Progress of IDD Elimination through Universal Salt Iodization in the Czech Republic, Slovakia, Hungary and Poland

OVERVIEW REPORT

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TERMS OF REFERENCE

Work Assignment

The Consultant will prepare 4 overview reports (one per country) on the progress of IDD elimination through USI in Poland, Czech Republic, Slovakia and Hungary. This will include:
- Collection and collating available information on IDD in the 4 countries (including data on recent surveys of goiter prevalence and urinary iodine excretion) and make a conclusion on whether iodine nutrition is sufficient;
- Review existing data on production, import and distribution of iodized salt in relation to expected demand;
- Make recommendations to the Regional Office on future activities in these countries, including expediency of partnership evaluation of IDD elimination through USI.

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EXECUTIVE SUMMARY

The UNICEF-WHO Joint Committee on Health Policy in 1993 agreed upon recommending universal salt iodization (USI) in countries where iodine deficiency disorders (IDD) are a public health problem. Universal iodization of all salt for human and animal consumption, including the salt used in food processing, is feasible, cheap, safe, rapidly effective and widely accepted.

The problem of iodine deficiency in European countries has been greatly underestimated for several decades. After initial successful efforts to combat endemic goiter in 1940s-1950s with iodized salt, IDD were generally considered no longer a significant health problem in Europe. Situation has been re-evaluated in early 1990s with the development of more sensitive methods to assess IDD (urinary iodine determination and goiter assessment by ultrasonography method). WHO, UNICEF and ICCIDD agreed upon the following criteria of IDD elimination through USI in affected countries: proportion of households using adequately iodized salt must be more than 90% nationwide; median urinary iodine level must be above 100 mcg/L while values below 50 mcg/L should be limited to less than 20%.

After World Summit for Children (1990) and several important European meetings several countries of Central Europe pledged elimination of IDD. This Report provides an overview of the progress of IDD elimination through USI in the Czech Republic, Slovakia, Hungary and Poland. The amount and quality of information on IDD control in these countries is different: situation is much better studied in Poland and the Czech Republic while data on iodine nutrition and especially iodized salt production are very scarce in Slovakia and Hungary.

In spite of the significant progress achieved over the past decade, iodine nutrition of population in the Czech Republic is not fully adequate and mild iodine deficiency is still persisting. USI is this country is limited to household (table) salt. However iodized table salt constitutes only relatively small part of integral salt consumption by population. In developed countries of Western and Central Europe about 80% of salt is consumed in processed foods such as bread, sausage, canned and other ready-to-eat foods (so called “hidden salt”). Only insignificant part of this “hidden salt” in the Czech Republic is iodized. The use of iodized salt and premixes in agriculture are also limited leading to iodine deficiency of cattle and, hence, of milk and dairy products. Expanded use of iodized salt in food industry (especially in baking and for meat procession) and in public catering may further increase proportion of iodized salt and lead to normalization of iodine nutrition.

In late 1990s Slovakia has reached optimal iodine nutrition of its population through USI. The data on the production and distribution of iodized salt is not complete, but available information suggests that normalization of iodine nutrition has been reached through iodization of salt both for household consumption and for food industry. Thus, Slovakia could be a priority country for partnership review of IDD elimination through USI.

Iodine nutrition in Hungarian population is still not optimal with large variations of iodine supply across the country. USI is not introduced in this country: production and import of iodized salt is voluntary. There is no information on the proportion of iodized salt on retail market in relation to common salt; iodized salt is also not used in food industry.

In the decade of 1990s Poland made a huge step towards elimination of IDD in its population and implemented rather efficient model of iodine prophylaxis based on mandatory production and distribution of household iodized salt. However, the goal of optimal iodine nutrition has not been met and additional measures to improve iodine supply to population are needed, including
upgrading the quality of iodized salt and iodization of salt for animal nutrition and for the food industry.

Table 1 summarizes progress achieved by four countries in relation to WHO/UNICEF/ICCIDD criteria for sustainable IDD elimination.

**Table 1. Progress of IDD control through USI in the Czech Republic, Slovakia, Poland and Hungary in relation to WHO/UNICEF/ICCIDD criteria for sustainable IDD elimination**

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>THE CZECH REPUBLIC</th>
<th>SLOVAKIA</th>
<th>POLAND</th>
<th>HUNGARY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary Iodine Values (mcg/L)</td>
<td>85-87</td>
<td>130-143</td>
<td>Below 100</td>
<td>52-115</td>
</tr>
<tr>
<td>The proportion of households consuming effectively iodized salt</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>IDD/USI monitoring system in place</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Recent monitoring data (within 2 years)</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Availability/access to laboratories for iodine in salt and urine</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Legislation or regulations on USI</td>
<td>Mandatory iodization of household salt only</td>
<td>Mandatory iodization of all salt for human consumption</td>
<td>Mandatory iodization of household salt only</td>
<td>Voluntary salt iodization</td>
</tr>
<tr>
<td>National IDD committee or council</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Evidence of political commitment to the elimination of IDD and USI</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>+/-</td>
</tr>
<tr>
<td>A program of public education on IDD/USI</td>
<td>Yes</td>
<td>N/A</td>
<td>Yes</td>
<td>N/A</td>
</tr>
</tbody>
</table>

NA – Data Not Available; +/- Difficult to Estimate

In terms of iodine supply though iodized salt only **Slovakia** has published data revealing optimal iodine supply to population. However, this information is based on several small-scale and regional assessments, rather than on a nationwide survey. In other three countries iodine nutrition remains marginally low. Information on iodized salt production and consumption (if available at all) in the **Czech Republic, Slovakia, Poland and Hungary** is based on production/supply figures, data on the proportion of households consuming effectively iodized salt are lacking. All four countries have IDD monitoring system in place with laboratories for measurement of iodine in salt and urine.

All countries, except **Hungary**, have legislation/regulation on USI; however only in **Slovakia** this regulation covers all salt for human consumption (and effectively results in optimal iodine supply). In **Poland** and the **Czech Republic** USI is limited to household (table) salt only. In **Hungary** the use of iodized salt is still voluntary. All countries have National IDD Committees (or Councils) and
are committed to the elimination of IDD and USI (situation is not clear in Hungary where decision on USI has not been reached).

**Recommendations**

- Partnership Review of IDD elimination through USI may be considered in **Slovakia**. However, a nationwide assessment of the proportion of households consuming effectively iodized salt and evaluation of iodine nutrition (based on urinary iodine levels in representative sample of population) should be conducted in this country **prior** to Partnership Review. Partnership review of IDD elimination through USI is currently **NOT** expedient in **Poland**, the **Czech Republic** and **Hungary** (median urinary iodine levels are below 100 mcg/L, at least in some regions of these countries).

- Taking into account relatively high consumption of household salt by **Polish** population (about 6 g per day), mandatory iodization of all table salt should result in more adequate iodine nutrition of population. Polish national authorities should consider increasing the level of salt iodization (to internationally recommended level of 40 ppm) and shifting to more stable KIO3. These measures could increase the quality of iodized salt (currently only 47% of salt contains the recommended iodine content) and elevate iodine supply. Lifting a ban over the use of iodized salt by food industry should be also considered.

- Nationwide surveys to assess the proportion of households that are currently consuming adequately iodized salt should be considered in **Poland**, the **Czech Republic**, **Slovakia** and **Hungary**;

- IDD/USI Program Review (using ISPAT tool) may be conducted in **Poland**, the **Czech Republic** and **Hungary** to outline ongoing problems and to decide on future steps to reach sustainable IDD elimination in these countries. UNICEF may provide external support for the Program Review, if requested.

- Representatives of **Poland**, **the Czech Republic**, **Slovakia** and **Hungary** should be invited to all future European IDD/USI Advocacy meetings.
INTRODUCTION

The problem of iodine deficiency in European countries has been greatly underestimated for several decades. Initial efforts to combat endemic goiter were launched in several western and central European countries in late 1940s and early 1950s. After remarkable studies on the effects of iodine deficiency and their prevention through salt iodization, iodine deficiency disorders (IDD) were generally considered no longer a significant health problem in Europe.

However, surveys carried out in 1980’s under the auspices of the European Thyroid Association (ETA), clearly demonstrated the persistence of iodine deficiency in many countries, including Czechoslovakia, Poland and Hungary [R.Gutekunst and P.Scriba, 1989]. Moreover, several European countries were affected by large radioactive contamination (mainly with radioactive iodine) which has occurred after the Chernobyl accident in 1986. The uptake of radioactive iodine by the thyroid gland increases in the situation of environmental iodine deficiency. Important reason to introduce iodine prophylaxis in many countries is an increased risk for the development of thyroid tumors from an insufficient iodine supply in the case of radioactive fallout.

An International Workshop “Iodine Deficiency in Europe: a Continuing Concern” held in Brussels, Belgium, on April 24-28, 1992 was an important milestone in the process of revitalization of IDD control programs in Europe. Based on results on this meeting, the European office of the WHO recommended all European governments to establish, support and fund a multisectoral national committee in charge of iodine deficiency and introduce legislation to ensure availability of iodized salt.

Numerous IDD surveys have been conducted before and after the Brussels meeting in several parts of Europe hitherto almost unexplored. In 1995-1996 a standardized study of iodine deficiency (“ThyroMobil Project”) was conducted in 12 European countries, including Poland, Czech Republic, Slovakia and Hungary under the auspices of ICCIDD, WHO and UNICEF. The mobile unit (“ThyroMobil” van) visited schools in all sites of the countries under investigation. Results of this study published in 1997 [F.Delange et al. 1997] provided an important update on iodine nutrition in Europe. In general, apart from regions with optimal iodine supply, mild and even moderate iodine deficiency was persisting in surveyed countries.

In 1997 three international agencies charged with leading fight against IDD (UNICEF, WHO and ICCIDD) have organized a Regional Conference on elimination of IDD in Central and Eastern Europe, the CIS and the Baltic States (Munich, September 3-6, 1997).One of the objectives of the conference has been a review of the current status of iodine nutrition in CEE/CIS/BS region. The Proceedings of this meeting provided another important update of situation in 4 Central European Countries.

Regional Salt Producers’ Meeting for Central and Eastern Europe, CIS and the Baltic Region (29 September – 1st October 1999, Kiev, Ukraine) provided another piece of important information on production and supply of iodized salt and current status of iodine nutrition in several European countries.

This Report is based on the analysis of available scientific information on status of iodine nutrition, progress in IDD elimination, production and supply of iodized salt in Poland, the Czech Republic, Slovakia and Hungary. The amount and quality of information on IDD control in these countries is different. Situation is much better studied in Poland and the Czech Republic while data on iodine nutrition and especially iodized salt production are very scarce in Slovakia and Hungary.
Issues of Universal Salt Iodization

The UNICEF-WHO Joint Committee on Health Policy in 1993 agreed upon recommending universal salt iodization (USI) in countries where iodine deficiency disorders are a public health problem. Universal iodization of all salt for human and animal consumption, including the salt used in food processing, is feasible, cheap, safe, rapidly effective and widely accepted. During the remainder of the decade, USI became the essential strategy for the elimination of iodine deficiency in all countries that have formulated national action plans. In 1990, less than 10% of the edible salt was being iodized. Prompted by a commitment made at the World Summit for Children, a significant increase occurred in the production and supply of iodized salt in most countries of the world. By the end of 1999, the proportion of households having access to iodized salt had improved to more than 70%, providing additional iodine to nearly 4 billion people worldwide, with the result that goiter rates are falling and that the intellectual promise for newborns and young children is improved.

Figure 1 shows main pathways for use of salt in the modern society. In developed countries, industrial requirements are several times the edible consumption. In the USA and Western Europe, for instance, nearly 97% of the total production of salt is used for technical (non-edible) purposes. In the developing countries, the trend towards increased industrial demand is becoming apparent only during past two decades and up to 90% of salt is used for human consumption, mainly as household (table) salt.

A high intake of salt is a factor contributing to the development of hypertension and cerebrovascular disease, therefore it is recommended that the consumption of salt be limited to 5-6 g a day. In Western and Central Europe about 80% of salt is consumed in processed foods such as bread, sausage, canned and other ready-to-eat foods. However, the use of iodized salt for food processing is not mandatory in most European countries. Moreover, some European countries (France, Great Britain, Poland) are even prohibiting the use of iodized salt in food industry. Taking into the account that many Central European countries (Poland, Hungary and others) are exporting significant amounts of their agriculture products, the use of iodized salt in food industry in these countries is also restricted. Unfortunately, the European Unions lacks agreed upon policy on the control of iodine deficiency and on universal salt iodization.

Indicators of Iodine Nutrition

There are two main impact indicators to assess severity of iodine deficiency and track progress of its elimination.

**IMPACT INDICATORS AND SEVERITY OF IODINE DEFICIENCY**


<table>
<thead>
<tr>
<th>Indicator</th>
<th>Severity of public health problem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median urinary iodine concent-</td>
<td>None</td>
</tr>
<tr>
<td>ration (mcg/L)</td>
<td>&gt; 100</td>
</tr>
<tr>
<td>Goiter prevalence</td>
<td>&lt; 5%</td>
</tr>
</tbody>
</table>
More recently, WHO, UNICEF and ICCIDD have adopted the iodine concentration in urine as the primary indicator for tracking progress in IDD control programs. Because most of ingested iodine is excreted in the urine, the measurement of iodine in urine is highly sensitive indicator of the iodine content in diet. In the individual, the amount of iodine in the urine can be quite variable depending on the number of factors. However, at the population level, the median level of urinary iodine from a representative sample of the population provides an estimate of the average amount of iodine in the diets. If iodine concentration of the population is adequate, then one can feel assured that the brains of newborns are being protected from IQ loss because of iodine deficiency [J.Gorstein, 2001].

In 2001 WHO, UNICEF and ICCIDD developed comprehensive Criteria for Sustainable Elimination of IDD [WHO, UNICEF, ICCIDD. Assessment of Iodine Deficiency Disorders and Monitoring their Elimination, Geneva, WHO. WHO/NHD/01.1, 2001]. A prerequisite of the sustainable elimination of iodine deficiency as public health problem is normal iodine nutrition confirmed by urinary iodine determination when median urinary iodine level in nationally representative sample of population is equal or above 100 mcg/L. If iodized salt is the vehicle for eliminating iodine deficiency, as in almost all countries, the proportion of households consuming effectively iodized salt must be more than 90%. Several other criteria must guarantee availability and sustainability of consumption of adequately iodized salt by population (see below).

These criteria are used to assess progress in IDD control in Poland, Czech Republic, Slovakia and Hungary and for preparation of recommendations to the Regional UNICEF Office on future activities in these countries, including expediency of partnership evaluation of IDD elimination through USI.

**Literature**

Figure 1.
A. Total Salt ingested (may be estimated from dietary survey of from B)
B. Urinary salt excretion (virtually identical to A)
C. Household salt added in the kitchen and at the table
D. “Hidden salt” in commercial food products
E. Salt lost during food preparation
F. Total salt produced for human consumption
For supplementing iodine either pathway C or D or both (i.e. A) can be used.
CRITERIA FOR SUSTAINABLE ELIMINATION OF IDD


To declare the sustainable elimination of iodine deficiency as public health problem the following criteria should be met:

1. **Normal iodine nutrition in the population, confirmed by urinary iodine concentration, in the following terms:**
   a. A median value equal or above 100 mcg/L;
   b. While the median of 100 mcg/L would imply that 50% of the samples are below 100 mcg/L, care must be taken to ensure that values below 50 mcg/l are limited to less than 20%;
   c. Recent monitoring data (national or regional) have been collected within the past two years.

2. **If iodized salt is the vehicle for eliminating iodine deficiency, as in almost all countries, there must be guaranteed availability and consumption of adequately iodized salt, demonstrated by:**
   a. The proportion of households consuming effectively iodized salt is more than 90%. Precondition for this are: (i) local production and/or importation of iodized salt in a quantity sufficient to satisfy the potential demand, about 4.5 kg/person/year; (ii) 95% of salt for human consumption must be iodized at the production or imported level according to government standards for iodine content; (iii) the percentage of food grade salt with an iodine content of at least 15 ppm, in a representative sample of households, must be at least 90%.
   b. Estimation of iodine at the production/import level and retail/consumer levels must be made by the titration method, while at household levels it could be made by either titration or certified kits.

3. **Evidence of sustainability,** based on the following programmatic indicators:
   a. An effective functioning national body (councils or committees) responsible to the governments for the national program for the elimination of IDD. The council should be multidisciplinary involving the relevant fields of nutrition, medicine, salt industry, education, the media, and the consumer, with a chairman appointed by the Ministry of Health.
   b. Evidence of political commitment to the elimination of IDD and universal salt iodization.
   c. Appointment of a responsible executive officer for the IDD elimination program.
   d. Legislation or regulations on universal salt iodization; ideally, regulations should cover both human and agriculture salt, but lack of coverage for animals does not necessarily preclude a country from being certified as IDD free;
   e. Commitment to assessment and reassessment of progress in the elimination of IDD, with access to laboratories able to provide data on salt and urinary iodine.
   f. A program of public education and social mobilization on the importance of IDD and the consumption of iodized salt.
   g. Regular data on salt iodine content on the factory, retail, and household levels.
   h. Regular laboratory data on urinary iodine in school-age children with appropriate sampling for high risk areas.
   i. Cooperation from the salt industry and maintenance of quality control.
   j. Database with recording results of regular monitoring procedures, particularly for salt titration, urinary iodine, and if available, neonatal TSH.
1. THE CZECH REPUBLIC

IDD control programs (aimed at the initial steps at the prevention of endemic goiter) were started in Czechoslovakia after the Second World War and represent one of the most important public health achievements.

Results of several decades of dedicated work were discussed on the conference “Prevention of Iodine Deficiency” in the National Public Health Institute, Prague, on March 13, 2001. Proceedings of this conference as well as several other publications were used to review current status of IDD control program in this country.

1.1. Legislative environment and national IDD/USI program

Salt iodization in the Czech Republic started in 1947 and was in place on the whole territory of the republic at the level of 18 mg iodine/salt from 1965 onwards. A 1967 regulation mandated salt iodization with KI. A more recent regulation (#298/1997) requires that all salt for retail trade must contain iodine in the range of 20-34 mg/kg (as iodine) and mandates the use of KIO3. This regulation also permits the use of iodized salt in food industry, but only on a voluntary basis.

In 1993 the Inter-Disciplinary Committee for Solving the Iodine Deficiency in the Czech Republic (IDC SID) was established with representatives from the medical field (endocrinologists, pediatricians, specialists of public health, hygiene and laboratory medicine), government bodies (Ministries of Health, Agriculture, Industry and Trade), NGO’s (National Committee for UNICEF) and producers of foods enriched with iodine. Activities of IDC SID were aimed primarily at the change of nutritional behavior of the population and on the increase of consumption of foods fortified with iodine. At the same time IDC SID introduced stepwise implementation of fortified foods to avoid sudden increase of the iodine consumption with possible negative consequences. In addition, IDC SID also promoted fortified baby milk formulas and iodine supplementation to risk groups, such as pregnant women.

Members of IDC SID also contributed to communication activities by presenting information about IDD and their elimination on TV, radio and in other media. IDC SID also recommended voluntary labeling of products fortified with iodine with special “Iodine Logo” which was registered by the National Institute of Public Health and granted after adhering to certain conditions on contractual basis. By early 2001, 36 different products enriched with iodine have acquired this logo. In 1999, 2000 and 2001 IDC SID organized “National Iodine Days” with variety of communication activities and media coverage. (J.Kriz, 2000)

1.2. Status of iodine nutrition of population

There is an ample historic evidence of the existence of iodine deficiency on the territory of the Czech Republic that was significantly ameliorated by vast production and distribution of iodized salt [Langer, 1980]. In 1988 survey, the European Thyroid Association (ETA) estimated iodine nutrition in Czechoslovakia as “intermediate” (e.g. having major problems in the past, but which has introduced efficient goiter prevention program) [R.Gutekunst and P.Scriba, 1989]. Revitalization of IDD control programs in the Czech Republic in the mid-1990s and introduction of more adequate level of salt iodization has improved iodine nutrition. However, the “ThyroMobil Study” performed
in 12 European countries in 1995-96 revealed mild iodine deficiency in the Czech Republic with median urinary iodine levels in the range of 85-87 mcg/l. [F.Delange et al., 1997]

More recent studies of iodine nutrition in the Czech Republic are still confirming marginally low iodine nutrition of the population: only 45% of the surveyed individuals have had urinary iodine concentration above 100 mcg/L [Zamrazil, 2000]. Improvement of iodized salt quality (increasing the level of salt iodization and shifting to more stable KIO3) also had some positive impact, but full normalization of iodine nutrition had not been achieved. This could be explained by the decreasing consumption of table salt and insignificant use of iodized salt in food industry [Bilek, 1999].

Data on poor iodine nutrition of cattle in the Czech Republic have been recently published [J.Kursa, 1997]. This research revealed that 30% of calves from birth to three weeks of age had goiter. Other features of IDD (stillbirths, abortions, partial baldness, etc.) were also frequently observed. The iodine content of milk decreased over the last decade from 140-225 mcg/L to 62-100 mcg/L, most likely due to the cessation of use of iodine-containing premixes to fodder and iodine-based sterilizing agents for cleansing udders and milking machines. These negative changes in iodine nutrition of cattle may also contribute to inadequate iodine supply to population of the Czech Republic.

1.3. Production and distribution of iodized salt

The Czech Republic has domestic production of iodized salt on the Joint Stock Company (JSC) “Solne mlyny” (Salt Mills) in the city Olomouc. This company is producing high quality iodized salt for retail trade and food industry. In 1997, by the initiative of the salt producers iodine content in salt has been increased from 12-20 mg/kg to 20-34 mg/kg and potassium iodide has been replaced by more stable potassium iodate. According to existing regulation, this company is supplying exclusively iodized table salt for the retail trade. The use of iodized salt in food industry is voluntary. While more than 70% of nitrite curing salt for meat procession is supplied in iodized form, delivery of iodized salt to other branches of food industry is remaining low: only 14% of the whole salt supply in the year 2000. From the point of view of salt producers [O.Hajicek, 2000] the main obstacles for USI in the Czech Republic are:

- Lack of legislation for mandatory use of iodized salt in food industry (that is currently existing in Slovakia). The Czech Republic is adhering to more liberal traditions and allows voluntary use of iodized salt by food manufacturers;
- The Law #110/97 requires all imported salt to comply with national standard (e.g. cooking salt for retail trade must be supplied only as iodized). However, some batches of imported cooking salt contain low or no iodine. Food industry (especially bakeries) is still using mostly cheap imported non-iodized salt. As the Czech Republic is entering the European Union and opening its market, this tendency may further aggravate iodine nutrition.

1.4. Conclusion

In spite of significant progress achieved over the past decade, iodine nutrition of population in the Czech Republic is not fully adequate (median urinary iodine level is below 100 mcg/L) and mild iodine deficiency is still persisting. USI in this country is limited only to household (table) salt. However, iodized table salt constitutes only relatively small part of integral salt consumption by population. Majority of “hidden salt” consumed with processed foods is not iodized. The use of iodized premixes to animal fodder in agriculture is also limited leading to iodine deficiency of cattle and, hence, of milk and dairy products. Mandatory use of iodized salt in food industry (especially in baking and for meat procession) and in public catering may further increase the use of iodized salt and lead to normalization of iodine nutrition.
1.5. Recommendations

- Partnership review of IDD elimination through USI is currently NOT expedient in the Czech Republic.
- Nationwide survey to assess the proportion of households that are currently consuming iodized salt should be considered;
- IDD/USI Program Review (using ISPAT tool) may be conducted in the Czech Republic to outline ongoing problems and to decide on future steps to reach sustainable IDD elimination. UNICEF may provide external support for this Program Review, if requested.
- Representatives of the Czech Republic should be invited to all future European IDD/USI Advocacy meetings.

1.6. Literature

1. J. Kriz. Work and experience of the Inter-Sector Committee for Solving the Iodine Deficiency in the Czech Republic. The Thyroid Gland, 2000, N3, p. 53-56
5. V. Zamrazil et al. Current condition of supplying with iodine in the Czech Republic. The Thyroid Gland, 2000, N3, p. 65-68
6. R. Bilek and V. Zamrazil. Iodization of table salt in the Czech Republic, IDD Newsletter, 1999, N1, p. 8
8. O. Hajicek, Experiences of manufacturers and consumers with iodinated salt. The Thyroid Gland, 2000, N3, p. 76-79
2. SLOVAKIA

There is an abundant evidence of past IDD problem in Slovakia. This part of the former Czechoslovakia was historically considered as a region with high prevalence of endemic goiter and, hence, more stringent measures to prevent iodine deficiency were introduced. Extensive research of endemic goiter sponsored by the government started in 1947. The prevalence of goiter in women aged 21 to 50 years was on average 70%, while that in men of the same age it was 50% [P.Langer, 1980, R.Gutekunst, P.Scriba, 1989].

Salt iodization in Czechoslovakia was introduced in 1947 and iodine content in salt has been gradually increasing. Iodine prophylaxis has started with distribution of iodized salt (7 mg/kg with KI); in 1949-1953 this amount was increased to 12 mg/kg. In 1965 the level of 25 mg/kg (with KI) has been used for the whole country. Current data on iodized salt production and distribution in Slovakia is scarce. According to the questionnaire study performed in 1997 for the WHO/UNICEF/ICCIDD sponsored conference “Elimination of Iodine Deficiency Disorders (IDD) in Central and Eastern Europe, the Commonwealth of Independent States, and the Baltic States” single salt producer in Slovakia was covering most of the domestic demand in salt. Salt was iodized with KIO₃ at the level of 25 mg/kg. Salt iodization is mandatory for table salt and for salt supplied for needs of food industry and for public catering.

2.1. Current status of iodine nutrition of population

Slovakia is considered to be the country with optimal iodine nutrition. This conclusion is based on the results of the “ThyroMobil Study” performed in 1995-96 in 12 European countries [Delange, 1997]. Assessment of schoolchildren was performed by standardized method in 4 sites and showed normal median urinary iodine values (130-143 mcg/L). More recent publications confirm normal urinary iodine values in schoolchildren in several regions of Slovakia [Tajtakova, 1998; Langer, 2000].

It is worth mentioning that several articles published in 1988-1994 considered iodine intake in Slovak schoolchildren as “not satisfactory” [Tajtakova et al. 1988; Langer and Tajtakova, 1992; Langer et al. 1994]. However, situation later improved and iodine nutrition reached optimal level. The reason for such gradual improvement is not yet clear, but may be related to the increase of iodized salt quality due to use of more stable KIO₃ instead of KI, especially in food industry.

2.2. Conclusion

There is good evidence that in 1990s Slovakia has reached optimal iodine nutrition of its population through USI (urinary iodine level above 100 mcg/L). However, this information is based on several small-scale assessments, rather than on nationwide survey. The data on the production and distribution of iodized salt in Slovakia has not been published in international journals and the proportion of households using iodized salt has not been studied. Available information suggests that normalization of iodine nutrition in Slovakia have been reached through iodization of salt both for household consumption and for food industry. This model could be applied in other Central European countries.

2.3. Recommendations

- Partnership Review of IDD elimination through USI may be considered in Slovakia.
• However, a nationwide assessment of the proportion of households consuming effectively iodized salt and evaluation of iodine nutrition (based on urinary iodine levels in representative sample of population) should be conducted in this country prior to Partnership Review.
• Representatives of Slovakia should be invited to all future European IDD/USI Advocacy meetings.

2.4. Literature

6. P.Langer et al., Industrial pollution by polychlorinated biphenyls and the thyroid status of adult and adolescent population. The Thyroid and Environment, Schattauer, 2000, p.79-84
3. HUNGARY

After some earlier attempts, iodine prophylaxis was officially introduced in Hungary in 1950 with the use of iodized salt (10 mg/kg salt with KI) only in selected endemic goiter areas. The percentage of goiter in areas with iodine prophylaxis decreased from 32% in 1950 to 11% in 1965, while in other, “nonendemic”, areas goiter prevalence sustained at the level of 4-8% without prophylactic measures [P.Langer, 1980].

The nationwide goiter screening was interrupted between 1970 and 1989. Goiter survey of schoolchildren was conducted in 1989/90 and revealed national goiter prevalence of 5.8%; only in one region high goiter prevalence (27.7%) was found. These data suggested significant decrease of goiter prevalence in schoolchildren in Hungary. At the same time, iodine prophylaxis through iodized salt in 1970-1990 was considered as “irregular”. The iodine content in salt has been increased from 10 to 20 mg/kg in 1976 and KI has been substituted with KIO3. [F.Peter, 1993]. Questionnaire Study performed in 1997 indicated that there was one Hungarian factory to produce iodized salt while the majority of salt is imported from several neighboring countries. The monitoring of iodized salt quality (iodine content) was in place.

3.1. Current status of iodine nutrition of population

The “ThyroMobil Study” was conducted in Hungary in 1995-1996 and revealed inhomogeneous distribution of urinary iodine levels within the country: three sites were evaluated with the range of median urinary iodine levels of 52-115 mcg/L [Delange et al. 1997]. These data supported previous hypothesis of the “patchy” pattern of iodine supply in Hungary. This may partially reflect differences of iodine content in drinking water across the country [F.Peter, personal communication].

However, the most recent publication of the group from the city Debrecen suggests that iodine deficiency may persist in the area of Hungary that was supposed to be of adequate iodine intake based on the low prevalence of goiter in the population. This group investigated 313 pregnant women and, based on urinary iodine excretion, found that 57% of pregnant women are iodine deficient and 19% had goiter. In Hungary, where both iodized and non-iodized salt are available, iodized salt is not used during the industrial production of foodstuffs, and usually only a small part of a meal is prepared at home. This study also showed that regular use of iodized salt at home of pregnant women did not result in improvement of their iodine nutritional status. [Merozi et al. 2000]

3.2 Conclusion

Iodine nutrition in Hungarian population is still not optimal with large variations of iodine supply across the country. USI is not introduced in this country: production and import of iodized salt is voluntary. There is no information on the proportion of iodized salt on the retail market in relation to common salt; iodized salt is also not used in food industry.

3.3. Recommendations

- Partnership review of IDD elimination through USI is currently NOT expedient in Hungary (median urinary iodine levels are below 100 mcg/L at least in some regions of the country).
- Nationwide survey to assess the proportion of households that are currently consuming iodized salt should be considered;
• IDD/USI Program Review (using ISPAT tool) may be conducted in Hungary to outline ongoing problems and to decide on future steps to reach sustainable IDD elimination. UNICEF may provide external support for this Program Review, if requested.

• Representatives of Hungary should be invited to all future European IDD/USI Advocacy meetings.

3.4. Literature


4. POLAND

Iodine prophylaxis in Poland started in 1935 and has been interrupted twice: by World War II and in 1980-1986 for economic reasons. Epidemiological surveys carried out after the Chernobyl accident in 1989 as well as in 1992/93 and in 1994 (“ThyroMobil Study”), revealed increased prevalence of goiter in children and adults. Ninety percent of Poland territory was classified as having moderate iodine deficiency, and 10%, on a seaside, as having mild iodine deficiency.

4.1. Legislative environment and national IDD/USI program

In 1986, after 6 years interval, a voluntary model of iodine prophylaxis was introduced with 20+/-10 mg iodine/kg (with KI). At the World Summit for Children in New York and on 42nd World Health Assembly in 1990, Poland pledged the elimination of IDD by the year 2000. In 1991 the Polish Council for Control of Iodine Deficiency Disorders (PCCIDD) was established as an advising body to the Ministry of Health and Social Welfare. In the following years several nationwide surveys were carried out and confirmed nationwide presence of iodine deficiency. These surveys also revealed that only 11 to 43% of households consumed iodized salt [Z.Szybinski, 1998].

In 1996 PCCIDD recommended a mandatory model of household salt iodization as part of USI approach. The level of iodine in salt was increased to 30+/- 10 mg/kg, still with KI. This model was approved by the Ministry of Health and Social Welfare and put into operation on 24 January 1997. Currently all salt for household consumption through the retail trade is iodized. The next step in national IDD program will be gradual increase of the use of iodized salt (salt licks) with fodder of cattle that will elevate iodine concentration in meat and diary products [S.Bobek, 1998]. The use of iodized salt in food procession is currently not allowed.

4.2. Status of iodine nutrition of population

In 1992/1993 nationwide epidemiological survey was carried out covering 20,000 randomly selected schoolchildren [Z.Szybinski and A.Zarnecki, 1993]. Data of this survey serve as a baseline for further IDD monitoring. In 1994/95 a “ThyroMobil Study” was carried out in 3 sites in Poland and also demonstrated very low median urinary levels – 20-32 mcg/L [F.Delange et al. 1997].

Most recent nationwide assessment of iodine deficiency in Poland was carried out in 1999 using the same sites as in earlier studies. Between 1994 and 1999 goiter prevalence decreased from 38% to 7% and urinary iodine concentrations increased from 60,4 to 96,2 mcg/L (in mean values). In four sites the prevalence of goiter diminished below 5%. In 1999, 70% of children excreted over 60 mcg/L of iodine, and 36% - over 100 mcg/L whereas in 1994 the values were 44 and 13% respectively [Z.Szybinski et al. 2001].

Thus, in the past decade iodine nutrition of Polish population has significantly improved. However, it is important to notice that optimal iodine nutrition in Poland, on the nationwide basis, has not been achieved. Aforementioned publication does not give median urinary iodine levels for assessed population groups (that better characterize iodine nutrition than mean values). However, it is not difficult to calculate that median urinary iodine level is below 100 mcg/L. (Median UI level equal or above 100 mcg/L may be achieved when not less than 50% of samples are above 100 mcg/L. Only 36% of UI samples during most recent survey in Poland exceeded the 100 mcg/L threshold).
4.3. Production and distribution of iodized salt

Production of iodized salt was seized for economic reasons in 1980-1986. In 1986 a voluntary model of iodine prophylaxis was introduced again with 20 +/- 10 mg iodine/kg (using KI). However, until 1991 production of iodized salt was insignificant – about 5,000 tones. In 1992 production of iodized salt markedly increased and sustained on the level of 50,000 tones until 1995. With introduction of mandatory iodization of household salt, its production increased to 80-85,000 kg (or 2,1 kg per capita of population per year). In terms of daily intake, this figure corresponds to 5,75 g of table salt per day (WHO recommends daily intake of no more than 6 g per day). Supply of iodine with “hidden salt” is negligible because the use of iodized salt in food industry is not allowed [Z.Szybinski et al. 2001]. Fortification of animal fodder with iodized salt or other iodine vehicles is not widely implemented.

Why such relatively high consumption of iodized salt is not providing adequate iodine supply to Polish population? One of possible reasons may be poor quality of salt iodization. A study of iodine content in iodized salt performed in 1996 revealed that only 57% of samples had iodine content within defined levels (30+/−10 ppm) [E.Andrzejewksa et al., 1996]. It is worth mentioning that Polish salt industry is still using non stable potassium iodide (KI) while most of other salt producers in western and eastern Europe already shifted to more stable KIO3. In such situation it would be quite reasonable either to increase the level of salt iodization, for instance to the mean level of 40 ppm, as recommended by ICCIDD/UNICEF/ICCIDD, or to use more stable potassium iodate in salt industry [WHO/NUT/96.13].

4.4. Poland IDD Review meeting

A conference entitled "Iodine Prophylaxis and obstacles to its implementation" was held at the Ministry of Health, Warsaw, February 1. The objectives were to identify obstacles to the program of iodine prophylaxis in the country and to discuss additional models. Participants included Dr. A. Nauman, Deputy Minister of Health, Professor Z. Szybinski, Chairmen of Polish Council for the Control of IDD (PCCIDD), Dr. L. Szponar, Director of the WHO Cooperating Center at the Institute of Food and Nutrition in Warsaw, Professor F. Brzuska, expert in animal fodder production technology, Dr. Pinchera (ICCIDD Regional Coordinator for Western/Central Europe), Dr. Delange (recent ICCIDD Regional Coordinator and Executive Director), Dr. de Benoist, WHO Nutrition, Geneva, and Mr. A. Malyavin, Project Officer, Health and Nutrition, at UNICEF Regional Office for CEE/CIS and the Baltics. An updated review shows that the goal of iodine sufficiency is almost reached, with the exception of some areas still significantly affected. The median urinary iodine is just above 100 mcg/L. Iodine deficiency persists in a number of pregnant women when evaluated by urinary iodine, and in a much larger fraction of the population when calculated on the basis of salt intake and the iodine content of salt. Only 47% of salt contains the recommended iodine content, and thus, a large fraction of the population have a calculated iodine dietary intake below recommended levels. In a report on iodine supplementation to animals, Poland has two types of salt licks, one containing only sodium chloride, and the other one enriched with iodine, selenium, and zinc; however, the iodine content of these licks is too low, and higher levels are not authorized by the present legislation of the Ministry of Agriculture. The conference recommended that the Ministry of Health sustain and further monitor the present program and complete iodization of salt for animal nutrition, and if necessary, for the food industry [ICCIDD Monthly Update, February 2002].
4.5. Conclusion

In the decade of 1990s Poland made a huge step towards elimination of IDD in its population and implemented rather efficient model of iodine prophylaxis based on mandatory production and distribution of household iodized salt. However, the goal of optimal iodine nutrition has not been met and additional measures to improve iodine supply to population are needed, including upgrading the quality of iodized salt and iodization of salt for animal nutrition and for the food industry.

4.6. Recommendations

- Partnership review of IDD elimination through USI is currently NOT expedient in Poland (median urinary iodine levels are below 100 mcg/L, at least in some regions of the country).
- Taking into account relatively high consumption of household salt by Polish population (about 6 g per day), mandatory iodization of all table salt should result in more adequate iodine nutrition of population. Polish national authorities should consider increasing the level of salt iodization (to internationally recommended level of 40 ppm) and shifting to more stable KIO3. These measures could increase the quality of iodized salt (currently only 47% of salt contains the recommended iodine content) and elevate iodine supply. Lifting a ban over the use of iodized salt by food industry should be also considered: sooner or later consumption of table salt will be decreasing while amount of “hidden salt” with processed foodstuffs will be increasing.
- Nationwide survey to assess the proportion of households that are currently consuming iodized salt should be considered;
- IDD/USI Program Review (using ISPAT tool) may be conducted in Poland to outline ongoing problems and to decide on future steps to reach sustainable IDD elimination. UNICEF may provide external support for this Program Review, if requested.
- Representatives of Poland should be invited to all future European IDD/USI Advocacy meetings.

5.7. Literature

1. Z.Szybinski, Results of the programmes on iodine deficiency in Poland and monitoring system of mandatory model of iodine prophylaxis. 1998 p. 9-19
2. S.Bobek at el. Supplementation pattern of cows fodder with iodine. P.35-44