Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

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Federal Office of Public Health FOPH
Consumer Protection Directorate

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Iodine report: Executive Summary

Historically, Switzerland was a country of severe endemic goiter and cretinism. In 1922, Eggenberger, chief surgeon at the hospital in Herisau, introduced iodized salt into the Canton of Appenzell Ausserrhoden. Within one year, goiter size was sharply reduced in affected children. Recognizing the enormous public health benefit, the United Swiss Rhine Salt Works began to produce iodized salt and the Swiss Federal Office of Public Health formed the Swiss Goiter Commission in 1922. This Commission proceeded cautiously with iodine fortification, raising the iodine content of Swiss salt in four steps over a period of 90 years, from 3.75 ppm to the current level of 20 ppm. The goiter rate in school-age children is now below 5% and no new cretins have been born since 1930. In 2012, the Swiss iodized salt program remains a model for many other countries. **Chapter 3** of this report briefly summarizes the history of Swiss iodine prophylaxis.

Iodine is essential for normal growth and development because it is an essential component of the thyroid hormones. Because thyroid hormones regulate normal fetal growth and brain development, in utero iodine deficiency can irreversibly damage the offspring. Thus, it is critical to provide ample dietary iodine during pregnancy (requirements are 250 µg/day), a 50% increase compared to pre-pregnancy (150 µg/day). Infants are born with very limited thyroidal iodine stores and are dependent on a steady supply of dietary iodine. Breast milk or infant formula should provide at least 90 µg of iodine per day to cover infant requirements. Breastfed infants of iodine sufficient mothers obtain adequate iodine from breast milk and do not need supplemental sources of iodine. Because dairy products and iodized salt are the major sources of iodine in the Swiss diet, weaning infants fed only complementary foods without added salt are at risk of iodine deficiency. Once the infant has weaned from breast milk and is beginning to eat other foods, provision of iodine-fortified complementary foods, follow-on formula containing iodine and/or home-prepared foods containing iodized salt, may be important to meet their iodine requirements. Mild-to-moderate iodine deficiency during later childhood can impair cognitive function and learning, and recent controlled trials of iodine repletion in school-aged children have shown benefits on cognitive and motor test performance. Thus, pregnant and lactating women, infants and children are important target groups for iodine prophylaxis in the Swiss population. **Chapters 1 and 2** of this report describe the effects of iodine deficiency on pregnant and lactating women, as well as infants and children.

In Switzerland, the Federal Office of Public Health measures the content of iodine in food groups to identify and quantify major sources of dietary iodine in the population. Nearly all foods, with the exception of marine fish, contain very low amounts of iodine. Milk and milk products are important sources of iodine in the Swiss diet, because iodine is introduced via supplements given to dairy cows (particularly in winter). The other main sources of iodine in the Swiss diet are bread and baked goods, because many bakeries voluntarily use

iodized salt. The iodine concentration in other foodstuffs, such as meat, vegetables and fruits, is extremely low. Cheese could be an important source of iodine in Switzerland, because of the iodine content of milk and iodized salt added during production. Yet most Swiss cheese producers have discontinued the use of iodized salt for two main reasons: 1) the inability to export products to France containing added iodine; and 2) the new Swiss 'Deklarationspflicht' that specifies that cheese containing iodized salt must have an ingredient label, whereas cheese containing non-iodized salt need not have a label of ingredients.

Use of iodized salt by Swiss households remains high, at greater than 80%, but use of iodized salt in industrially processed foods may be decreasing. In Switzerland, iodized salt consumed from home-cooked food contributes only a small proportion of the total iodine intake since most salt consumption is from processed foods. Thus, use of iodized salt by the food industry is critical and must be strongly promoted. Therefore, when considering changes to the iodine content of Swiss salt to increase dietary iodine intake in the population, the focus should be on the food industry rather than only household salt. The Swiss Federal Office of Public Health estimates an adult following the dietary recommendations of the Swiss Society for Nutrition will have a mean iodine intake of approximately 145 µg/day, near the adult requirement of 150 µg/day. However, people following restrictive eating behaviors, such as a strict vegan diet without milk or eggs, may be at risk of iodine deficiency, particularly if they do not use iodized salt. Nutritional habits, food formulation and production procedures are constantly changing, and since all of these factors can influence iodine intakes, regular monitoring of iodine nutrition in Switzerland will remain important. **Chapter 4** of this report summarizes the iodine content of Swiss foods and iodine sources in the Swiss diet.

In Switzerland, iodine status in target groups is monitored every 5 years through national surveys. The main indicator used in these surveys is the urinary iodine concentration (UIC), an excellent biomarker of population exposure because most dietary iodine is excreted in the urine in the following 24 hours. In the last two national surveys, in 2004 and 2009, the median UIC in school-age children and pregnant women indicated sufficient iodine intake. However, iodine intakes fell in these groups between 2004 and 2009. In addition, in 2009, infants, lactating women and women of reproductive age had borderline low iodine intakes. Thus, although Switzerland is still considered an iodine sufficient country, iodine intakes appear to be decreasing in key target groups, and are currently at the lower end of the recommended range in pregnant women and children. These monitoring data suggest a modest increase in the iodine content of Swiss salt is needed in order to ensure iodine sufficiency in all population groups. **Chapter 3** of this report describes the recent epidemiology of iodine nutrition in Switzerland.

Current efforts to lower population sodium intake in Switzerland to reduce hypertension do not conflict with the salt iodization program; these two important public health policies can be complementary but public health messages need to be integrated to avoid confusion. Future reductions in salt intake will require adaptations to the Swiss iodized salt program by: 1) ensuring high penetration rate of iodized salt in food production; and 2) adjusting iodine fortification levels in salt upward to compensate for lower salt intake. Regular monitoring of iodine status should continue in school age children, pregnant women and infants. For the latter two groups, if the iodized salt program cannot provide adequate iodine intakes, alternative intervention strategies will need to be considered. An effective iodized salt program in Switzerland requires a joint effort of all partners including the Swiss Federal Office of Public Health, salt industry, food producers,

academia, health professionals and consumer organizations. **Chapter 5** in this report summarizes the critical role of the food industry, partnerships and integration of iodized salt and sodium reduction programs.

Further information:
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This document is also available in French, German and Italian.
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