH has been one of the routine functions of the Sentinella reporting system and the National Reference Centre for Influenza (NRCI) since 1986. The network of national partners responsible for monitoring is tied into international monitoring systems (WHO, EU).

The purpose of reporting systems is to provide long-term data on the frequency of a disease and especially on trends over time

Monitoring provides the following:

- Early detection of new threats (HxNy) in humans and animals (detection of warning signs)
- The basis for national risk assessment (Risk Assessment Expert Panel)
- A comprehensive situation report and description of epidemiological development
- The basis for containment by means of immediate measures affecting individuals (contact management)
- Data for use in defining criteria for suspected cases, reporting and sampling

The focus of monitoring activity is determined by the epidemiological conditions. In the early stage of a pandemic, the focus is on early detection of flu cases caused by the new influenza virus subtype and on monitoring animal vectors. Later on, once the pandemic has broken out, attention shifts to case monitoring to learn more about the severity of cases and about risk factors for complications. Reporting criteria need to be adjusted accordingly.

[2] As of November 2017

3.2 Pandemic stage

As soon as the virus has become better adapted to humans and person-to-person transmission increases, there is an acute pandemic risk. According to the provisions of the EpidA, the situation during the pandemic stage is either particular or extraordinary.

It is highly unlikely that containment measures will be able to prevent a pandemic. Therefore, the strategic aim when attempting to control a pandemic is to slow the spread of the virus and thereby minimise damage.

Mitigation can be achieved by the preventive and therapeutic use of medical and non-medical measures.

Containment measures can mitigate the impact of a pandemic but not prevent it

Containment measures in the early stage of a pandemic can delay the spread of the pathogen, buying precious time and reducing the overall impact of the pandemic. They also provide important information that helps in early detection, the assessment of exposure risk, etc. If a pandemic involving a more aggressive virus occurs, these time savings could be vital in allowing healthcare capacities to be built up. Under the International Health Regulations (IHR 2005),[3] Switzerland is required to introduce isolation (= separation) or quarantine measures under certain conditions.

The following measures may be implemented in the early stage of a pandemic:

- Personal behavioural measures (hygiene rules, etc.)
- Communication (prevention options, self-protection, individual responsibility)
- Development of specific diagnostic lab tests
- Contact management (contact tracing, quarantine, antiviral prophylaxis)
- Social distancing (e.g. school closures, bans on events)
- Isolation of sick individuals
- Treatment of sick individuals

Measures affecting individuals are reduced once the pandemic has broken out over a wide area. However, at this stage the aim is still to slow the spread of the virus and minimise morbidity and mortality among the population without putting too much strain on the resources of the health system. The focus lies on protecting individuals at greater risk of developing complications. The aim is no longer to prevent new infections but to recognise local outbreaks and keep them within bounds.

As the pandemic progresses, the following measures move to the forefront:

- Vaccination
- Communication (prevention options, self-protection, individual responsibility)
- Social distancing
- Personal behavioural measures (hygiene, etc.)
- Hygiene masks
- Prophylaxis with antiviral drugs
- Medical care for cases, treatment with antiviral drugs

[3] International Health Regulations (2005), Art. 31 para. 2

3.3 Post-pandemic stage

Everything possible must be done to bring about rapid restoration and **normalisation** of services. Preparations for a subsequent wave must be taken as soon as the first pandemic wave starts to subside. They include determining the resources needed at all levels and adjusting case definitions, protocols and algorithms. The resources being freed must be used to achieve rapid restoration and normalisation of services, particularly essential services.

Preparations for possible subsequent waves must be taken at an early stage

Once the pandemic is over, the structures set up to deal with the crisis must be **wound down** in an orderly manner, and the exit from the crisis must be properly organised.

A debriefing must take place to evaluate the success of pandemic response. The evaluation can cover the entire crisis response process or merely selected aspects such as communication, vaccination strategy or crisis management structure. The analysis and assessment of the activities carried out during the crisis and of their effects is of critical importance. The evaluation should enable practical recommendations for action (in particular with regard to refining pandemic plans, crisis communication and organisation).

4 Antiviral drugs

4.1 Recommendations on the administration of oseltamivir (Tamiflu®) to adult patients

4.2 Recommendations and information on the administration of zanamivir (Relenza®) to patients

The two recommendations set out below on the use of oseltamivir (Tamiflu®) and zanamivir (Relenza®) are based on the 2009 epidemiological situation (low virulence of the pandemic flu strain in circulation and no widespread viral resistance). The recommendations are given by way of example and will be adjusted to the current situation if epidemiological circumstances change.

A drug known as favipiravir is available under certain conditions in Japan. And an intravenous neuraminidase inhibitor known as peramivir is on the market in the USA.

To date there are no valid alternatives to oseltamivir and zanamivir

4.1 Recommendations on the administration of oseltamivir (Tamiflu®) to adult patients[4]

4.1.1 Indication for treatment

Oseltamivir treatment

- should **not** be routinely given to patients with a mild condition who are not part of a risk group;
- should be considered for all patients at greater risk of a complicated course of infection caused by a pandemic influenza virus (see below for risk assessment);
- should be considered for all patients with a severe condition

Early treatment should be considered for all influenza patients at greater risk of complications or those who have a severe form of the disease, especially at times of high flu activity, but only if influenza is very likely.

The success of treatment depends largely on how early it is started

Patients for whom oseltamivir has been prescribed should be **tested** for influenza infection. The treatment indication should be reviewed once the test results have been received. Treatment should be stopped if the test result is negative (specific detection, e.g. PCR), although continuing treatment should be considered for patients with severe pneumonia (especially patients in intensive care) or where there is reason to suspect that the test result is wrong, for instance if the sample was taken from the upper respiratory tract.

4.1.2 Risk assessment

Prescription of oseltamivir or zanamivir to individual patients should always include a risk assessment regarding

- the existence of an underlying condition or risk factor[5];
- the severity of symptoms;
- treatment-related side effects

[4] Chapter 4.1 is based on the recommendations of the Swiss Society for Infectious Diseases (SSI) for the administration of oseltamivir (Tamiflu®) to adult patients with suspected or confirmed diagnosis of 2009 pandemic influenza (H1N1).

[5] Risk factors for a complicated course of 2009 pandemic influenza (H1N1) (cf. FOPH publication "Dealing with cases of influenza in connection with the influenza pandemic")

It can be assumed that the risk of complicated influenza is not significantly higher if any underlying conditions are well controlled (e.g. well-controlled diabetes with no organ damage).

Immunosuppression is another risk factor in cases of complicated influenza. It applies to all patients undergoing chemotherapy, radiotherapy, systemic corticosteroid therapy (>20mg/kg prednisone per day for more than 14 days) or who are taking immunomodulating drugs (e.g. TNF-alpha blockers). Immunosuppression must be continued for up to several weeks after the end of steroid treatment or chemotherapy and for two years after an allogenic bone marrow transplant.

A higher risk of complications must be expected in the case of HIV infection in the following groups:

- Patients with additional comorbidity or who are in an age-related risk group
- Patients who are not on antiretroviral treatment and have a CD4 count of <350/mm^3

The risk of complicated flu progression is higher in patients with a combination of risk factors. For example, empirical oseltamivir treatment should be considered earlier for a pregnant woman with a pre-existing condition, even if her symptoms are mild.

4.1.3 Severity of symptoms

Symptoms are regarded as mild if the patient's general condition is not worse than normal (or only slightly worse), the respiratory symptoms (e.g. cough) are mild and improve during the course of the disease.

Severe complications associated with influenza include viral pneumonia, bacterial secondary pneumonia and decompensation of an underlying disease. Encephalitis, rhabdomyolysis and myocarditis are rarer complications. The disease can progress to a severe form either very quickly (sometimes within 24 hours) or over several days.

The warning signs for severe disease progression include:

- Symptoms of pneumonia; signs of hypoxia (dyspnoea, tachypnoea, etc.), tachycardia >100/min., abnormal blood pressure (systolic <90mmHg or diastolic ≤60mmHg), infiltrates or shadows on a chest X-ray
- Impairment of consciousness
- Signs of decompensation of an underlying disease (e.g. asthma, COPD, chronic liver or kidney failure, diabetes, cardiovascular disease)
- Signs of dehydration
- Rapid worsening of symptoms or persistent high fever

4.1.4 Timing of treatment and dosage

Treatment should start as early as possible (within 24 to 48 hours). The start of treatment can be delayed until more than 48 hours after the onset of symptoms for patients who are severely ill (e.g. patients on artificial ventilation).

Table III.4.1: Dosage of oseltamivir (Tamiflu®)

Indication/treatment	Oseltamivir (Tamiflu®) orally per day	Duration (days)
Outpatient or inpatient (not in intensive care)	2 x 75mg	5
Severely ill and in intensive care	2 x 75mg OR 2 x 150mg	10
Post-exposure prophylaxis	1 x 75mg	10

4.1.5 Oseltamivir prophylaxis

Prophylactic administration of oseltamivir entails the risk of viral strains becoming resistant. Post-exposure oseltamivir prophylaxis should thus be limited to patients who have not been vaccinated or who are expected to have a poor immune response (e.g. patients who have had a lung transplant or severely immunosuppressed patients with chronic graft-versus-host reaction) and those at very high risk of severe influenza complications.

4.2 Recommendations and information on the administration of zanamivir (Relenza®) to patients

4.2.1 General observations

Zanamivir is also a selective neuraminidase inhibitor (NAI) with proven efficacy against influenza A and B. Given its similar mechanism of action and comparable indication, zanamivir is an alternative to oseltamivir.

The use of antiviral drugs plays a decisive role in the treatment of sick individuals and as prophylaxis for health-care personnel, especially in the early stages of an influenza pandemic

In terms of its stereochemistry, zanamivir is more closely related to the natural substrate than is oseltamivir, a fact that confirms the lower development of resistance observed in clinical studies. However, cross-resistance cannot be ruled out, so there is no guarantee that zanamivir will be effective in case of resistance to oseltamivir.

Limited quantities of zanamivir are available to diversify the federal emergency reserve and to increase the flexibility of drug intervention measures.

Zanamivir is intended for use in localised occurrences of influenza virus strains that are resistant to oseltamivir or when there are other reasons for not administering oseltamivir.

4.2.2 Indications and recommendations for the treatment and prophylaxis of suspected or confirmed cases

To date, the active substance is available only as a powder for inhalation that is administered via an inhalation device (diskhaler). According to the prescribing information, zanamivir powder may only be used in conjunction with the diskhaler supplied with the drug. In particular, it must not be dissolved or nebulised.

This mode of administration means that the drug can be used only to treat adults or children over seven (or over twelve for prophylaxis) who tolerate the inhalation.

Beyond this, the indication is the same as for oseltamivir, except in cases of risk of bronchial spasms in patients with obstructive pulmonary disease.

4.2.3 Restrictions in case of intensive care patients

Given the complexity of administration (inhalation), zanamivir is not the first choice for intensive care patients. Intravenous administration as part of individual treatment attempts (compassionate use) is a possible alternative for patients who do not respond or who show resistance to oseltamivir.

4.2.4 Restrictions for high-risk patients

Experience with Relenza® in patients with severe asthma, severe chronic obstructive pulmonary disease (COPD), other severe chronic respiratory diseases, patients with immunosuppression or those with severe chronic conditions is limited. The safety and efficacy of Relenza® in these groups of patients has not yet been demonstrated.

The risks and benefits of treatment should be weighed even more carefully for patients with asthma or COPD. In particular, they should be told about the potential risk of bronchial spasm when taking zanamivir and should have a bronchodilator at the ready before inhaling zanamivir.

4.2.5 Pregnancy and breast-feeding

No human studies have been carried out on the use of zanamivir during pregnancy or on whether the drug passes into breast milk.

However, reproduction studies in animals show that zanamivir crosses the placental barrier and enters breast milk. On the other hand, there are no indications of possible teratogenicity or impairment of fertility or of peri- and post-natal development.

5 Legal situation

5.1 Introduction

The **Epidemics Act** of 28 September 2012 (EpidA; SR 818.101) and the **Epidemics Ordinance** of 29 April 2015 (EpV; SR 818.101.1) form the statutory foundation for the control of communicable diseases in Switzerland and, consequently, for the Swiss Influenza Pandemic Plan. These two pieces of legislation define powers and responsibilities and thereby enable the competent authorities to take suitable measures to mitigate to the greatest extent possible the expected health, economic and societal repercussions of an influenza pandemic.

This legislation is in line with the WHO's International Health Regulations of 23 May 2005 (IGV; SR 0.818.103). The EpidA specifies the exchange of information, the collaboration and the harmonisation of measures with international partners, in particular the WHO and the EU.

Additional relevant federal legislation related to pandemic preparedness includes:

- FDHA Ordinance of 1 December 2015 on the Reporting of Observations of Communicable Human Diseases (SR 818.101.126)
- Therapeutic Products Act of 15 December 2000 (TPA, SR 812.21), regarding the marketing authorisation of vaccines
- National Economic Supply Act of 8 October 1982 (NESA, SR 531), regarding the stockpiling of drugs
- Ordinance of 27 April 2005 on the Coordinated Medical Services (CMedSO, SR 501.31)

This section cannot address individual cantonal legislation.

5.2 Main features of the Epidemics Act

5.2.1 Tasks of the Confederation, the cantons and third parties

The Epidemics Act compels the Confederation and the cantons to undertake the necessary measures to protect the population from communicable diseases. It regulates the competences of the federal as well as the cantonal authorities and describes the proper procedures for when measures are ordered.

The **Confederation** is responsible for collecting, processing and transmitting information, for border measures applicable to people entering and leaving the country (border medical services) and for the supply of drugs. The **Confederation's leadership role** is reinforced by the establishment of superordinate steering and coordination instruments (cf. Art. 4 and 5 EpidA). In order to further strengthen the Confederation's leadership role, it is handed the authority, along with the cantons, to determine the essential national goals and strategies in the area of control of communicable diseases (Art. 4 EpidA). In addition, the measures are bundled in the form of national programmes (Art. 5 EpidA). The FOPH develops national programmes particularly in the context of vaccination, treatment-related infections, pathogen resistances, HIV and other sexually transmitted diseases. In the area of vaccinations, the national vaccination plan was given a statutory foundation, and the duties of doctors and cantons were clarified. The Confederation is, further-

more, charged with the oversight of EpidA enforcement and coordinates cantonal measures where necessary. At the same time it is responsible for international coordination. The Federal Office of Public Health (FOPH) is the Swiss IHR contact point, and thus the WHO contact, especially in the case of events that constitute a public health emergency of international concern. Furthermore, the EpidA confers to the Federal Council the authority to issue provisions for the prevention of communicable diseases. Such preventive measures start at the level of living, working and environmental conditions, for example: hospitals, care homes and doctors' surgeries are compelled to take measures to prevent treatment-related infections and antibiotic resistance; prisons and collective accommodations for asylum seekers are mandated with ensuring access to appropriate preventive measures for all those in their custody.

Under the terms of the EpidA, health policy measures taken in the context of infection control are within the purview of the **cantons**. They are responsible for the enforcement of, e.g., separation measures, medical monitoring or activity prohibition orders and population-based measures (bans on events, school closures) and for coordinating all involved partners within the canton (hospitals, doctors, laboratories). And there now is a statutory foundation for requiring individuals who are ill, suspected of being ill, infected or suspected of being infected and those who excrete pathogens to undergo medical treatment. In addition, the cantons have the authority to temporarily restrict the population's freedom of movement in certain areas. Controlling communicable diseases and ordering corresponding measures are specialist tasks requiring oversight by a trained expert. The EpidA designates the cantonal medical officer for that task. In addition, the cantons are responsible for epidemiological investigations, vaccine promotion as well as disinfection of possibly contaminated objects, premises, etc.

Doctors, hospitals and laboratories are responsible for notifying the competent authorities of communicable diseases, as are cantonal authorities and aircraft and boat operators. Continuous epidemiological monitoring aims to detect health problems early, so the necessary measures for combating infectious diseases can be initiated promptly. Risk factors, the emergence and progression of diseases among the population and the impact of adopted measures are analysed using scientific methods. The findings from these analyses help the federal and cantonal health authorities intervene appropriately.

The EpidA regulates **the duty to cooperate of businesses** engaged in cross-border railway, bus, ship or airway transportation of passengers as well as the duty to cooperate of port, airport, railway station and bus terminal operators and travel agencies. All of them need to allocate the necessary operational and personnel resources to execute the measures imposed on them.

5.2.2 Tools for preventing and controlling an influenza pandemic

In terms of preventing and controlling an influenza pandemic, the EpidA provides for the following specific measures:

- The Confederation and the cantons are mandated by law to take preparatory measures for the prevention and timely limitation of threats to and impairment of public health (Art. 8 EpidA, Art. 2 EpV). This includes, e.g., the **compilation of emergency plans** by the FOPH and the cantons. The cantons are obligated to base their plans on the federal plans. Planning must, furthermore, be coordinated with neighbouring cantons and countries, and the plans must be published and reviewed on a regular basis. Reinforced preparation aims for a timely, appropriate and, depending on the situation, comprehensive uniform deployment of prevention and response measures, as well as ensuring coordination between the cantons. The events surrounding the H1N1 pandemic flu have shown that preventive measures are crucial.

- A **three-stage escalation model** for overcoming crisis and emergency situations creates the foundation for a sensible **division of labour between the Confederation and the cantons** (cf. Art. 6 and 7 EpidA). For that purpose, the EpidA identifies a normal situation, a particular situation and an extraordinary situation. The Act specifies when a particular situation exists which would authorise the Federal Council to order specific measures as outlined by the Act (Art. 6 EpidA). In special situations, the Confederation may order measures affecting individuals or the general population, it may compel doctors and other health professionals to participate in the control of communicable diseases, and it can declare vaccination mandatory for certain population groups. Insofar as specific regulations in the Act are lacking in the case of unforeseeable, acute and severe threats to public health, article 7 EpidA takes effect, which empowers the Confederation to order the necessary measures to control the disease if an extraordinary situation requires. But even in such extraordinary circumstances, federal intervention may not be necessary: the Confederation is called upon mainly if and when the cantonal measures are insufficient or the available legal tools for ordering the necessary measures are insufficient. Naturally, the principles of proportionality are to be observed in this case as well. Enforcement rests with the cantons in any situation.
- The EpidA regulates the **distribution and transport of vaccines** to the cantons and within the cantons (logistics). In that respect and in case of particular threats to public health and explicit shortages, the FDHA is tasked with regulating the distribution of such drugs to the population by way of a **priority list** (cf. Art. 61 EpV). In case of a shortage, certain categories of people, such as medical and nursing personnel or severely ill persons, may be given priority in drug distribution. In addition, the FOPH determines, in cooperation with the cantons, the **share of drugs** that is allocated to each canton (cf. Art. 62 EpV). Transportation of the drugs to the cantons is handled by the Armed Forces Pharmacy (cf. Art. 63 EpV). Insofar as there are divergent agreements with the vaccine manufacturers, the Armed Forces Pharmacy will handle coordinating duties. This kind of expansion of the Confederation's responsibilities aims to provide the population with the best possible vaccine protection.
- An **Epidemics Act Coordinating Body** is appointed, with the task of promoting cooperation between the Confederation and the cantons (cf. Art. 54 EpidA; Art. 80 ff. EpV). This permanent body to foster expert exchange between the Confederation and the cantons and to coordinate measures is designed to achieve uniform enforcement. The Federal Council can also use the Federal Crisis Management Board to help control a particular or extraordinary situation. This body is responsible for advising and supporting the Federal Council in such situations (cf. Art. 55 EpidA). The former Pandemic Special Staff has been transferred to the Federal Crisis Management Board.
- The Confederation assumes a crucial coordination, leadership and supervisory role in normal as well as in particular and extraordinary situations (cf. Art. 77 EpidA). The Confederation thus has at its disposal several tools to assist it in carrying out its oversight role: it may order the cantons to take measures for uniform enforcement and instruct them in situations of particular threat to public health to take certain enforcement measures (bans on events, separation of certain persons, etc.). As far as the enforcement of measures is concerned, however, the current division of responsibilities between the Confederation and the cantons remains unchanged. The **cantons remain the primary enforcement bodies** for measures to protect the population against communicable diseases.

Table III.5.1: Levels of enforcement and action – Confederation, cantons, third parties

	Confederation	Cantons	Doctors, hospitals, other institutions Laboratories	Businesses engaged in passenger transport
Measures	• Targets and strategies (Art. 4) • National programmes (Art. 5) • Particular/extraordinary situations (Art. 6, 7) • Preparatory measures (Art. 8) • Information (Art. 9) • Early detection and monitoring systems (Art. 11) • Support for epidemiological investigations (Art. 15 para. 2) • Reference centres (Art. 17) • Vaccination plan (Art. 20) • Entry and exit, border medical services (Art. 41) • Drug supply (Art. 44) • Movement of goods (Art. 45) • Vaccination compensation (Art. 63 ff.) • International cooperation (Art. 80)	• Preparatory measures (Art. 8) • Epidemiological investigations (Art. 15) • Laboratory network (Art. 18) • Vaccination promotion (Art. 21) • Mandatory vaccinations (Art. 22) • Measures affecting individuals: medical monitoring, quarantine and separation, medical examination and treatment (Art. 30 ff.) • Measures affecting the population (Art. 40) • Disinfection and disinfestation (Art. 48)	• Reporting requirement communicable diseases (Art. 12 ff.) • Authorisation requirement laboratories (Art. 16) • Doctors' tasks (Art. 39)	• Duty to cooperate (Art. 42, 43, 47 para. 2, Art. 48 para. 2)
Organisation	• Coordinating body EpidA (Art. 54) • Operational body (Art. 55) • Federal commissions (Art. 56, 57)	• Cantonal medical officer (Art. 53)		
Supervision and cordination	• Supervision and coordination (Art. 77)			

Table III.5.2: Bodies

Body	Function	Tasks	Composition
Coordinating body EpidA (Art. 54)	• Permanent body to promote cooperation between Confederation and cantons, in addition to the existing coordination platforms (CMPH, meetings of cantonal medical officers) • Improvement of general coordination and uniform enforcement • Facilitating the Confederation's access to the cantons • No political decision-making or enforcement authority	• Coordination of preparatory measures for particular threats • Coordination of detection, prevention and control measures • Promotion of uniform enforcement • Coordination of information and communication • Support for operational body in particular and extraordinary situations	• Technical representation of the Confederation and the cantons
Operational body (Art. 55)	• Temporary body to support the Federal Council in particular and extraordinary situations • Special Staff according to Art. 4 FluPO is replaced and integrated in the Federal Crisis Management Board	• Advising the Federal Council • Supporting coordinating measures between the Confederation and the cantons	• Cf. Ordinance on the Federal Crisis Management Board

Additional information on the Epidemics Act is available at:
www.bag.admin.ch → Service → Legislation → Legislation regarding people & health

5.3 Other statutory foundations

The **International Health Regulations** (IHR 2005) constitute the international law foundation for the international monitoring and control of communicable diseases. The IHR entered into force for Switzerland and the other 194 WHO member states on 15 June 2007. Their primary objective is to prevent the spread of infectious diseases without unduly impeding the international transport of goods and passengers.

The IHR apply to all events that could lead to an acute threat to public health with international dimensions, regardless of whether the event is caused by biological or chemical exposure, ionising radiation, natural events, unintentional (e.g. laboratory accidents) or deliberate action.

The IHR contain a set of specific recommendations that can be implemented by the WHO when an event of international concern occurs.

The IHR contain an evaluation system to be used if an event of international concern is suspected, so that events within the territory of a country can be uniformly assessed. If such an event occurs, it must be reported to the WHO within 24 hours after the assessment has been made (Art. 6 IHR), together with the measures that have already been taken. The WHO, along with the emergency committee made up of internationally recognised experts, will decide on the basis of various criteria whether an emergency exists and will then issue recommendations for its control.

The powers of the WHO do not impinge in any way on the sovereign autonomy of the states, including Switzerland. However, it is desirable for Switzerland and all other states to abide by the WHO recommendations in order to protect their populations

6 Ethical issues

6.1 Introduction

The following is intended to help clarify the ethical problems arising from issues relating to the distribution[6] of scarce resources for the prevention and treatment of pandemic influenza. The principles to be considered in taking measures for any necessary rationing are to be named and well justified. These principles form the basis of distribution procedures, and any possible discussion must include not just procedural considerations concerning the decision-making process but also material considerations concerning its substance. These relate to the aim of preserving life and minimising the number of victims so that as few people as possible die of flu or become severely ill.

A distinction is made between prevention (primarily through vaccination and other measures such as quarantine) and treatment (with antiviral drugs, medical treatment and care, etc.). A pandemic develops in successive stages that give rise to different ethical issues. Even during the initial stage of the spread of the disease, prevention measures (for those who are still healthy) and treatment (for those who have fallen ill) have to be provided simultaneously.

In this context, certain basic considerations that are relevant to pandemic preparedness need to be formulated. Management of individual cases must be left to local practitioners (e.g. a hospital's emergency medicine department). In making their decisions, these practitioners are required to comply with the fundamental principles of medical ethics and general ethical standards.

6.1.1 Preserving life

Influenza, especially pandemic influenza, is a potentially fatal disease that can affect large parts of the population. Consequently, the resources used to prevent and treat it are vitally important to all who are or might be affected. Human life is a great good to be preserved, on which many other goods depend. Preserving life is therefore a high priority. Appropriate provisions must be made to ensure the preservation of life in practice.

If a bottleneck occurs in the provision of resources for the prevention and treatment of pandemic influenza, every effort must be made to make more resources available. If necessary, resources must be transferred from other areas that are less important to the preservation of life.

The distribution of resources to avoid bottlenecks involves both government activity and tasks undertaken by the administration, authorities and healthcare institutions. The criteria for triage and treatment planning do not involve distribution to individual institutions and hospitals but must work at the regional and cantonal levels. The CMS concept 96[7] requires hospitals to

[6] For reasons of specialist terminology, this chapter consistently uses the terms "distribution", "principles of distribution" and "fair distribution". In common parlance, the term "distribution" has taken on a somewhat paternalistic flavour, implying that the entities in charge of distribution improperly acted as owners, whereas "allocation" aims to avoid the implication of supposed "generosity" from the outset. In the present context, however, "distribution" is used strictly in its mathematical or logistical meaning and is favoured over the term "allocation".

[7] The Coordinated Medical Services (CMS) is considered "an extension of the public health system through the coordinated deployment of means provided through partnership with the armed forces, civil defence and civil society organisations in order to achieve the best possible care for patients" (CMS concept 96, p. 4).

conduct a systematic reorganisation planning process[8] that would allow them, if necessary, to postpone less urgent interventions and thus free up capacity.

6.1.2 Ethical values

The core ethical values in pandemic control are: preserving life, fairness, freedom, responsibility and solidarity

Preserving life, fairness, freedom (access to vaccinations), responsibility and solidarity are the core ethical values that are at stake in a pandemic.

Preserving life is the goal of preventive planning as well as of any measures taken in the event of a pandemic.

Solidarity means cohesion, standing as one with and supporting those in need of help and making joint efforts to avert a threat.

- Fairness: The resources for prevention and treatment must be distributed fairly. Among other things, this means that distribution must not be affected by social privileges or disadvantages.
- Freedom: An individual's freedom of choice is a basic right that may be restricted only under very specific conditions – for example if important targets for preventing or treating a pandemic influenza cannot be reached by an alternate course of action.
- Responsibility: Trustworthy and conscientious conduct vis-à-vis others and oneself is a central and crucial element in the fight against a pandemic. The official bodies in charge must inform the population competently about any measures that individually may reduce or prevent the risk of infection or the spread of the disease. In that respect the healthcare system experts bear a special responsibility.

Furthermore, privacy, trust and proportionality also make up the values that are to be considered from an ethical point of view in pandemic control.

- Privacy: Personal matters may be made public only if doing so is absolutely essential for the health of the broader population. Any form of stigmatisation must be avoided.
- Trust: In all their decisions and approaches, the individuals in charge must realise that they may not, under any circumstances or for any reason, jeopardise the population's trust in their competence and good will. Trust is not "blind" but develops in connection with the ethical nature and transparency of decisions.
- Proportionality: The measures must be directly related to the risk to public health and the expected benefit.

6.1.3 Solidarity in the community

In the event of a life-threatening crisis, there is a risk of a decline in solidarity as a result of fear and traumatisation or as a consequence of the instinct for self-preservation. During a crisis, the authorities must make every effort to maintain solidarity among individuals and among groups, as it is the task of the state to preserve the life of all its members. On the other hand, restricting an individual's freedom is justified only if other measures which do not affect that individual's freedom cannot lead to the same outcome. A balance needs to be struck at all times between the imperative of strengthening solidarity among those affected and the demand that their autonomy be respected.

Open, honest and effective communication is necessary in order to preserve each individual's motivation to show solidarity beyond their immediate circle of relations. This includes being

[8] The responsibility of CMS for coordinating reorganisation and resource planning in hospitals was recognised by all cantonal governments with the ratification of the CMS concept 96.

honest about possible shortages of important goods (e.g. drugs and vaccines), patchy or lacking experience with regard to possible adverse effects and long-term consequences, and about the limits of official action.

Information dissemination must always be planned with the aim of creating or preserving a climate of trust and solidarity, which presupposes that the decisions taken are transparent and capable of receiving widespread support. The concern that certain information might unsettle the public is not an adequate reason for failing to disclose that information. In this context, as well as to promote solidarity in general, extended multilingualism must always be taken into account insofar as not all inhabitants or temporary residents can reliably be reached in one of the national languages. This must include appropriate measures of information, prevention and, if necessary, treatment of undocumented immigrants.

On the other hand, precautions must be taken to ensure orderly distribution, since it is to be expected that not all members of society will voluntarily comply with restrictions in a life-threatening crisis. This will be especially acute during distribution of vaccines and drugs in the virulent phase of a pandemic, when the disparity between supply and demand may be substantial.

Last but not least, the population needs to be made aware by appropriate means that uncooperative or selfish and chaotic behaviour severely compromises the effectiveness of the fight against the pandemic.

Nor does solidarity end at the country's borders, which is why out of consideration for, e.g., cross-border commuters and in the course of communities becoming increasingly international, specific prevention and, if necessary, treatment measures must be planned and coordinated jointly with neighbouring countries.

6.1.4 Approaching fair distribution

Fair distribution means the fairness of distribution rules and their outcomes

The principle of fairness through impartiality states: Where life and health are involved, every individual is of equal value.

Every individual, whether young or old, rich or poor, male or female, respected or marginalised, irrespective of their religion, political opinions, merits, etc., has the same dignity, the same value and, therefore, the right to equal treatment in case of illness. Nobody should receive privileged medical treatment at the expense of other affected individuals on the basis of their ability to pay, their standing, their social position, their age or for any other reason.

If the resources required to properly treat all patients (or preventively protect all those who have not yet fallen ill) are not available, then a wholly "fair" decision and distribution are scarcely possible. In case all patients cannot be treated or protected according to their needs, the least unfair solution must be sought. That process should be based on the following objectives:

- Containing the infection: the minimum number of people should be affected
- Saving the maximum number of patients who are in a life-threatening condition

Those who are suffering from influenza and other patients who require intensive care should be placed on the same level and assessed according to the same criteria, i.e. influenza patients should not be given preferential treatment over other patients requiring acute care, but neither should they be treated any worse.

6.2 Targets

- Immediate: Contributing to resolving ethical problems and distribution issues; defining, explaining and justifying the pertinent principles involved; contributing arguments to support the measures
- Longer term: Preserving life and minimising casualties, i.e. protecting life; achieving fair distribution; creating transparency and a climate of solidarity

6.3 Measures

6.3.1 Application of the principles of distribution of scarce goods for prevention and treatment

Unequal rules are defensible only if they better serve to save human lives than all alternative rules

Distribution does not involve an evaluation of the value of a human life. Rather, it involves distribution in the knowledge that it is not possible to treat everyone equally. However, the rules and practice of distribution cannot call into question the principle that all people are of equal value. The starting position must therefore be that all those affected have the same opportunities of access. This is based on a precept of fairness that provides for the equal treatment of each individual and bestows the same respect and the same rights on each individual. Consequently, unequal rules are justified only if they lead to more effective containment of the infection or to the saving of a relatively large number of human lives. In this context the pandemic is to be viewed as an exceptional situation which permits the pursuit of the greatest common benefit. (At this point the utilitarian point of view of "the greatest good for the greatest number" enters into consideration to some extent.)

If there is not enough for everyone, then those who will not suffer or who will suffer the least as a result of exclusion should be excluded. At the same time, additional resources should, as much as possible, be mobilised to maximise availability.

Rationing must be based on reasonable criteria which ensure that the decisions taken are ethical while at the same time meeting the medical requirements. The decision-making criteria should be reviewable in relation to the appropriateness of the steps. They include four key elements:

- Transparency: The implemented measures must be capable of being explained and well justified
- Health benefit: The measures must be based on scientific findings
- Efficiency and practical feasibility: The measures must reach the greatest possible number of individuals
- Adaptability: It must be possible to review and modify previous decisions in the light of new experience and findings

6.4 Principles for the distribution of scarce preventive resources

The drawing up of a definitive priority list must take into consideration all relevant parameters

Distribution principles for vaccines and for other influenza prevention measures should be based on the objective of minimising the number of people suffering from influenza during a pandemic and dying as a consequence. The question of distribution must be approached in differing ways, depending on the amount of vaccine available. If sufficient vaccine is available, a decision must be made regarding who is to be vaccinated first. If insufficient vaccine is available, criteria for distributing the scarce vaccine must be established.

From an ethical perspective, the following aspects may influence the wording of relevant distribution principles:

a) On the one hand, prophylactic measures should benefit those individuals who are in especially frequent contact with other people and who are thus at increased risk of becoming infected and who would, on the other hand, propagate the illness to a particularly great extent if they were themselves infected. It stands to reason that children and adolescents would be especially affected, as they have more interactions, on average, than do adults. This principle produces the maximum preventive effect with relatively small quantities of vaccine. Admittedly, in a pandemic those patterns may change depending on the circumstances, which is why it is impossible to determine in advance the specific groups concerned in each case.

The latter determination also depends on how much vaccine is available, i.e. how large or small the proportion of the population that can be vaccinated is and what quantity of further supplies of vaccine can be expected at what point. Based on the experience with seasonal flu, these groups might include any and all healthcare professionals who have direct contact with patients. Assuming that schools (and nursery schools) are still open at that point, pupils must also be considered.

b) From another point of view, the risk groups who would be most likely to die from a flu infection (e.g. the relevant chronically ill) and thus would probably be most in danger, deserve special consideration.

c) Those who are indispensable for maintaining public services should also be remembered. A distinction should be made within public services between those individuals with tasks that require specialist knowledge and those whose tasks could be assumed by others if necessary. Individuals with certain key functions that are essential to the maintenance of public order and orderly supply structures (e.g. parts of the police force) may also be assigned to this category. In certain cases, prophylaxis may even be compulsory for these individuals.

d) The rest of the population gets access to vaccination as soon as possible.

The definitive allocation of groups should be undertaken by a specially designated and competent body on the basis of actual circumstances, epidemiological dynamics and the available and expected quantities of vaccine.

6.4.1 Prevention through antiviral drugs

It is unlikely that sufficient quantities of a vaccine will be available as soon as the first pandemic cases occur in Switzerland. It might therefore prove necessary to administer antiviral drugs to treat suspected flu cases, provided their efficacy is guaranteed. In this case and for the purpose of meaningful prevention, the drugs would also have to be given to individuals who look after infected patients or who, owing to circumstances, come into contact with them.

If sufficient drug stocks are available, prophylactic treatment might also be made available to individuals who are not directly exposed to the virus, provided this does not adversely affect the general protection of the public (e.g. as a result of resistance developing). Supplies should be distributed according to the aforementioned aspects.

6.4.2 Principles for the distribution of scarce resources

Principles for the distribution of drugs, treatment units, respirators, beds and other resources for the treatment of influenza are based on the goal of saving the lives of as many influenza patients as possible. During prophylaxis, drugs are distributed according to different logical principles than when the disease is spreading and increasing numbers of individuals require treatment.

In all probability, a shortage of treatment options will emerge gradually, because the pandemic usually develops in stages. In that respect, all possible measures shall first be taken to increase treatment capacity, e.g. reorganisation of hospitals or the mobilisation of additional temporary staff, provisional nursing places and drug reserves.

During the **first stage**, everyone who needs treatment will receive it. This stage will continue until the number of individuals requiring treatment exceeds the capacity of even the expanded treatment facilities. In this stage treatment is administered to individuals on a "first come, first served" basis or to those who are already being treated for another illness.

The **second stage** begins when the exhausted therapeutic capacities make it impossible to treat everyone anymore and some have to be turned away. In this stage, the scarce therapeutic resources are reserved for those individuals whose condition is most threatening.

Finally, there is the **third stage**, which corresponds to the triage used in disaster and war medicine. Right from the outset of this stage, the scarce resources are reserved for influenza patients in a life-threatening condition. When all those who are in a life-threatening condition can no longer be treated, priority will be given to those who are expected to have the best chance of survival as a result of treatment. Conversely, treatment in this stage will, if possible, be withheld only from those who would be unlikely to benefit from it. In this stage, individuals with a poor prognosis will only be treated palliatively; intensive treatment, for example, will not be initiated.

Preference should not be given to the treatment of individuals who are particularly important to society for "political" reasons, i.e. policymakers.

If supplies of treatment resources such as ventilators or patient beds are not (yet) limited at a certain point in time but are available in the form of warehouse stocks (e.g. drugs), it may be reasonable to bring forward the implementation of a rationing policy as part of farsighted stock management before the available resources run out.

Table III.6.1: Basic rules of distribution in different stages

Stage	Treatment resources	Individuals to be treated	Basic rule of distribution
Stage 1	Treatment resources > treatment demand	All those in need	First come, first served
Stage 2	Treatment resources < treatment demand	People in immediate danger	Depending on the situation, threat or danger
Stage 3	Treatment resources < urgent treatment need	Only those who are in a life-threatening condition	According to greater chance of survival (as with triage in disaster medicine)

6.4.3 Additional considerations

No specific persons or professions shall receive a priori and indiscriminate preferential treatment

1. No blanket preferential treatment for particular professions or groups: Prioritisation in the distribution of prophylactic and treatment measures exclusively according to occupation or broad personnel categories – without more careful consideration of the aspects for the development of distribution principles in the context of prevention and treatment outlined in chapters III.6.4.1 and III.6.4.2 – would be too imprecise and ultimately random and unsystematic. It would result in a less than ideal distribution, with people in senior positions presumably receiving a larger share, and would be detrimental to those in the lower priority categories.

2. Ongoing adjustment of distribution criteria: The interpretation and implementation of the principles of distribution must be specified for each stage of the pandemic and adapted to the specific circumstances. This task will fall to specific bodies with the necessary expertise, powers and capacities.

3. Vaccination to protect exposed healthcare personnel: Those working in the healthcare professions who are in contact with influenza patients (particularly doctors, nurses and those responsible for the technical and logistical functioning of healthcare services) have a duty, as part of their professional ethos, to continue working during the pandemic. They therefore have the right to priority vaccination. In turn, society has an obligation to ensure that these individuals receive the best possible health protection and reasonable living conditions (including financial resources) and is responsible for any consequences that might arise from the fulfilment of this obligation (illness, invalidity or death). Any person who refuses to be vaccinated must not be allowed to come into direct contact with patients suffering from influenza.

4. Discussion of the obligation for specific occupational groups to be vaccinated: The obligation to be involved in treatment in the event of a pandemic and the potential ethical dilemmas that may arise from this obligation must be discussed by peer groups and professional associations. The purpose of such discussions must be to resolve in advance the modalities for fulfilling this professional duty according to the corresponding responsibilities. The moral obligation of medical and nursing personnel to be vaccinated in the event of a pandemic must also be discussed.

5. No compulsory vaccination: Since it is a matter of principle that nobody may be vaccinated against their will, the Epidemics Act does not provide for compulsory vaccination. However, if public health is seriously endangered and no other measures are available, compulsory vaccination may be ordered for clearly defined groups of professionals. This compulsion must be lifted as soon as there is no longer a serious threat.

Hospitals can also take independent action to protect their patients, based on employment law rather than on the Epidemics Act.

6. Restrictions on freedom are only appropriate if there is a guaranteed benefit: Measures to restrict freedom (e.g. quarantine) are legitimate if they are beneficial according to the aforementioned principles (in particular the preservation of life), appropriate and necessary in view of the public interest. Their introduction must be accompanied by a detailed justification and a statement explaining why they are appropriate and necessary, what their expected benefit is and what the consequences of failing to comply will be. Care (food, medical treatment, etc.) for individuals affected by these measures must be guaranteed.

7. Avoiding all forms of stigmatisation: Those who are ill, or presumed to be ill, must be protected from stigmatisation and must continue to be treated in accordance with the requirements of medical confidentiality.

6.5 Stakeholders

The present context differentiates between the following types of stakeholders:

- Direct stakeholders: Decision-makers working in political, administrative and official bodies and the various healthcare institutions
- Indirect stakeholders: All those affected and involved

6.6 Management and coordination

Definition of specific bodies with the necessary specialist knowledge, responsibilities and capacities to carry out this specification.

Specification of the interpretation of and information on the implementation of distribution principles with regard to the pandemic stage, the nature and quantities of drugs available, the expected quantities of future supplies, the epidemiological dynamics and the specific features of the involved virus and the actual circumstances. It is impossible to define in advance which group should have priority in the event of a shortage of vaccines or drugs. It would nevertheless make sense for expert panels to develop scenarios relating to probable or conceivable situations.

7 Planning elements

7.1 Working hypotheses and assumptions

Due to the constant evolution of influenza viruses, there is no way to predict a pandemic's properties. A pandemic virus would have to be in circulation for a few weeks at least before the type and nature of the virus, its attack rate, age groups, severity, hospitalisation rate and case fatality ratio could be identified. In order to plan for a future pandemic and quantify needed resources and capacities (hospital beds, intensive care beds, etc.), however, certain assumptions regarding the epidemiology of a future pandemic virus must be made. This chapter provides an overview of the principal working hypotheses and the calculated expectations.

"Plans are worthless, but planning is everything"
Dwight D. Eisenhower

Realistic pandemic planning reflects the spectrum of possible pandemic scenarios and is flexible enough to permit an appropriate response to a pandemic. The 2009 pandemic was relatively mild and so lies at the lower end of the spectrum of possible pandemic scenarios. The hospitalisation rate per number of sick people and the number of fatalities were well below the average for seasonal flu. It should be borne in mind that the over-64 age group accounts for most of the cases of morbidity and mortality caused by seasonal flu. In contrast, the age group most severely affected by the 2009 pandemic flu was the 5 to 14 age group. Illness and hospitalisation rates fell with increasing age.[9] The excess mortality in the over-64 age group that is usually observed with seasonal flu was completely absent.

5 Ps: Planning and preparation prevent poor performance

Pandemic planning should continue to focus on worst-case scenarios, especially when calculating capacities such as hospital beds, drugs and vaccines, as the aim must be to meet maximum demand. There has been no attempt to define a range, i.e. to state minimum and maximum figures, or an apocalyptic worst-case scenario since, for planning purposes, it is more sensible to work with realistic figures.

7.1.1 Characteristics and origin of the virus

- The pandemic virus is a new subtype of the influenza A virus
- There is a wide variety of subtypes of the influenza A virus which affect animals and from which new types could develop that are adapted to and could be dangerous to humans.
- Irrespective of the origin of a new influenza virus subtype isolated from humans, its potential for human-to-human transmission and its pathogenicity cannot be predicted yet must be identified rapidly.
- The new influenza virus subtype sporadically infects individuals who have been in contact with infected animals. This type of transmission can occur in places where animals live in close proximity to humans (e.g. 1997 in Hong Kong, 2003 in the Netherlands, since 2004 in China and other Asian countries, 2009 in Mexico, 2012 in the USA). However, these infections do not necessarily lead to a pandemic.

[9] Bulletin 20, 17.05.2010 "Pandemische Grippe H1N1 2009 in der Schweiz, Wochen 17 (2009) bis 8 (2010)"

7.1.2 Time horizon, development over time and duration of a pandemic

- An influenza pandemic can start anywhere and at any time of year
- Globalisation and the associated rise in travel accelerate the spread of new influenza virus subtypes throughout the world
- If a new influenza virus subtype starts to spread and become an epidemic anywhere in the world, it is likely that this virus will also be introduced into Switzerland. Depending on the attack rate and the virulence of the virus, this will happen sooner or later. A pandemic influenza wave in Switzerland can basically start at any time of year. But mild pandemics in particular are more likely to start in the winter months
- It will take a few days or weeks for a pandemic wave to reach Switzerland and cause the first cases of illness
- Once a pandemic wave reaches Switzerland, it will take two to three weeks for the virus to spread throughout the country
- Once a flu wave has passed a certain threshold (approx. 11 ILIs per 1,000 doctor consultations are roughly equivalent to 70 ILIs per 100,000 inhabitants per week), it will last about 12 weeks. It is assumed that in small institutions (e.g. schools), an epidemic will last two to four weeks
- Several pandemic waves (subsequent waves) may occur until a seasonal pattern with a wave in winter and "normal" rates of morbidity and mortality is restored. The interval between the waves is not known

7.1.3 Key facts about transmission

- Influenza is transmitted primarily via the respiratory tract
  - Droplets (>5µm) of respiratory secretions are transmitted when infected individuals speak, cough or sneeze. Droplets fall rapidly and are transmitted over distances of up to approximately one metre
  - Contact with a surface that is contaminated by droplets of infected respiratory secretions and subsequent contact with oral/nasal mucous membrane or the mucosa of the eye is also possible
  - The possibility of transmission by aerosols (<5µm) cannot be excluded
- The incubation period for influenza is between one and four days
- Infected individuals are contagious from approximately one day before until seven days after the symptoms appear (for an average of five to seven days). The contagious stage lasts longer (up to 21 days) in children and immunosuppressed individuals
- The basic reproduction number R0 amounts to 1.1–2.0
- Most people are at risk of infection, but not everyone will be infected with the first wave, and not everyone who is infected will fall ill. A second or third wave still presents a threat to non-infected individuals

7.1.4 Rates of attack, complication, hospitalisation and mortality

- Seasonal and pandemic influenza viruses differ in their occurrence over time, their age group distribution and severity. These differences can be considerable but are not identifiable until the point at which human-to-human transmission occurs at the earliest, and most likely until a few weeks or months later.

- The attack rate (2%–5% in the case of seasonal flu) is likely to be considerably higher in children of school age – 30% to 50%, compared to 15% to 30% in adults
- The course of the disease is expected to be more severe (generally or for specific risk groups) than it is for seasonal influenza. This means that more people will develop generalised and, more particularly, pulmonary symptoms that will lead to secondary complications and/or bacterial superinfections. In the case of a mild pandemic, the course of the disease can also be comparable with that of "normal" seasonal influenza
- Up to 30% of those who fall ill seek medical advice (mostly from their general practitioners). Planning should assume a hospitalisation rate of between 1% (minimum) and 2.5% (maximum) in the event of a severe pandemic. It is also assumed that 15% of hospitalised individuals will have to be referred to intensive care
- In a severe pandemic, approximately 0.4% of those falling ill will die from complications of pandemic influenza
- Depending on severity, the number of hospitalisations and deaths can vary by a factor of 10

7.1.5 Absenteeism

- The extent of absenteeism will depend on various factors, e.g. the workplace itself, as well as the attack rate in the relevant age group. The need for employees to look after family members (e.g. children if schools are closed) can significantly increase absenteeism
- An influenza pandemic will spread faster among children, and school-age children in particular, which means that school closures are likely (chapter II.5, "Social distancing")
- School closures will have a major impact on the presence of employees at their workplaces
- It is estimated that 25% of employees will be absent from work for an average of five to eight days during a pandemic wave lasting twelve weeks
- Based on these assumptions, absenteeism will reach 10% for two weeks at the height of the pandemic wave
- Normality may be restored in schools and communes as early as four weeks after the start of a pandemic wave

7.2 Planning tool: Calculation of cantonal patient numbers, hospitalisations and fatalities

The electronic planning tool is available on the FOPH website

The FOPH provides the cantons with an electronic planning tool allowing them to calculate patient numbers, the number of hospitalisations and fatalities per canton (or another baseline population) on a uniform basis.[10] Variable planning values can be fed into the Excel spreadsheet "Planungsgrundlage Influenzapandemie Kantone" ("Planning basis for an influenza pandemic in the cantons"), which can thus be adjusted to take account of the current or potential epidemiological situation (e.g. its severity).

This calculation is based on a "do nothing" scenario, i.e. a scenario with no intervention (no antiviral drugs, no vaccinations and no public-health interventions such as school closures). The figures calculated for beds in cantonal hospitals and beds in intensive care wards form the framework of a requirements scenario independent of existing capacities.

The sections below describe the various parameters used in the planning tool and the underlying assumptions as set out in the scientific literature and the pandemic plans of other countries, the European Commission and the WHO.

[10] www.bag.admin.ch/specialised-information

7.2.1 Cumulative incidence, attack rate

According to the WHO, at least 2% to 5% of the population contract influenza-like illnesses (ILIs) during seasonal influenza epidemics. In addition, part of the population is infected subclinically. These individuals develop antibodies to the disease and are slightly infectious to susceptible individuals, but they do not develop the disease themselves. Experience has shown that illness within a population may be distributed unevenly depending on age, pre-existing conditions and frequency of contact with other people. The attack rate among school-age children, for example, can be twice as high as in the rest of the population. During the three waves of the 1918/1919 pandemic, up to one quarter of the Swiss population fell ill. The FOPH bases its pandemic plan on an attack rate of 25% of the population.

7.2.2 Hospitalisation rate

Between 2005 and 2014, between 0.3% and 1.1% of those who contracted seasonal influenza in Switzerland required hospitalisation. The proportion was between 1.5% and 4.3% in the over-65 age group. The hospitalisation rate usually varies more during a flu pandemic. During each of the two "milder" pandemics in 1957 and 1968, approximately 1.0% of those who fell ill were hospitalised. However, there were also other patients who, given their state of health, should have been hospitalised. Although there are no exact figures on hospitalisation during the 1918/1919 pandemic, the high mortality rate suggests that several per cent of those who had contracted flu should have been hospitalised.

A hospitalisation rate of 1.0% is assumed in the European Union's pandemic plan; the WHO calculates a rate of between 0.64% and 2.2% in "high-income countries"; individual countries assume even higher rates (table III.7.1). The efficacy of medical and public-health interventions will not be known until the start of the pandemic wave in Switzerland. For example, there may be resistance to antiviral drugs; and in the absence of effective interventions, a requirement scenario that includes a hospitalisation rate of 2.5% of all ill individuals is considered adequate.

The FOPH recommends that the cantons should plan for a hospitalisation rate of 1.0% of all patients (over a three-month period) as a minimum level of preparedness in the context of a 25% attack rate.

At the same time, the cantons should have surge-capacity plans showing how they would cope with a hospitalisation rate of 2.5% of all patients if a pandemic with an "aggressive" virus were to develop or if certain medical interventions were to prove ineffective.

7.2.3 Patients requiring intensive care

The European Commission and the American CDC assume that 15% of hospitalised patients will be so ill as to require intensive care. There are few figures on intensive care rates, but the scale can be estimated based on the number of deaths and the medical facts on influenza. The FOPH assumes that 15% of hospitalised patients would need intensive care in a severe pandemic.

7.2.4 Case fatality ratio

The European Commission's pandemic plan and the plan of the UK's National Health Service assume a case fatality ratio of 0.025% to 2.5% of all patients; for planning purposes the case fatality ratio recorded in 1957 (0.37%) serves as a baseline.

The case fatality ratio of seasonal influenza in Switzerland is between 0.3% and 1.0% in extreme years, which is why the FOPH proposes a total case fatality ratio of 0.4% of patients for planning purposes. This figure is slightly higher than the figure for seasonal influenza in Switzerland.

7.2.5 Duration of the pandemic

Experience with previous pandemics shows that several waves of illness must be expected. This is because of mutations in the genome of influenza viruses, which produce slightly modified variants. The extent and duration of subsequent waves will be determined by the infection rate during the first wave, by the characteristics of the virus and the interventions (treatment, vaccination, social distancing, etc.).

Subsequent waves are not taken into account in the planning tool. The assumption is of a wave lasting 12 weeks, during which a maximum of 25% of the population will fall ill.

7.2.6 Distribution of cases

The planning tool calculates the weekly distribution of cases during the assumed 12-week period. It should be borne in mind that not all who fall ill will do so at the same time; only a small number of people will develop influenza at the start and end of the pandemic wave. Assuming a total attack rate of 25% and a duration of illness of seven days, the number of illnesses is expected to peak in the fifth week, when close to 6% of the population will be ill at the same time. The average length of hospitalisation or occupancy of an intensive care bed is also assumed to be seven days.

Table III.7.1: Summary of expected values

	Morbidity, attack rate → % of population sick, cumulative	Hospitalisation rate → % of sick people hospitalised	Intensive care (ICU) rate → % of hospitalised patients requiring intensive care	Case fatality ratio → % of patients who die	Mortality, death rate → number of deaths per 100 000 inhabitants
Observed figures:					
Seasonal flu (CH Sentinella data)	2%–5% (CH ILI)	0.4%–0.8% (CH, total) 1.8%–4.8% (CH, in the over-65 age group)		Approx. 0.3% (CH)	6–14 (CH) 5–18 (USA) 50–58 (CH, only over-65s)
2009/2010 pandemic in Switzerland	3.7%[11] (CH ILI)	0.2%	0.8%	0.006%	0.232; no excess mortality in the over-64s!
1968 pandemic	11%–49% (USA, depending on age group)	0.58%		0.15% (worldwide, morbidity 20%)	12 (CH)
1957 pandemic	10%–42% (USA, depending on age group)	0.94%		0.37% (worldwide, morbidity 20%)	29 (CH)
1918/1919 pandemic	up to 25% (CH, during 3 waves)			3.6%	560 (CH, only 1918)
Hypothetical requirements: pandemic plans[12]					
Australia	7%–35%	1.2%–3%		1%–2.5%	66–223
Denmark	25%	0.55%	10%	0.37%	92.5
European Union	30%	1%	15%	0.37%	111
Ireland	25%–50%	0.55%–3.7%		0.37%–2.5%	34–179
Japan	25%	8.3%		0.53%–2%	
Mexico	10%–50%	10%		1%	100–500
Netherlands	30%	1.6%–4%	10%	0.6%–1.9%	43.1
New Zealand	40%			2%	825
United Kingdom	30%–50%	1%–4%		0.025%–2.5%	92.5
USA: CDC	20%–30%	1.25%–12%	20%–30%	0.08%–2%	15–600
WHO	25%–45%	no target		no target	no target
FOPH planning					
Parameters	25%	2.5% (min. 1%)	15%	0.4%	100
Absolute figures CH (= 8 million inhabitants)	2 000 000 patients	50 000 cases requiring hospitalisation	7 500 patients requiring intensive care	8 000 deaths	8 000 deaths

[11] Bulletin 20, 17/05/2010 "Pandemische Grippe H1N1 2009 in der Schweiz, Wochen 17 (2009) bis 8 (2010)"
[12] This is a (non-exhaustive, partly based on indirect calculations derived from multiple parameters) compilation of statistics pulled from other pandemic plans. These figures serve as indications to give an idea of the scale.

7.3 Economic consequences of an influenza pandemic

The effects of a severe epidemic or pandemic have been explored in various macroeconomic studies which analysed the experiences of previous influenza epidemics and the SARS epidemic of 2003.

The findings of various studies[13] point to a drop in GDP of between 0% and 6%. The higher figures are of the magnitude experienced during the post-1945 recessions, while the lower values are below the threshold which defines a recession. According to the Federal Office for Civil Protection, a strong-impact pandemic will result in an expected cost of damage in the low tens of billions.[14]

The resulting costs reflect the personnel and material resources used. The direct costs incurred by the health system must, furthermore, be distinguished from the indirect costs, which arise mainly outside the health system.

While the health system is placed under extreme strain during a pandemic, the additional costs are limited by the performance capacity of the health system. The care of influenza patients will to some extent be provided at the expense of usually rendered medical services, which will be postponed until the situation has started to normalise. To a certain extent, there will be no demand for these services while they are being postponed. The impact of this substitution on costs has not been quantified.

The costs of a pandemic could amount to several billion Swiss francs

The indirect costs are even higher than the direct costs. Indirect costs are incurred as a result of the public- and private-sector efforts to avoid infection and reduce the disease burden. Absenteeism is the principal cost element in this context (cf. chapter 7.1.5).

Additionally, many sectors of the economy are likely to face a drop in demand for products and services. The most severely affected sectors would be transportation, hotels and restaurants, culture and sport. As was the case during the SARS crisis, the outbreak of a disease of this kind almost immediately leads to a decline in passenger transport. In such a situation, both longer journeys and shorter leisure trips are avoided.

The two prime cost factors, absenteeism and a drop in demand, depend largely on the public mood, which emphasises the vital importance of official communication.

[13] -MAPI VALUES, The economics of pandemic influenza in Switzerland (2003) and MAPI VALUES, The economic impact of influenza in Switzerland – interpandemic situation (2003)
-Grobabschätzung der wirtschaftlichen Folgen einer Grippe-Pandemie für die Schweiz, Thomas Ragni, SECO, internal document
-Congressional Budget Office: A potential influenza pandemic: possible macroeconomic effects and policy issues (2005); an update on possible macroeconomic effects and policy issues (2006)
-European Commission, Directorate General for Economic and Financial Affairs (2006): The macroeconomic effects of a pandemic in Europe – a model-based assessment. Study by L. Jonung and W. Roeger
-Evaluating the economic consequences of avian influenza. Andrew Burns, Dominique van der Mensbrugghe, Hans Timmer, World Bank, September 2008
-Could swine flu tip the world into deflation? Oxford Economics (2009)

[14] Katastrophen und Notlagen Schweiz 2015, Federal Office for Civil Protection (FOCP)

8.1 Introduction

An influenza pandemic can put significant strain on business infrastructure and, consequently, on business processes. It is therefore vital for businesses to make early and thorough preparations for a pandemic. Employers account for their economic importance by accepting the responsibility imposed on them by law for the health of their employees in the event of an influenza pandemic.

This chapter summarises the key aspects of workplace preparedness. For more detailed information, see the "Pandemic Plan – Manual for workplace preparedness"[15] document (not available in English). This document describes the principles of workplace pandemic planning. It offers recommendations on in-house measures businesses can take in the event of a flu pandemic, along with practical tips on organising resources, structures and operational processes. An updated version of the manual for workplace preparedness was published in August 2015.

Businesses should anticipate that the number of staff missing work may noticeably exceed the number who contract influenza

8.2 Targets

- Assessing risks and planning measures appropriate for the situation
- Minimising the risk of infection at the workplace through animal-to-human or human-to-human transmission
- Maintaining the social and economic infrastructure, particularly public services

[15] www.bag.admin.ch/pandemieplan-kmu

8.3 Measures

Table III.8.1: Workplace measures

Possible measure	Explanation	Confederation guidelines and recommendations
Preparation	• Analysis of occupational exposure and infection risks • Planning protective measures, notification of needed resources, specification of when materials are to be procured • Assessing whether employees belong to a risk group and should therefore be vaccinated against seasonal flu	"Pandemic Plan – Manual for workplace preparedness"
Business continuity management	Business continuity management (BCM) as part of risk management	
Information	• Informing the workforce regarding current recommendations issued by health authorities • Notifying workforce of the implementation of behavioural measures • Informing business partners and customers about ordered protective measures	
Protective measures	• Specific instructions to employees on the implementation of ordered measures • Protective measures are to be selected in accordance with the degree of exposure. Where necessary, appropriate protective measures and protective equipment are to be taken/provided for individuals at particular risk of exposure within the company	
Authorised absence from work	Employees who think they show signs of influenza (temperature ≥38°C and at least one of the following: cough, respiratory problems, sore throat) should not go to work or should leave their workplace. In both cases, the employee's superior is to be informed (by phone) and the patient should seek medical advice (also by phone) from home. The individual should not return to work until at least five days after the symptoms have subsided	
Cleaning and disinfection	Objects and surfaces in areas used by employees who might have influenza must be thoroughly cleaned or disinfected	
Vaccination	Businesses themselves decide, in consultation with the cantonal authorities, whether a company-wide programme of vaccination for seasonal or pandemic influenza should be carried out. They are responsible for organising and funding any such programme	Chapter II.12

9.1 Introduction

In response to the SARS crisis, the Confederation (FOPH), which is responsible for border measures, has refined the airport concept which has been in existence since 1995 and developed it into the **Airport Network for Travel Medicine (FNRM)**. The network includes the three national airports with intercontinental flights – Basel-Mulhouse, Geneva-Cointrin and Zurich-Kloten – and the airports with flights within Europe – Bern-Belp, Sion-Sitten, St Gallen-Altenrhein and Lugano-Agno. Basel-Mulhouse airport has a special status, since it is located on French territory and is therefore subject to French legislation, while being governed by binational customs legislation.

Over the past few decades there has been a significant rise in the international mobility of people and goods, which has also accelerated the spread of communicable diseases

The current rules governing airports are set out in the Ordinance of 29 April 2015 on Combating Communicable Human Diseases (Epidemics Ordinance, EpV, SR 818.101.1) and the International Health Regulations (IHR 2005), which were adopted by the World Health Assembly in May 2005 and entered into force in Switzerland in June 2007. The airports have adopted guidelines on the preparation and updating of emergency plans relating to infectious diseases in the context of the FNRM in order to facilitate the implementation of these statutory provisions. The airports regularly revise their emergency plans to take account of statutory provisions. Due to its binational nature, Basel-Mulhouse airport is an exception: in this case, the ARS[16] Alsace is responsible for emergency planning related to infectious diseases. Authorisation for the distribution of posters and leaflets has to be obtained from the Préfecture du Haut-Rhin, France.

IHR (2005) provisions require signatories to designate airports responsible for creating and maintaining specific capacities[17] to ensure a rapid response to health emergencies. On 16 April 2013 the Federal Council designated Zurich and Geneva airports for that purpose.

9.2 Targets

The aim of airport measures is to prevent the import and/or export of pandemic viruses by infected travellers.

The Swiss Influenza Pandemic Plan does not contain measures aimed at stopping the introduction of a new influenza subtype into an animal population via the import and/or export of animals or products of animal origin. Information on this topic can be obtained from the website of the Federal Food Safety and Veterinary Office (FSVO).[18]

9.3 Measures

The Confederation is responsible for measures at airports in conjunction with the border medical officers working at the airports in question. The details of implementation, as well as

[16] Agence Régionale de Santé Grand Est
[17] IHR (2005), annex 1.B
[18] www.blv.admin.ch/ein_ausfuhr/index.html?lang=en

the distribution of documents relating to the implementation of measures, are described in the respective airports' emergency plans and depend on the epidemiological situation. The Confederation bears the costs of measures affecting international passenger transport that are ordered by its bodies.[19]

The following measures may be carried out at airports:

- **Informing passengers by means of:**
  - Screens
  - Posters
  - Leaflets
  - Messages read out by cabin crew in the plane
- **Contact tracing by means of:**
  - Contact cards
  - Information taken from passenger lists
- **Screening by means of:**
  - Health questionnaires
  - Medical checks when entering and/or leaving the country (entry/exit screening)
- **Flight diversion (chapter III.9.3.4)**

9.3.1 Informing passengers

The aim of informing passengers is to make travellers aware of an extraordinary situation and to encourage them to take certain precautionary measures and follow behavioural rules. The passengers' diverse cultural and language backgrounds must be taken into account as much as possible when preparing such information.

Table III.9.1: Informing passengers

Method	Explanation
Screens	The use of screens in baggage reclaim areas has the following advantages: flexibility (information can be updated regularly), speed (within one or two days) and logistic simplicity (available on site). Screens are the ideal medium for disseminating recommendations that can be adjusted to reflect the course of the pandemic.
Posters	Posters can provide general information about the pandemic and can be displayed at strategic points of the airport. However, it takes quite a long time (at least ten days) for posters to be printed and delivered.
Leaflets	Leaflets can provide general information and recommendations in various languages and can be distributed passively (from dispensers) or actively (handed out at the gate by airline staff).
Messages read out by cabin crew	Targeted information is given to passengers travelling to Switzerland in the form of messages produced by the FOPH and read out by cabin crew. These messages can contain both specific information about measures taken at the airport (contact cards, health questionnaires, etc.) and general information on preventive measures to guard against infection.

[19] Art. 74 para. 1 EpidA

9.3.2 Contact tracing

In the context of international passenger travel, the term "contact tracing" refers to the tracing of contacts between healthy passengers (contacts) and one or more passengers with an infectious disease. The powers, measures and procedures relating to contact tracing at the national level are described in chapter II.4, "Contact management".

Table III.9.2: Contact tracing

Method	Explanation
Contact cards	Contact cards are used specifically to record passengers who during the flight were in contact with individuals known or thought to be infected with the HxNy flu virus or who travelled from an affected region to Switzerland on a direct flight.
Passenger lists	If an individual is diagnosed with influenza within a few days of taking a flight, and this individual may already have been infectious at the time of the flight, passenger lists can be used to identify passengers who might have come into contact with this infectious case.

9.3.3 Medical screening

Medical screening of travellers who might be sick and/or infectious allows them to receive the necessary care without delay. It also allows for targeted measures to be taken to help prevent the spread of a pandemic virus.

As large numbers of healthcare professionals are needed to carry out medical screenings, a plan has been devised in consultation with the Medical Services Directorate[20] for the army to assist civilian specialists at Zurich and Geneva airports (FOPH-BUG CH).

The FOPH makes the decision to implement entry and exit screenings in consideration of WHO, ECDC and HSC recommendations and the measures taken by EU countries.

Multiple studies have shown the efficacy of medical screenings at airports and the cost–benefit ratio to be modest. Furthermore, an exit screening in the country where the epidemic started is more effective and more cost-effective than the introduction of entry screenings. But if the affected country has not yet introduced such a measure, or if implementation is considered inadequate, entry screenings may be introduced in Switzerland.

In the specific case of a flu pandemic it is unlikely that a medical screening may be able to stop its spread. That measure does, however, have the advantage of providing a certain sense of safety to the population as well as informing passengers and raising their awareness for appropriate behaviour.

[20] Army Medical Service, Medical Services Directorate, DDPS

Table III.9.3: Screening

Method	Explanation
Health questionnaire	Passengers complete a health questionnaire on infectious diseases before, during or after their trip. Depending on the information provided, this questionnaire may be followed up by non-invasive medical screening carried out by healthcare professionals.
Entry screening	Passengers travelling to Switzerland undergo entry screening, which can consist of a non-invasive medical examination, review of health documentation and/or lab results, etc.
Exit screening	• Passengers leaving Switzerland undergo exit screening, which can consist of a non-invasive medical examination, review of health documentation and/or lab results, etc. • In order to ensure that passengers leaving the country are recorded efficiently, any exit screening must be carried out before boarding cards are checked.

Comments:
According to a general principle of international law, a state has sovereignty over all individuals in its territory, including foreign nationals and those bearing special privileges or immunity. The measures introduced in Switzerland thus also concern individuals of privileged status (with exceptions to be decided on a case-by-case basis). A person's status can, therefore, not be deemed a hindrance to implementation of the measures. Diplomatic and consular representatives as well as international organisations must be informed in detail by the Federal Department of Foreign Affairs (FDFA).[21]

9.3.4 Flight diversion

There is no statutory foundation allowing flights to be diverted purely on epidemiological grounds. The pilot decides where to land in the light of advice given by the border medical officer of the airport in question.

9.4 Tasks and powers

The FOPH is responsible for providing all information relating to measures to be taken at airports. The documents are distributed by the FNRM. The various authorities at the airport are then responsible for implementing these measures. Details of the procedures, such as distribution and evaluation of questionnaires, are described in the individual airports' emergency plans.

[21] Statement by the Directorate of International Law (DIL)

Table III.9.4: Tasks and powers[22]

Stakeholder	Powers
FOPH	• Preparation of documents (posters, leaflets, contact cards, etc.) during interpandemic stages • Decision on the formats in which screen information should be displayed • Development, adaptation and translation of recommendations (screen information, posters, leaflets, messages for airlines, etc.), contact cards and health questionnaires • Distribution of documents (screen information, posters, leaflets, contact cards, health questionnaires, etc.) to all airports that belong to the FNRM
	• Request for passenger lists from airlines • Review of passenger lists and circulation to cantonal medical officers
	• Development, organisation and implementation of entry and exit screening programmes for Zurich and Geneva airports, which have been designated under the IHR (2005), on the basis of the FOPH-BUG concept
Army (Armed Forces Logistics Organisation AFLO)	• Operative management of medical entry and exit screenings at the designated airports of Zurich and Geneva (according to FOPH-BUG concept)
Airports	• Identification of the best locations at which most passengers can be reached by screens, posters, leaflets, etc. • Provision of copy for the screens, posters, leaflets, etc., at predetermined locations and in line with the airport's resources (passive distribution) • Distribution of messages, contact cards and health questionnaires to airlines • Provision of staff and infrastructure to implement entry and exit screenings
Airlines	• Active distribution of leaflets, contact cards and health questionnaires, either on the plane or at the gate, to passengers arriving from or travelling to affected countries • Reading out messages on planes
	• Release of passenger lists to the FOPH
Cantons	• Receipt of passenger lists distributed by the FOPH and implementation of measures in accordance with chapter II.4, "Contact management"

9.5 Communication and coordination

The FOPH is responsible for communicating and coordinating the implementation of measures in airports and for disseminating information relating to these measures in consultation with the affected airports.

[22] Chapter 4 para. 1 EpV

PART IV Annexes

1 Checklist for hospitals and sociomedical institutions

This checklist is for use by hospitals and other providers of inpatient medical care in planning operational measures relating to an influenza pandemic. It complements chapter III.8, "Businesses".

Internal pandemic plan (business continuity plan)	
Section on organisational measures/responsibilities	☐ yes ☐ no
Section on protection of personnel	☐ yes ☐ no
Section on raising awareness among and training of personnel	☐ yes ☐ no
Certain activities (training, elective surgery, research, etc.) suspended to give priority to activities that are essential to the preservation of life	☐ yes ☐ no
Concept for (internal and external) communication has been developed	☐ yes ☐ no
Logistics for triage (rooms, personnel, etc.) has been provided	☐ yes ☐ no
Need for technical services (water, electricity, oxygen supply, communication networks, waste disposal, various supply services) has been assessed	☐ yes ☐ no
Plan for mobilising additional resources exists (including civilian service)	☐ yes ☐ no
Coordination plan with the authorities (health system, disaster planning and political authorities) has been developed	☐ yes ☐ no
Material, premises, environment	
Adequate quantities of materials for patients (masks, antiviral drugs, antibiotics, other frequently used drugs, disinfectants, textiles, oxygen, disposables) are available; first-response material is available for a small number of patients/suspected cases in the early stage of the pandemic	☐ yes ☐ no
Plan for using rooms (admissions, cohorting, intensive care, mortuary, emergency centre, additional intensive care beds, X-ray) has been developed	☐ yes ☐ no
Storage and need for various materials (disinfectants, bed linen/other textiles, laboratory and X-ray material, etc.) have been assessed	☐ yes ☐ no
Storage and need for equipment (respirators for adults and children, pulse oximeters) have been assessed	☐ yes ☐ no
Storage and need for food and drink have been assessed	☐ yes ☐ no
Arrangements have been made for meal transport and handling of crockery	☐ yes ☐ no
Storage and need for antiviral drugs and protective masks have been assessed, taking account of the quantities available in the federal reserves and compulsory stockpiles for the cantons	☐ yes ☐ no
Procedures for cleaning and disinfecting material and rooms are in force	☐ yes ☐ no
Direction boards to facilitate the flow of people inside and outside the hospital have been installed for use during the cohorting stage	☐ yes ☐ no
Waste disposal has been organised	☐ yes ☐ no
Personnel	
Implementation of measures to prevent infection (in accordance with plan)	☐ yes ☐ no
Need for protective material (personal protective equipment) based on number of individuals involved in care has been assessed	☐ yes ☐ no
Required quantities of protective material have been procured	☐ yes ☐ no
Recommendations for use of personal protective equipment have been set up and personnel trained	☐ yes ☐ no
Coordination with authorities (cantonal/federal) to distribute antiviral drugs has been implemented	☐ yes ☐ no

Personnel	
Distribution of antiviral prophylaxis drugs to personnel who are in contact with patients with suspected or confirmed infection	☐ yes ☐ no
Concept for monitoring of adverse effects in healthcare personnel is ready for use	☐ yes ☐ no
Vaccination of personnel who are in contact with patients with suspected or confirmed infection	☐ yes ☐ no
System for recording numbers of absences is ready for use	☐ yes ☐ no
Individuals with influenza symptoms have been stopped from coming to work	☐ yes ☐ no
Working hours have been adapted to requirements and organisation	☐ yes ☐ no
Working concept for nursing staff on cohorting wards (working hours, breaks, time off, behaviour outside the workplace, psychological support) is ready for use	☐ yes ☐ no
Triage of suspected cases and first-response measures	
Algorithm for treating suspected cases is known	☐ yes ☐ no
Reporting and sampling criteria are known	☐ yes ☐ no
Procedure to be followed in case of suspected cases or symptoms is known	☐ yes ☐ no
Immediate protective measures are known and can be implemented	☐ yes ☐ no
Designated hospitals are known and patient transfer options have been prepared	☐ yes ☐ no
Procedure for handling suspected cases is defined: accommodation, isolation in patient rooms, medical care	☐ yes ☐ no
Concept for remote triage centre (outside emergency departments)	☐ yes ☐ no
Inside emergency departments: triage algorithms (for adults and children) are known	☐ yes ☐ no
Algorithm for dealing with cases of influenza in patients who are already hospitalised is known	☐ yes ☐ no
System for registering cases (triage, admission to cohorting and intensive care wards, available beds, fatalities and transfers) is ready for use. The process for transferring these data to the health authorities (cantonal/federal) is known. The data can be used for in-house hospital management (staff reallocation, bed occupancy, etc.).	☐ yes ☐ no
Crisis committee has been deployed and is functional	☐ yes ☐ no
Patients	
Procedure for dealing with patients has been prepared: isolation and medical care (knowledge and care transfer on the part of doctors/care personnel is ensured)	☐ yes ☐ no
Scenarios for expected number of patients are known (depending on how long the pandemic lasts)	☐ yes ☐ no
National guidelines regarding (medical and ethical) criteria for admission to intensive care, exclusion and discharge are known	☐ yes ☐ no
Treatment of one or more suspected cases of infection with the new virus subtype in which human-to-human transmission has been confirmed	☐ yes ☐ no
Treatment guidelines have been developed (diagnosis, therapy, criteria for removal from isolation, criteria for discharge)	☐ yes ☐ no
Concept for family visits (permission, safety, information by means of leaflets, etc.) has been devised	☐ yes ☐ no
Permanent availability of psychological and pastoral support	☐ yes ☐ no
Transmission of data to the authorities (case reporting, number of admissions)	☐ yes ☐ no
Procedure for dealing with the deceased has been set up	☐ yes ☐ no

2 Pandemic preparedness checklist

Pandemic preparedness involves many areas of society. Many non-medical areas are affected in addition to the leading federal and cantonal public health institutions. Concerted action by all stakeholders during a pandemic is a complex process. The main targets, stakeholders and their roles must therefore be defined and coordinated as part of the planning.

The checklist defines the critical elements of pandemic preparedness. It is designed to aid the development and review of the cantonal pandemic plans in view of the degree of pandemic preparedness and compatibility with the Swiss Influenza Pandemic Plan.

The checklist is drawn up in accordance with the structure of the Swiss Influenza Pandemic Plan and takes the "Pandemic Plan – Manual for workplace preparedness"[1] (not available in English) and the WHO guidance (Pandemic Influenza Risk Management)[2] into account where appropriate. The left-hand column indicates the relevant chapters of the Swiss Influenza Pandemic Plan, while the heading of each section lists the targets and primary indicators. The secondary indicators are listed further down in each section.

Development of cantonal pandemic preparedness plans			
	Target	**Primary indicators**	**Status**
I.2 **I.3**	**There is a multisectoral framework plan showing all preparatory measures in the canton**	• **Pandemic plan** • **Basics of crisis management plan exist**	☐ **yes** ☐ **partly** ☐ **no**
	Secondary indicators		
	The cantonal pandemic plan was drawn up in accordance with the Confederation's guidelines		☐ yes ☐ no
	The cantonal pandemic plan takes account of existing agreements on cross-border cooperation with surrounding countries		☐ yes ☐ no
	The cantonal pandemic plan has been coordinated with the neighbouring cantons (horizontal coordination)[3]		☐ yes ☐ no
	Mutual support agreements with the neighbouring cantons exist		☐ yes ☐ no
	The cantonal pandemic plan takes account of communes/cities (vertical coordination)		☐ yes ☐ no
	The cantonal pandemic plan is updated regularly		☐ yes ☐ no
	Specific cantonal features are taken into account in the planning principles		☐ yes ☐ no
	The cantonal pandemic plan distinguishes between individual escalation stages		☐ yes ☐ no
	The pandemic plan contains provisions for maintaining essential services. Essential services include: emergency and rescue services (AORS)[4], hospitals, retirement homes, nursing homes and homes for the disabled, Spitex, businesses operating in the energy, water, food, pharmaceutical, traffic and transport, finance, postal, ICT, education and waste disposal sectors.		☐ yes ☐ no
	The essential services have emergency plans		☐ yes ☐ no
	The essential services have business continuity management plans (BCM)[5]		☐ yes ☐ no
	The essential services have pandemic plans		☐ yes ☐ no
	There are detailed operational plans for enforcing measures		☐ yes ☐ no
	The resources needed to enforce measures have been ascertained and are available		☐ yes ☐ no

[1] ww.bag.admin.ch/pandemieplan-kmu
[2] www.who.int/influenza/preparedness/pandemic/influenza_risk_management_update2017/en/
[3] Art. 40 EpidA
[4] Authorities and Organisations for Rescue and Security
[5] www.bag.admin.ch/influenza/01120/01134/03058/04319/index.html?lang=en

	Checklists for public administrations in the cantons and communes have been produced	☐ yes ☐ no
	Drills for essential processes (management, coordination, communication) have been planned	☐ yes ☐ no

Management and coordination in the cantons			
	Target	**Primary indicators**	**Status**
I.2 I.3	**Bodies and their roles and responsibilities have been identified. Management and control systems have been established at all levels.**	• **Clear management structure** • **Defined interfaces with the Confederation and other cantons**	☐ **yes** ☐ **partly** ☐ **no**
	Secondary indicators		
	The cantonal management hierarchy in the event of a pandemic has been defined and is known to the bodies involved		☐ yes ☐ no
	The distribution of tasks between the cantonal leadership organisation (KFO) and the cantonal health system (cantonal medical officer, cantonal pharmacist, cantonal veterinary officer, etc.) has been defined		☐ yes ☐ no
	Arrangements have been made for the secondment of staff to national coordinating bodies		☐ yes ☐ no
	Arrangements have been made to coordinate the enforcement of measures as the pandemic escalates		☐ yes ☐ no
	The management hierarchy includes the administrative regions (districts, etc.) and the communes		☐ yes ☐ no
II.2	Communication within the management structure has been established		☐ yes ☐ no

Communication			
	Target	**Primary indicators**	**Status**
II.2	**All stakeholder groups can be supplied with the necessary information**	• **Concepts** • **Channels of communication**	☐ **yes** ☐ **partly** ☐ **no**
	Secondary indicators		
	The communication hierarchy within the cantonal management structure has been defined		☐ yes ☐ no
	The canton is represented in the FOPH communication core group		☐ yes ☐ no
	The canton is represented in the CMS SANKO		☐ yes ☐ no
	The detailed exchange of information between the Confederation and the cantons regarding the enforcement of measures is ensured		☐ yes ☐ no
	Means of communication with the cantonal and regional medical societies, doctors in private practice as well as hospitals and psychiatric wards/rehab facilities have been established		☐ yes ☐ no
	Means of communication with the employers' federation, communal presidents, the administration (other departments, in particular the Department of Education) have been established		☐ yes ☐ no
	Means of communication with institutions employing medical personnel, rescue personnel, healthcare and/or care personnel have been established		☐ yes ☐ no
	There is a cantonal liaison for medical questions		☐ yes ☐ no
	Communication channels for multipliers have been established		☐ yes ☐ no
	Cantonal information campaigns can be conducted according to federal guidelines		☐ yes ☐ no

Monitoring			
	Target	**Primary indicators**	**Status**
II.3	**Threats to public health can be identified and affected cases can be monitored**	• **Monitoring systems** • **Laboratory resources for primary diagnosis**	☐ **yes** ☐ **partly** ☐ **no**
	Secondary indicators		
II.3	Outbreaks in schools, homes, crèches can be recognised promptly		☐ yes ☐ no
	Known and suspected cases of influenza or clusters are reported or passed on as directed		☐ yes ☐ no
	The following measures can be deduced based on the monitoring: • Containment • Description of epidemiological development • Care planning (vaccines, hospital beds, ICU) • Protection of risk groups		☐ yes ☐ no
Contact management			
	Target	**Primary indicators**	**Status**
II.4 **II.7**	**Outbreaks can be delayed and risk groups protected**	• **Uniform concepts** • **Resources**	☐ **yes** ☐ **partly** ☐ **no**
	Secondary indicators		
II.6	Resources are available for contact tracing		☐ yes ☐ no
	A concept for contact tracing exists		☐ yes ☐ no
	Resources are available for quarantine and isolation measures		☐ yes ☐ no
	A concept for quarantine and isolation measures exists		☐ yes ☐ no
	A case management concept exists		☐ yes ☐ no
School closures and bans on events			
	Target	**Primary indicators**	**Status**
II.5	**School closures and bans on events can be implemented as appropriate**	• **Agreed concepts**	☐ **yes** ☐ **partly** ☐ **no**
	Secondary indicators		
	Responsibilities for school closures and bans on events have been resolved and communicated		☐ yes ☐ no
	A concept for school closures exists[6]		☐ yes ☐ no
	The concept for school closures is coordinated with the neighbouring cantons, communes and schools		☐ yes ☐ no
	A concept for bans on events exists in accordance with FOPH recommendations		☐ yes ☐ no
	The concepts are coordinated with the neighbouring cantons		☐ yes ☐ no

[6] According to Art. 40 EpidA and Pandemic Plan chapter II.5

Ensuring medical care			
	Target	**Primary indicators**	**Status**
II.6 II.11 II.12 III.6 IV.2	**There are enough beds and drugs to protect the population**	• **Beds and drug reserves** • **Distribution concept** • **Interfaces for logistics arrangements** • **Resources**	☐ **yes** ☐ **partly** ☐ **no**
	Secondary indicators		
II.6 II.9–12	Stocks of drugs and medicinal products (protective masks, examination gloves, disinfectants) have been prepared in hospitals, Spitex, rescue services, homes and other healthcare institutions[7] in line with federal recommendations, or plans have been made for their distribution to these institutions by the canton		☐ yes ☐ no
IV.2	Preparedness in hospitals and sociomedical institutions is monitored		☐ yes ☐ no
	Hospitals responsible for caring for suspected cases in the early stage of the pandemic have been designated		☐ yes ☐ no
	Transport to a designated hospital is set up		☐ yes ☐ no
	The capacities of the current health system are known. The following aspects of the system can be coordinated according to the escalation stage: • Treatment options • Nursing and care options • Bed capacities • Intensive care beds (particularly for children) • Counselling for patients and their relatives		☐ yes ☐ no
	There is a person identified by name in the canton who is authorised to direct the above coordination if necessary		☐ yes ☐ no
	Reception points for vaccines and antiviral drugs have been defined and reported to the Confederation		☐ yes ☐ no
	Implementation, monitoring and ensuring of needs-based distribution of drugs in the canton has been organised		☐ yes ☐ no
	The provision of additional resources to allow vaccination to start uniformly and for mass vaccinations has been settled		☐ yes ☐ no
	Funding and legal questions at the cantonal level have been resolved		☐ yes ☐ no
	Destruction of surplus vaccines stored in the canton has been organised		☐ yes ☐ no
	Handling the deceased: storage, transport and burial/cremation capacities have been defined		☐ yes ☐ no

[7] Veterinary services are to be taken into consideration insofar as animal-to-human transmission plays a part.

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https://ecdc.europa.eu/en/seasonal-influenza/preparedness/influenza-pandemic-preparedness-plans

FOPH website on the Pandemic Plan: www.bag.admin.ch/pandemicplan

4 Abbreviations

AFLO	Armed Forces Logistics Organisation
AFP	Armed Forces Pharmacy
ARS	Agence Régionale de Santé Grand Est
BSS	Blue Screen Switzerland
CCG	Conference of the Cantonal Governments of Switzerland
CDC	Centers for Disease Control and Prevention (USA)
CivSO	Ordinance of 11 September 1996 on Alternative Civilian Service (SR 824.01)
CMO	Cantonal medical officer
CMPH	Swiss Conference of the Cantonal Ministers of Public Health
CMS	Coordinated Medical Services
CSA	Federal Act of 6 October 1995 on Alternative Civilian Service (SR 824.0)
CVO	Cantonal veterinary officer
DDPS	Federal Department of Defence, Civil Protection and Sport
ECDC	European Centre for Disease Prevention and Control
EIA	Enzyme immunoassay
FCV	Federal Commission for Vaccination
EIViS	Electronic Vigilance System
EpidA	Epidemics Act
EpV	Ordinance on Combating Communicable Human Diseases (Epidemics Ordinance)
ESD	Electronic situation display
EU	European Union
FCP	Federal Commission for Pandemic Preparedness and Response
FDFA	Federal Department of Foreign Affairs
FDHA	Federal Department of Home Affairs
FFP	Filtering face piece
FluPO	Influenza Pandemic Ordinance
FMH	Swiss Medical Association
FNRM	Flughafennetzwerk für Reisemedizin (Airport Network for Travel Medicine)
FOCP	Federal Office for Civil Protection
FOEN	Federal Office for the Environment
FOITT	Federal Office of Information Technology, Systems and Telecommunication
FONES	Federal Office for National Economic Supply
FOPH	Federal Office of Public Health
FSO	Federal Statistical Office
FSVO	Federal Food Safety and Veterinary Office
GDP	Good Distribution Practice
GMP	Good Manufacturing Practice
GOARN	Global Outbreak Alert and Response Network
GSP	Good Storage Practice
HPAI	Highly pathogenic avian influenza
IES	Informations- und Einsatzsystem (Information and Deployment System)
IES-CMS	Coordinated Medical Services Information and Deployment System
IF	Immunofluorescence
IHR	International Health Regulations
ILI	Influenza-like illness
Influenza HxNy	Name given to an as yet unknown, potentially pandemic influenza virus
IVI	Institute of Viral Diseases and Immunoprophylaxis
KAD	Kantonsärztlicher Dienst (Cantonal Medical Service)
KFO	Kantonale Führungsorganisation (Cantonal leadership organisation)

KKM-SVS	Konsultations- und Koordinationsmechanismus des Sicherheitsverbundes Schweiz (Consultation and coordination mechanism of the Swiss Security Union)
KOr EpG	Epidemics Act Coordinating Body
LPAI	Low pathogenic avian influenza
NCE	National Advisory Commission on Biomedical Ethics
NEOC	National Emergency Operations Centre
NRCI	National Reference Centre for Influenza
PCR	Polymerase Chain Reaction
PHEIC	Public health emergency of international concern (Art. 12 IGV)
RBCN regulation	Regulation on the organisation of interventions during RBC and N events
SANKO	Medical Services Coordinating Body
SAPh	Swiss Association of Pharmacists (pharmaSuisse)
SARS	Severe Acute Respiratory Syndrome
SBK	Swiss Nursing Association
SDC	Swiss Agency for Development and Cooperation
SDV	Schweizerischer Drogistenverband (Swiss Association of Druggists)
SECO	State Secretariat for Economic Affairs
SFTA	Swiss Federation of Travel Agencies
SKS	Foundation for Consumer Protection
SMEs	Small and medium-sized enterprises
SRC	Swiss Red Cross
SSI	Swiss Society for Infectious Diseases
Suva	Swiss Accident Insurance Fund
TESSy	The European Surveillance System – ECDC
TPA	Therapeutic Products Act
VIRGIL	Vigilance against Viral Resistance. VIRGIL is an organisation that coordinates pan-European research into hepatitis B and C and influenza
VKS	Swiss Association of Cantonal Officers of Health
VSP	Vaccine supply in the event of a pandemic
WHO	World Health Organization
ZIVI	Central Office for Civilian Service

5 Glossary

Aerosol	Liquid or solid particles suspended in a gas (air)
Amantadine	Antiviral drug to combat influenza A virus; an M2 protein inhibitor
Antibodies	Parts of the immune system used in the specific recognition and neutralisation of exogenous substances (antigens)
Antigens	Substances that can be recognised as foreign by the immune system and can trigger an immune response (the body's defence reaction)
Antiviral drugs	Drugs that act on specific viruses
Attack rate	Proportion of a population that falls ill, morbidity
Blue Screen Switzerland (BSS)	Web-based application for compiling, executing and analysing surveys on the medical service sector status of health system service providers
Collective	All institutions (apart from medical and nursing institutions) offering collective care for infants, children, adolescents and adults
Contact management	A measure to identify people who have been in contact with individuals suffering from a disease (such as influenza)
Contact tracing	A medical–epidemiological process of detecting specific infection chains of infectious diseases
Endemic	Present to a greater or lesser extent in a particular area (e.g. a disease)
Epidemic	Unusual pattern of a (usually infectious) disease lasting for a limited period and occurring in a limited area
Epidemiology	Study of the frequency and distribution of diseases in population groups and related determining factors
Flu	"Flu" (influenza) is a respiratory tract infection triggered by an influenza A or influenza B virus
Flu virus	Influenza virus, the pathogen that causes flu; of the various types in existence, types A and B are significant for humans
Genome	The complete set of genetic information of an organism
H1N1	The influenza A(H1N1) pathogen, a subtype of an influenza A virus with the surface proteins H1 and N1
H5N1	The pathogen that causes "bird flu" or avian influenza (a subtype of an influenza A virus with the surface proteins H5 and N1)
Haemagglutinin (H)	One of the two surface proteins of the type A influenza virus (haemagglutinin H and neuraminidase N)
HxNy	An unknown influenza virus subtype
Immune reaction	The body's reaction to penetration by foreign substances
Immunity	An organism's insensitivity to disease-causing pathogens/antigens
Immunosuppression	Suppression or weakening of the immune response (the body's defence reaction)
Incubation period	Time between infection with a disease (entry of a pathogen into the body) and the onset of the first symptoms of the disease
Indication	Reason for prescribing a specific diagnostic or therapeutic procedure for a defined illness
Influenza	Flu (see "Seasonal flu"), influenza virus
Influenza pandemic	Transnational or global spread of flu

Initial case	An initial case (previously referred to as an index patient) is the person suspected or proven to be at the origin of the spread of an illness
Isolation	Separation of sick people; housing sick animals separately
Lethality	Percentage of people contracting a disease who die of it
Morbidity	Frequency of a disease relative to a particular population group
Mortality	Measure of the frequency of deaths in the population
Mutation rate	Frequency with which changes in the genome (e.g. of a virus) occur
Neuraminidase (N)	One of the two surface proteins of the type A influenza virus (neuraminidase N and haemagglutinin H)
Neuraminidase inhibitor	Drug which can prevent viruses from leaving an infected cell, thus preventing further spread within the body and mitigating the symptoms of influenza
Nosocomial infection	Infectious disease contracted during an inpatient stay in a hospital or nursing home
Oseltamivir (Tamiflu®)	Antiviral drug, neuraminidase inhibitor effective against the influenza virus
Pandemic	Epidemic affecting a large number of countries over a very wide area
Pandemic threat	Period between the first occurrence of a new, rapidly spreading virus that causes disease in humans and the actual start of the pandemic
Quarantine	Separation of people or animals that may be infected with dangerous pathogens
Recombination	New combinations (e.g. of viral genome)
Relenza® (zanamivir)	See "Zanamivir"
Risk group	Individuals at risk because of chronic cardiovascular, pulmonary or metabolic disorders, renal failure, haemoglobinopathy or immunosuppression, or because of their age
Seasonal flu	Acute respiratory tract infection triggered by an influenza A or B virus. "Seasonal" refers to the annual outbreaks that occur mainly in winter
Sentinella	The FOPH's Sentinella reporting system is used to obtain representative epidemiological data on communicable diseases
Social distancing	Measure to avoid social contact between individuals in order to avoid the transmission of pathogens
Swine flu	Common infectious disease in humans that is caused by a variant of the influenza A virus H1N1 and that caused a pandemic in 2009/2010
Tamiflu® (oseltamivir)	See "Oseltamivir"
Virus	Pathogen that can only develop in a living cell
Zanamivir (Relenza®)	Antiviral drug, neuraminidase inhibitor effective against the influenza virus

Acknowledgement

The 2018 issue of the Swiss Influenza Pandemic Plan is based on the various earlier editions, for the development of which numerous experts have done committee work or provided editorial contributions:

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Staff of federal agencies: Elise de Aquino, Fosca Gattoni-Losey, Daniela Hadorn, Ueli Haudenschild, Rudolf Junker.

Editorial contributions: Michael Bel, Andreas Birrer, Andrea Bühlmann, Nadine Eckert, Frédéric Eynard, Thomas Jauch, Valérie Maertens, Jürgen Müller, Pierre-Alain Raeber, Jennifer Saurina, Mike Schüpbach, Anne Witschi, Patrizia Zurbrügg.

Our heartfelt thanks to all for their hard work!

Publishing information

Published by: Federal Office of Public Health

Fifth updated edition: January 2018

This publication is also available in German, French and Italian. In case of ambiguity, the German version takes precedence. It can also be downloaded as a PDF.

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Consultants: Cantonal medical officers and deputy cantonal medical officers, cantonal pharmacists, Federal Office for Civil Protection (FOCP), Federal Office for National Economic Supply (FONES), Federal Food Safety and Veterinary Office (FSVO), Institute of Viral Diseases and Immunoprophylaxis (IVI), Interlifescience, Cantonal Pharmacists' Association (KAV), College of Primary Care Medicine (KHM), Conference of Cantonal Medical Associations (KKA), Coordinated Medical Services (CMS), Armed Forces Logistics Organisation (AFLO), National Advisory Commission on Biomedical Ethics (NCE), National Reference Centre for Influenza (NRCI), Association of Swiss Communes (ASC), Swiss Union of Cities (SVC), Swissmedic, Zurich University Hospital, Swiss Medical Association (FMH), Swiss Association of Cantonal Officers of Health (VKS).

Copy editor: Textmax GmbH

Design and layout: Jürgen Müller, 2CCommunication GmbH; Zala-Grafik

Supplier:
SFBL, Distribution of Publications, CH-3003 Berne, www.bundespublikationen.admin.ch
SFBL article no. 316.519.e