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REVIEW ARTICLE

SUMMARRY OF THE SWISS VACCINATION SYSTEM

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Summary

Vaccination protects the community as a whole from serious communicable diseases, such as polio, pertussis, diphteria, measles and others. The incidence of these diseases has been successfully reduced in the last decades. Switzerland with its National vaccination strategy takes part in an international effort on public health described in WHO's 2011-2020 Global Vaccine Action Plan (1), and in the European 2015- 2020 Vaccine Action Plan (2). However, in contrast to the Czech Republic, Switzerland doesn´t have a compulsory global vaccination schedule. It only presents the vaccination recommendations. Vaccination rates are not always high enough in Switzerland and vary from one region to another.

Key words: vaccination; Switzerland; vaccination recommendations; high-risk population; national vaccination strategy

Introduction

Vaccination in the same way as every medical drug has certain risks and benefits. Every person must consider it individually. Not only healthcare professionals raise the awareness of vaccination, but also other institutions must be able to provide good advice on vaccination.

In Switzerland, vaccination involves many parties: the federal level, the cantons, healthcare and education professionals, health and training institutions, childcare centres, insurance companies, private companies and civil society organisations (3).

The Swiss vaccination schedule is developed by the Federal Commission for Vaccination and approved by the Federal Office of Public Health (4). It defines which vaccines are recommended for the whole population, and at what age they should be applied. The Federal Office of Public Health also offers a free counselling through its hotline (0844 448 448). Recommendations on vaccination in Switzerland recognize 4 groups of vaccines: basic vaccination, additional vaccination, vaccination for high-risk populations and other vaccination (4, 5).

Recommended basic vaccination

The Basic vaccination is essential for both individual and public health. It not only protects the vaccinated individuals but also indirectly those who cannot be vaccinated. This group contains immunization against Diphtheria,

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Tetanus, Pertussis, Haemophilus Influenzae Type B, Poliomyelitis, Measles, Mumps, Rubella, Hepatitis B, Varicella zoster virus and also Human papilloma virus by female adolescents and Seasonal influenza by elderly over 65 years of age. The basic vaccination is covered by the compulsory basic health insurance (but the coverage varies depending on the deductible rate/Franchise and „out of pocket expenses" of each insurance model). The basic immunization schedule is shown in the Table 1.

Table 1. Swiss immunization schedule, last updated in March 2017 (FOPH) (1)

	Basic vaccination								**Additional vaccination**		
Age	**DiTePe**	**Polio**	**Hib**	**HBV**	**MMR**	**HPV**	**VZV**	**Influenza**	**PCV**	**MCV-C**	**HPV**
2 M	DTP_a	IPV	Hib	(HBV)					PCV		
4 M	DTP_a	IPV	Hib	(HBV)					PCV		
6 M	DTP_a	IPV	Hib	(HBV)							
12 M					MMR				PCV		
12-15 M										MCV-C	
15-24 M	DTP_a	IPV	Hib	(HBV)	MMR						
4-7 Y	DTP_a / dTp_a	IPV									
11-14/15 Y	dTp_a			HBV		HPV ♀	VZV			MCV-C	HPV ♂
25-29 Y	dTp_a										HPV
45 Y	dT										
> 65 Y	dT							Influenza			

(M (months), Y = (years), dTp_a / DTP_a (Diphtheria-Tetanus-Pertussis vaccine); dT (Diphtheria-Tetanus vaccine); IPV (Inactivated Polio Vaccine); VZV (Varicella Zoster Virus vaccine); HiB (Haemophilus Influenzae Type B vaccine); HBV (Hepatitis B Vaccine); MMR (Measles, Mumps, Rubella vaccine); HPV (Human Papilloma Virus vaccine); Influenza (Seasonal Influenza vaccine); PCV (Pneumococcal Conjugate Vaccine), MCV-C (Meningococcal Conjugate Vaccine - Group C))

The coverage of DiTePe- and MMR-vaccination shows Table 2.

Table 2. Vaccination coverage of schoolchildren aged 8 in Switzerland, data from The Swiss National Vaccination Coverage Survey, 2005–2007 (13)

8-year-olds (n= 10 314)	
Type of vaccine (number of doses)	Percent (95% confidence interval)
Diphtheria (4)	94,3 (93,6; 95,1)
Diphtheria (5)	78,1 (76,5; 79,7)
Tetanus (4)	94,7 (94,0; 95,4)
Tetanus (5)	78,2 (76,6; 79,8)
Pertussis (4)	89,5 (88,5; 90,5)
Pertussis (5)	70,6 (68,9; 72,3)
Polio (4)	93,7 (93,0; 94,4)
Polio (5)	75,4 (73,8; 77,1)
Haemophilus influenzae type B (3)	88,9 (87,9; 89,7)
Haemophilus influenzae type B (4)	74,3 (72,9; 75,6)
Measles (1)	89,9 (88,8; 91,0)
Measles (2)	75,2 (73,6; 76,8)
Mumps (1)	88,8 (87,6; 89,9)
Mumps (2)	74,2 (73,7; 75,7)
Rubella (1)	88,7 (87,5; 89,9)
Rubella (2)	73,8 (72,3; 75,3)

WHO monitoring system summarises the incidence of vaccine-preventable diseases in Switzerland in 2007-2016 (Table 3). In Switzerland, around two cases of rubella per 100,000 inhabitants are currently reported per year. In recent years, fewer than 1000 cases of mumps per year were observed in Switzerland.

The data collected between 1974-2007 shows 57 reported tetanus infection cases in Switzerland. The vaccination status was available by 38 Patient (64%), of which 25 were not vaccinated at all (66%). None of the 38 Patients was completely vaccinated. The statistics show higher occurrence of tetanus in Switzerland (0-4 reported cases per year in 2000-2007) in comparison to the zero occurrence of tetanus in the Czech Republic (0 reported cases in 2002-2010). (8,9)

Same as in the Czech Republic also the incidence of pertussis in Switzerland has increased in the last decade. In 2010-2014 in average 8700 cases per year had been reported in Switzerland (0,106%) in comparison to 2521 reported cases in 2014 in the Czech Republic (0,024%). (9,10)

Measles has become far less common since vaccination was introduced, however Switzerland records about 50 cases annually, even in years when there is no epidemic. During an epidemic the figure can rise to well over 2,000.

Switzerland has recorded no cases of Diphtheria, Japanese encephalitis, Polio, neonatal Tetanus or yellow fever in the last decade.

Table 3. WHO vaccine-preventable diseases: monitoring system. 2017 global summary. Incidence time series for Switzerland. Last update 28/02/2018 (data as of 28/02/2018) (16)

Disease	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007
Measles	65	35	23	175	61	621	77	958	2022	1015
Mumps	0	-	-	-	-	140	600	900	-	-
Rubella	0	3	4	6	10	9	12	35	12	-
Pertussis	8046	-	-	-	-	4700	5900	3700	-	-
Tetanus (total)	-	-	-	-	-	-	1	4	1	1

The Swiss Federal Office of Public Health (FOPH) has set a goal to eliminate measles in Switzerland by the year 2000. Seventeen years after that deadline, the vaccination rate lies at 87%, below the 95% that the World Health Organization deems a target for eradication.

To date, Geneva is the only canton to have reached a 95% vaccination rate. French- and Italian-speaking cantons have generally been more successful than the German-speaking part of the country at increasing the vaccination rate and reducing cases, a fact that is partially attributed to lasting effects from anti-vaccine movements several decades ago. Furthermore French-speaking cantons also appeared to have higher coverage than the German-speaking ones for younger age groups, this impact was not observed for adolescents. Rather, immunization coverage for teenagers appears to be influenced more by school vaccination programs, which are confounded by the fact that all French-speaking cantons have school vaccination programs, unlike in the German- and Italian-speaking regions where it varies by canton. Moreover, alternative immunization plans adopted by complementary and alternative medicine practitioners recommend MMR vaccination for children to be delayed until 10–14 years of age, and only if protection has not yet been acquired through natural infection.(13)

Recommended additional vaccination

This group represents an additional individual protection from less common but potentially lethal diseases, such as Pneumococcal disease, Meningococcal disease (Group C) and also Human Papilloma Virus (HPV) Infection. Identically to the basic vaccination all medical expenses related to the additional vaccination are also covered by the compulsory basic health insurance (coverage depending on the insurance model as above). The overview of the additional vaccination schedule is shown in Table 1.

The FOPH recommends vaccination against HPV for all adolescents aged 11 to 14. Since HPV-related diseases are more common in women than in men, routine vaccination is recommended for girls and optional vaccination for boys. Currently HPV-vaccination rate in women between 18 and 24years of age is approximately 53% (at least one dose). (11)

Recommended vaccination for high-risk populations

This category is recommended to individuals with special medical conditions such as the premature birth, immune suppression, diabetes, heart disease, lung disease, or individuals at a high risk for an occupational exposure, such as healthcare workers. The special subgroup are individuals living in a region with high incidence of particular disease, for example tick-borne encephalitis. All these individuals are identified by healthcare professionals. Recommended vaccination for high-risk populations involves vaccination against Hepatitis A and B, seasonal influenza, Tuberculosis, Tick-borne encephalitis (TBE) and Varicella. The recommended vaccination for high-risk populations is partially covered by the compulsory basic health insurance.

The vaccination rate of flu vaccines in Switzerland in 2016/2017 was approximately 32% in elderly (>64 years of age), 29% in patients with chronic diseases, in healthcare workers 25% and in groups with a regular contact to other risk groups 7%. (12)

Recently, a big attention has been paid to ticks. Every year Swiss insurers record around 9,700 reported tick bites according to the national accident insurer SUVA. The total annual cost of dealing with these bites comes to CHF 7.7 million. Of the total, 57% of incidents involve men, mainly during leisure activities such as jogging, horse riding, mountain biking or hunting – 4,400 cases.

Ticks (Ixodes ricinus) can be found all over Switzerland up to an altitude of around 1500 meters. The preferred habitat for ticks are mixed forests with an abundance of undergrowth (grasses, shrubs, bushes), overgrown edges of forests, forest clearings and paths, also hedgerows and land with tall growing grasses and bushes. The danger of being bitten in winter is very low and increases in spring (February to the middle of June) and in autumn (middle of August to October) in Switzerland. These periods can vary from year to year depending on climatic conditions.

In Switzerland 5-30% in average (up to 50%) of ticks are infected with Borrelia burgdorferi. An estimated 3 000 people yearly contract the so-called Lyme disease caused by this bacterium. Contrary to that, ticks, which carry the tick-born encephalitis virus, are only found in certain endemic areas (Figure 1). The following cantons are affected - Zurich, Thurgau, Schaffhausen, Sankt Gallen, Graubünden, Aargau, Lucerne, Zug, Nidwalden, Obwalden, Uri, Solothurn, Bern, Fribourg, Vaud and the Principality of Liechtenstein. In these endemic areas around 1% (0.5-3%) of ticks carries the virus. At present there are no known areas with TBE infested ticks above an altitude of 1000 m (6, 7).

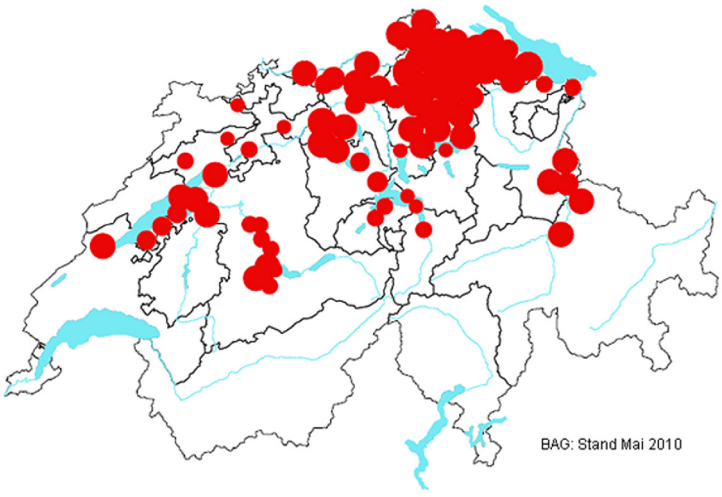

Figure 1. Known endemic areas (natural herds) of Tick-borne encephalitis in Switzerland (7).

Other vaccinations

These vaccines are mainly recommended to people travelling to countries with high exposure risk to certain diseases. Depending on the travel destination travellers can get vaccinated against hepatitis A, rabies, typhoid, Japanese encephalitis, yellow fever, cholera and others. The compulsory basic health insurance does not cover the cost of vaccination.

Vaccine coverage for the basic recommended immunisations in the adult population in Switzerland is suboptimal, whereas vaccination coverage for vaccinations recommended for travelling abroad is quite high. More efforts are needed to vaccinate adolescents before they leave school, since vaccinations that are not needed for travelling tend to be forgotten. (14)

Conclusions

Despite of an advanced healthcare system, vaccination rates are not always high enough in Switzerland. The latest data shows a significant difference from one region to another, especially in older age groups. This allows for rare infections, for instance flares of measles, to still occur. On the other hand, the youngest generation shows a high vaccination coverage. No vaccination is compulsory in Switzerland, everyone has to weigh up risks against benefits. One of the main challenges is to keep the population well informed and raise the awareness of the collective interest.

The Swiss federal health office wants to increase the numbers of adult vaccinations. Children and mothers receive most of vaccinations in Switzerland. Other adults are less likely to get vaccinated. Vaccinations that could be fully covered in the future include tetanus, measles, flu, hepatitis and papillomavirus. The Swiss federal health office is focused on improving vaccination rates among young adults, in particular booster shots. This age group is the most likely to have high deductibles, because they are healthier and often more cost conscious. No details on how the costs will be covered have been revealed, which has put health insurers on the edge of uncertainty.

Declaration of conflict of interest

Author declares no conflict of interest.

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