



# IDD NEWSLETTER

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## Controlling IDD in Ukraine: a ground-breaking program shows the way

Only 1/3rd of Ukrainian households are using iodized salt and, in western parts of the country, one child in five is goitrous due to lack of dietary iodine

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Ukraine has a population of 47 million, 8.8 million of which are children. Iodine deficiency disorders (IDD) are a major public health problem in the country. With the assistance of UNICEF and the U.S. Centers for Disease Control and Prevention (1), a 2002 national assessment found iodine deficiency was prevalent nationwide. In some regions in Western Ukraine, one child in five is goitrous due to lack of dietary iodine. Despite the clear evidence of iodine deficiency nationwide and the international experience with universal salt iodization (USI), the government of Ukraine is



Women and children in Ukraine are particularly vulnerable to IDD

Credit: WHO/V. Suvorov

**THE INTERNATIONAL COUNCIL FOR CONTROL OF IODINE DEFICIENCY DISORDERS (ICCID)** is a nonprofit, nongovernmental organization dedicated to sustained optimal iodine nutrition and the elimination of iodine deficiency throughout the world. Its activities have been supported by the international aid programs of Australia, Canada, Netherlands, USA, and also by funds from UNICEF, the World Bank and others.

remains hesitant about introducing USI, the most efficient strategy for IDD elimination.

UNICEF is committed to supporting national efforts on IDD elimination in Ukraine. These efforts include high-level advocacy for adoption of a USI law, and communication to the public on the benefit of iodized salt. A recent pilot program in one oblast (an administrative territorial division within Ukraine, see map) was developed to generate evidence and contribute to national policy development and advocacy in support of USI. The oblast of Lviv was selected for the pilot study in 2004.



**The Lviv oblast in western Ukraine**

The Lviv oblast, part of which lies in the Carpathian Mountains, covers 21,800 sq. km in the western Ukraine. The total population is ca. 2.5 million, 40% live in rural areas, and the oblast has a high rate of unemployment. The oblast is recognized as one of the 'highly endemic' IDD regions in Ukraine. The aim of the project was development and implementation of a comprehensive and applicable model for controlling IDD using existing infrastructure, and included testing of the model's efficiency and advocacy for its scale-up. The main objectives of the pilot program were to ensure high market coverage with iodized salt, promote use of the iodized salt and thereby improve the iodine intake of the population.

## Strategies and partners

In the first stage of the project in 2005–2006, the emphasis was on raising awareness of IDD/USI among the main stakeholders and establishing an inter-sectoral partnership for implementation of the USI strategy. Twenty-five seminars were conducted and 730 local administrators, health care specialists, teachers, and community and youth leaders were trained to understand the benefits of adequate iodine nutrition and the cost-benefits of salt iodization in relation to public health. One of the most reliable target groups included in the education campaign were trade and wholesale representatives. They are a group in direct contact with consumers and are able to influence consumers' attitudes towards iodized salt, in order to promote iodized salt as a 'healthy' product.

A Coordination Council was established under the Governor to ensure inter-sectoral collaboration and coordination between the different state structures involved into the supply, distribution, quality control and monitoring of household use of iodized salt. A plan for monitoring iodized salt on the market and consumption of iodized salt was developed and successfully implemented. Documents were issued to: 1) ensure availability of iodized salt at each sales point; 2) allow regulatory monitoring of the quality of iodized salt at the wholesale level by sanitary stations; and 3) collect information on household use of iodized salt by the Department of State Statistics. A strong collaboration between the education and health departments within the oblast administration supported school education on IDD and the impact evaluation survey. Throughout the duration of the project, the local mass media dissemina-

ted information about IDD control on regular basis.

## Results

The household use of iodized salt in Lviv oblast one year after beginning the project was much higher than the Ukrainian national average. As a part of the monitoring program, in 2005 the oblast Department of Statistics conducted a survey of 548 households. The study found 77.4% were using iodised salt and 98.5% of all shops sold iodized salt. In 2006, among 685 households surveyed, 81.3% were using iodized salt. Compared to the 2005 national average (31% of households using iodized salt), the level of iodized salt consumption is ca. 2.5 times higher in Lviv oblast.

In May 2006, a 30 cluster school-based survey was conducted to measure the impact of iodized salt consumption on the iodine nutrition of the population. A total of 844 schoolchildren, aged 6–12 years, were examined, urine samples for analysis were collected and salt samples from their homes were tested for iodine. The survey was designed to provide representative data on the iodine nutrition of the 2.6 million people living in the Lviv oblast and create the basis for building a national monitoring system. Urinary iodine concentration (UIC) was measured by the IRLI laboratory in Kiev. The children were asked to bring salt samples from their homes to school on the day of examination. Household salt iodine content was measured at school using MBI rapid testing kits. The children were also requested to report the use of iodine-fortified foods and tablets.



**Ukrainian children participating in the Lviv iodine survey**

The survey found a median (range) UIC of 144 (2-507)  $\mu\text{g}/\text{L}$  in the children, within the recommended range indicating adequate iodine intake (2). Only 12.3% of samples had a value  $<50 \mu\text{g}/\text{L}$  and 32.5%  $<100 \mu\text{g}/\text{L}$ . Fifty-nine percent were in the recommended range of 100 to 299  $\mu\text{g}/\text{L}$ , and 8.9% were  $>300 \mu\text{g}/\text{L}$ , suggesting greater than recommended intakes. The field testing of salt samples for iodine found 65% were fortified with iodine. Only 8.2% of the schoolchildren surveyed reported use of iodine containing supplements. Compared to the Ukrainian national median UIC of 90  $\mu\text{g}/\text{L}$ , indicating mild IDD, the increased use of iodized salt in Lviv has improved iodine intake among school-aged children. Although the goiter rate was still elevated at 22% in the second year of implementation of the project, the goiter rate is an

IDD indicator that needs a long period of time to normalize after iodine intakes improve. Overall, the survey confirmed the strong positive impact of the use of iodized salt due to implementation of the new project.

### Conclusions

Due to an effective information campaign and proper local regulations, within two years the consumption of iodized salt markedly increased. This resulted in a substantial improvement in the iodine nutrition of children in the Lviv oblast. An external expert evaluation of the project confirmed the model was successful, and recommended scale-up by the Ukrainian Ministry of Health.

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# Controlling iodine deficiency in Italy

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An Italian law “Final Arrangement for the Prevention of Endemic Goitre and other Diseases of Iodine Deficiency” became effective in November 2005. This law requires retailers to only make iodized salt available on the shelf. Non-iodized salt should be available behind the counter, but it has to be specifically requested by the customer. The law also foresees the possibility of using iodized salt in the food industry and in communal eating areas. Following application of the law, to activate a monitoring program, the Italian Parliament established at the Higher Institute of Health a National Observatory for Monitoring Iodine Prophylaxis (OSNAMI). OSNAMI will monitor and ensure the effectiveness of the IDD prevention program.

## National Observatory for Monitoring Iodine Prophylaxis (OSNAMI)

OSNAMI will operate in tight contact with the National Committee for The Prevention of Goitre. For many years, this Committee has dealt with the consequences of nutritional iodine deficiency. The institution of OSNAMI foresees the introduction of a Coordinating Activity Group which includes various professional figures (thyroid specialists, biologists, chemists, nutritionists and epidemiologists). This group will be responsible for programming and coordinating work on the effectiveness of iodine prophylaxis. They will monitor variations in the frequency of thyroid diseases in the population, particularly cases of hyperthyroidism resulting from general use of iodized salt. They will also develop a campaign for direct information on iodized salt to the general population as well as doctors and health personnel.

## Indicators of the effectiveness of iodine prophylaxis

In agreement with the guidelines of WHO, UNICEF, and ICCIDD, monitoring will be based on the following indicators:

### 1. Sales trends of iodized salt

Sales trends of iodized salt will be evaluated by collecting national sales data submitted to the Higher Institute of Health by the salt producers. The consumption of iodized salt should be >90% of total salt consumption for food use.

### 2. Iodine content in salt packages on the market

Verification of the iodine content in salt on the market will be carried out at the National Centre for Food Quality. Samples of the salt will be taken at the producers, and also at points-of-sale in areas pre-selected for epidemiological research to verify the iodine content and variation at the household level.



*The Italian Parliament in Rome has established a new national IDD monitoring program*

### **3. Urinary iodine concentration (UIC) in representative samples of school-age children**

For determination of UIC, each child attending the selected school will provide a morning spot urine sample. The criteria for defining effectiveness will be an average UIC of at least 100  $\mu\text{g}/\text{L}$ , with at least 50% of values  $>100 \mu\text{g}/\text{L}$  and not more than 20% with a value  $<50 \mu\text{g}/\text{L}$ .

### **4. TSH concentration in newborns**

Data on neonatal TSH will be collected through the network of laboratories already participating in the National Register of Congenital Hypothyroidism. Effectiveness of prophylaxis program will be judged by an incidence of less than 3% of newborn TSH values  $>5 \text{ mU}/\text{L}$ .

When financial resources are available, thyroid volume by ultrasound will be evaluated. A prevalence of goiter less than 5% in school-age children will be used to define the effectiveness of the IDD program.

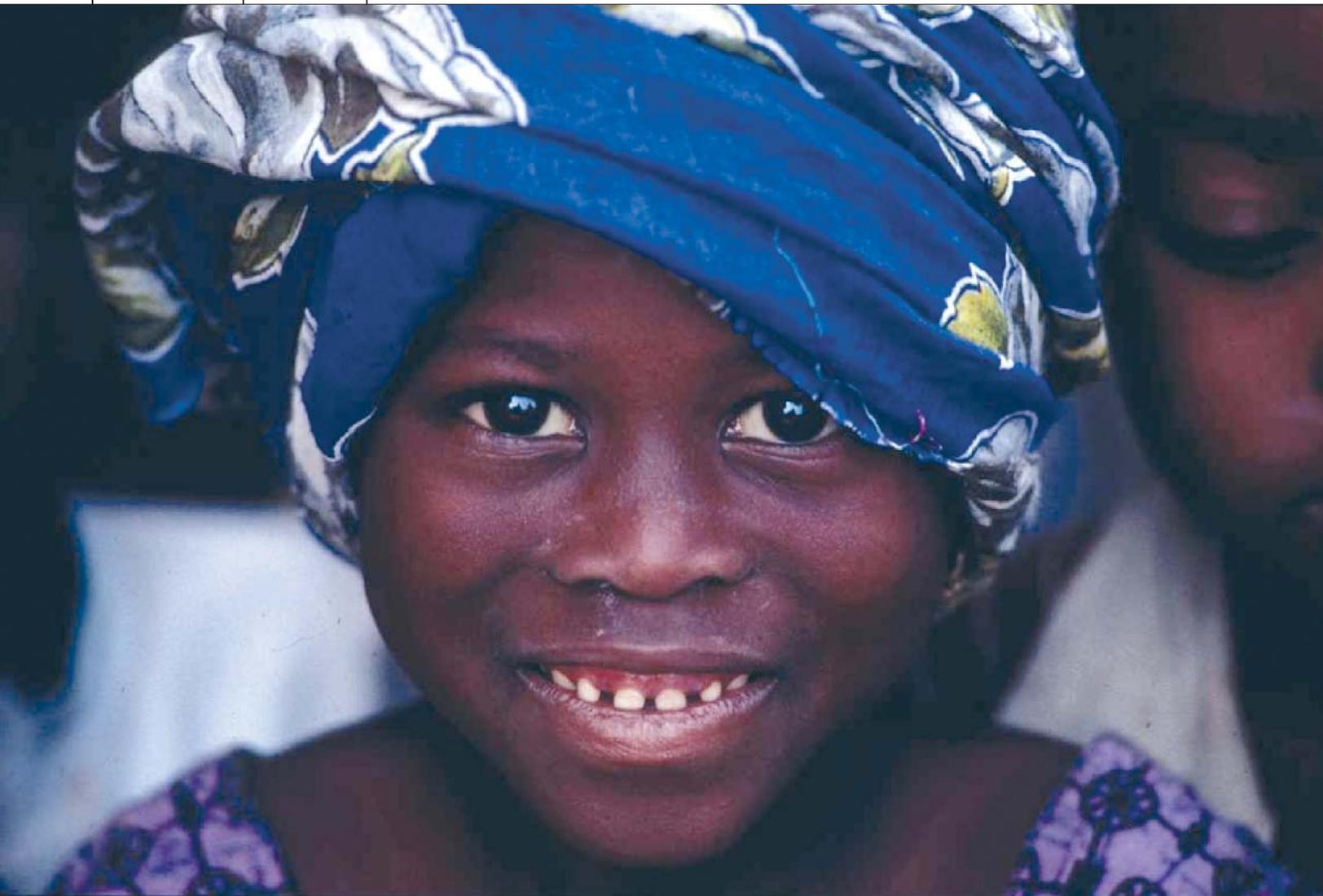
### **Monitoring Plan**

For the surveys in the schools, extra-urban “sentinel areas” will be identified in each region where the presence of iodine deficiency and endemic goiter has previously been documented. In each “sentinel area” a referral “urban area” should be specified. In both the sentinel and urban areas, a number of schools and children representing the general population of that region will be randomly selected. Epidemiological evaluation will include data on the median UIC in schoolchildren and TSH values in newborn screening.

The data from the surveys will be collected at regional centers in order to maximize the flow of information from the periphery to the Higher Institute of Health. To reduce variations between laboratories, four reference laboratories have been identified. In the first stages of the monitoring program, effectiveness studies will be done every two years; subsequently, they will be done every 3–5 years.

### **Surveillance of adverse events and circulation of information**

The program will monitor the frequency of new cases of hyperthyroidism following general use of iodized salt. Surveillance will include use of anti-thyroid drugs in collaboration with organizations appointed for drug control by the Italian Agency of Drugs (AIFA). For new pathology cases, general practitioners will be involved. Surveillance of congenital hypothyroidism will be done by the Higher Institute of Health through coordination with the National Register of Congenital Hypothyroidism. Activity of OSNAMI will be presented annually to the Ministry of Health. There will be regular meetings between participants of the monitoring program to discuss potential interventions to improve the iodine prophylaxis program.



# The IDD Control Program in Equatorial Guinea

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## Background

Equatorial Guinea is a small country sheltered in the elbow joint of the Atlantic Ocean in the Gulf of Guinea in West Africa. It consists of two territories, firstly the former Spanish Island of Fernando Po with the capital of Santa-Isabel and the mainland continental territory of Rio-Muni, with Bata as the capital. The country is wedged between Cameroon to its North, Gabon to its East and South, and the Atlantic Ocean to the West. After gaining

independence on 12 October 1968, it adapted Santa Isabel as its political capital and renamed it Malabo. Equatorial Guinea is listed among the Highly Indebted Poor Countries (HIPC) of the world. In 2005, the total population was 504,000 inhabitants. The infant mortality rate is 123 per 1000, an under 5 year-old child mortality rate ranking that is 9th highest in the world and a life-expectancy at birth of 42 years.

Along with a severe burden of endemic tropical diseases, the country was

traditionally affected by IDD. However, due to remarkable recent progress with iodized salt, in 2005 it was estimated that 68% of households were consuming iodized salt. Certainly, the sustainable elimination of iodine deficiency, one barrier to improving socio-economic productivity in the country, can be achieved. It is a matter of strengthening political will and commitment, and reinvigorating the already existing program structures to assure monitoring and reporting. Indeed, the World Health Assembly Resolution (WHA 58.24)

on iodine reporting of May 2005 that was renewed at Geneva in May 2007 was supported by Equatorial Guinea. In recent years, the return of peace and political stability led to the discovery of underground wealth (petroleum), and now the socio-economic, political and cultural development picture is changing radically.

During the 1987 African Regional WHO/UNICEF/ICCIDD Conference on IDD, held at Yaounde, Cameroon, there was no information on IDD in Equatorial Guinea; but a Regional Task Force was created with the following functions:

- Promotion of country programs to fight against IDD
- Coordination of all initiatives concerning the fight against IDD in the African Region
- Follow-up and monitoring the progress of the fight against IDD in the African Region
- Promotion of universal iodized salt (USI) as the best strategy where possible

In April 1995, Dr John Onyeani Egbuta, from UNICEF, Lagos, Nigeria, conducted a national survey on the prevalence of IDD and the prevalence of iodized salt in households. He examined 1453 children of 8 to 12 years of age from 13 districts, both on the Island Region and the Continental Region. He found the prevalence of goiter in the continental and island regions was 18.4 and 8.6%, respectively. He concluded IDD was a public health problem of moderate endemicity in Equatorial Guinea, and recommended USI as an urgent measure, especially for the Evinayong district with a goiter prevalence of 25%. Only 20% of households were consuming iodized salt. The origins of the salt available in the market were Cameroon and Senegal, but 80% of the non-iodized salt came from Europe, especially Spain and France.

The consultant recommended that the government should make legislation to favor exclusive iodized salt importation and to ban importation



of non-iodized salt. The second recommendation was for the government to set up a multi-sectoral committee to combat IDD. Third, it was recommended that the government set up a program for the fight against iodine deficiency in the Nutrition Service to ensure regular monitoring and reporting.

### The May 2007 study

As a member state of World Health Organization, Equatorial Guinea was expected to be reporting progress to the African Regional Office of WHO in Brazzaville. However, reports were hardly ever submitted. Sadly, according to UNICEF by 2007 only 33% of households were using iodized salt. This figure was derived from MICS and Demographic Health Surveys. In the 2007 West and Central African Scorecard on Progress toward USI, Equatorial Guinea ranked amongst the lowest in percentage of population protected against iodine deficiency. Equatorial Guinea was identified as one of the countries in Africa where the USI/IDD program had stalled. ICCIDD developed a mission to go into the field, assess the situation and accelerate progress. This was done in May 2007.

The ICCIDD team began their work by reporting their presence to the responsible administrative officers of the Ministry of Health. They were cordially received by the Regional

Delegate for Public Health, Inspector of Health, Vice-Rector of the University of Equatorial Guinea responsible for health and manpower development, the Provincial Coordinator for Laboratory Services and the Epidemiologist. The team visited two popular markets in Bata city, found several salt retailers and sampled salt from nine of them randomly. The purchased salt sample was tested for iodine. Then the retailer was questioned on her knowledge of the value of iodized salt. During this procedure, other market women would join in the discussion on the consumption of iodized salt to prevent goiter (which all of them could recognize) and IDD.

The team distributed to these market women (salt retailers) copies of the bilingual manuals: (1) “Consommons de Sel Iodé pour la Vitalité Et Intelligence et pour Prevenir le Goitre”/ Lets Eat Iodized Salt for Vitality, Brilliance and to Prevent Goitre.”; (2) “Iodine Deficiency Disorders in Cameroon 1990-1991: 25 Questions and Answers” / “Les Troubles d’us a la Carence en iode au Cameroun 1990-1991: 25 Questions et Reponses”. The photographs of voluminous goiters on the cover pages effectively communicated the principal message even to those who could not read the booklets.

The team visited three schools on two consecutive days. A brief talk was given (translated into Spanish) on goiter (a common endemic disease in Equatorial Guinea), its cause (iodine deficiency in the soil, food and diet), other IDD syndromes such as brain damage and endemic cretinism, and their prevention with iodized salt. A question and answer session followed.

All the children were requested to bring a sample of kitchen salt the next day for testing for the presence of iodine. On day two, the children were invited to come to the front of the class in sets of three, to have their salt tested. The principle of the test was explained. After each test, the



**Testing the iodine content of salt at a Bata market**

pupil was instructed to announce publicly the colour change. If the salt changed colour, the pupil would announce:

“My salt contains iodine  
We eat iodized salt in our house” –  
A smile followed, and the entire class applauded.

Otherwise:

“My salt is not iodized  
We do not eat iodized salt in our home”

I will tell my mother to buy only iodized salt – Sadness! No applause.

The team collected spot urine samples, and as there is no specialized laboratory in Equatorial Guinea to carry out iodine measurements, they were sent to the IRLI laboratory in Yaounde. As the SANTY Brand of salt was most popular, the team then visited and interviewed the salt suppliers/importers.

## Results

Of the 350 salt samples tested at the school, 70% were iodized of which 30% showed deep blue colour, while the remaining 40% were mildly iodized. About 30% did not show profound colour change. Sixteen random samples were titrated for specific iodine content in parts-per million at IRLI, Yaounde and the mean was 55.2 ppm, the range being 4.2 to 112.2 ppm.

The results of the urinary iodine concentration (UIC) measurements were:

- Range = 54–844 µg/L
- Median = 564 µg/L
- Over 96% of the samples contained >300 µg/L indicating iodine excess.

The analysis of the samples of household salt showed a range of 4.2–



**Children bringing salt samples to school for iodine testing**

112.2 ppm, with a mean value of 55 ppm. The iodine content in branded market salt in Bata is shown in Table 1.

**Table 1: Iodine content in branded market salt in Bata**

Brand	Samples	Iodine (ppm)	Mean	Comment
Commercial Santy	6	55 – 105	77.58	Iodized
SARA Food Table Salt	2	67.7 – 68.8	68.5	Iodized
Sel de Sine Saloum SSS)	2	89.9 – 96.3	95.1	Iodized
Sal Marinho SGCA T-T FINADA	4	1.1 – 2.1	3.2	Non Iodized

## Conclusions

From the salt sample analysis, the majority of salt brands marketed at Bata were legally iodized between 50 and 100ppm at production or importation into Equatorial Guinea mainland. However Sal Marina (Espanol) was not iodized, and it is therefore imported against government regulation. However, as the iodized salt brands clearly dominate the market, the probability of every family or household purchasing and eating iodized salt every two or three weeks was very high. This is confirmed by the fact that great majority of children brought iodized salt samples to school, and further by the data on UIC in the children.

Perhaps the most important discovery of this study was that the median UIC was 564 µg/L, high above the recommended range of 100–299 µg/L. Because nearly all the children had UICs indicating iodine excess, the salt iodization level of 50–100 ppm at production or importation is too high and should be reduced by legislation (according to WHO recommendations) to 25–45 ppm iodine or 35–65 ppm iodate. However, what holds good for Bata may not be the same for all the



**Distribution of IDD control pamphlets in the Bata market**

districts and regions of Equatorial Guinea. But given that the country is quite small even when the Continental and Insular Regions are taken

together, and considering the very good road network, the chances of adequate iodized salt losing value by long delays due to poor circulation are unlikely.

## Recommendations to the Government

- To study the present report carefully and decide on a plan of action to reinvigorate the USI/IDD program and assure regular monitoring and reporting yearly to WHO and UNICEF according to Resolution WHA 58.24 of May 2005 renewed in May 2007.
- Measures should be taken to stop the importation of non-iodized salt by Marinho (Spanish) Salt especially at the ports. The rules and regulations should be enforced on all imported salt.
- A specific USI/IDD Program Head should be appointed in the Nutrition Service and assisted to keep a good information and data bank.
- More regular monitoring should be practiced in the former moderate-endemic district of Evinayong.
- The important iodized salt dealers should be congratulated and encouraged to market their good quality salt in all the districts of the country.

# Correcting iodine deficiency through iodination of irrigation water in Inner Mongolia

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## Background

Iodine deficiency disorders continue to be a severe problem in many parts of Central Asia, causing delayed mental development and cretinism in indigenous populations. In some areas iodized salt has not succeeded in controlling this problem. In southern Xinjiang Province of China in 1992–93, a new method of supplying iodine to rural populations by dripping potassium iodate into irrigation water canals was tested. After dripping the level of soluble iodine in soil increased and was high for several years. Uptake of iodine by plants increased promptly after dripping and persisted at least seven years. Plant iodine content peaked after two years. Wheat and cabbage – the most important food grain and dietary vegetable in the local area – had iodine increases similar to those of other grains and vegetables. Both continued to show increased iodine concentration after seven growing seasons, presumably reflecting continued increased iodine concentration in soil.

The method proved feasible and cost-effective; it reached virtually all the people, required no medical expertise, required no continuing effort after the initial dripping, and had the important added benefit of improving livestock production. Descriptions of the study areas, demographic data, methods, and results up to six years after dripping in Xinjiang have been published previously (1–4).

## Iodine dripping program in Inner Mongolia

In 2002, the Inner Mongolia Center for Endemic Diseases Prevention and Control began a similar project, with the additional feature that total soil iodine, in addition to soluble iodine, was measured in order to better define the fate of iodate added to the soil. Potassium iodate was applied in two townships, Nalinxili and Holumsu, in Yijinholo county of the



*Iodination of irrigation water can provide iodine to rural Mongolian children*

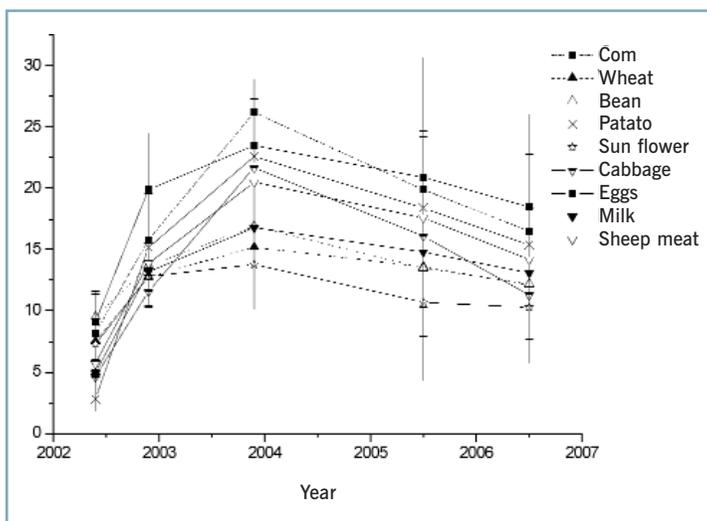
Erds prefecture in southern Inner Mongolia. Soil and agricultural conditions were very similar to Xinjiang. A total of 1600 mu (700 in Holosumu and 900 in Nalinxili) (1600 mu = 1.056 km<sup>2</sup>) were dripped with a population of 1400 persons directly affected; an additional 2400 persons were affected indirectly. The Inner Mongolia test area received a total of 25 kg of potassium iodate in 2002; 14 kg in Holosumu (tilled area 700 mu) and 11 kg in Nalinxili (tilled area 900 mu).

thus urine iodine values were not low before dripping, with the exception of nursing mothers. After dripping, iodized oil capsules were discontinued, so that later values represent primarily the effect of dripping.

The Inner Mongolia results confirm the permanence of dripped potassium iodate for more than four years in desert soils of central Asia, and also confirm the availability of this source of iodine for humans. An added benefit is the improvement in live

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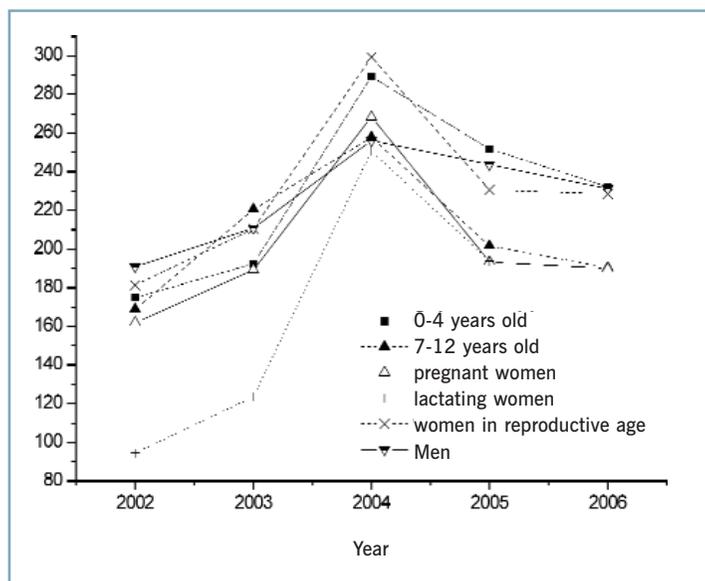


**Figure 1** Comparison of iodine content of vegetables, eggs and meat before and after iodate dripping in Yijinhuolo, Inner Mongolia. Values at left are pre-treatment.

After the dripping, indices were followed for four years. The results parallel those found in Xinjiang. Soil iodine values (both soluble iodine and total soil iodine) rose and remained elevated for four years, with only modest fall-off in that time. Uptake of iodine by plants and products of poultry and animal origin increased promptly after potassium iodate dripping and persisted through at least four years (Figure 1). Urinary iodine concentrations in human population groups show a robust increase that persisted for four years in the Inner Mongolia study (Figure 2). The population had been treated with oral oil capsules before the dripping,

stock production and quality, conferring an important economic benefit.

**Note:** A paper on the Inner Mongolia dripping program is in press at the *Journal of Trace Elements in Medicine and Biology*.



**Figure 2** Comparison of urinary iodine concentration for different population groups before and after iodine dripping in Yijinhuolo, Inner Mongolia.

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# Excessive iodine intake in Brazil

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*Brazil's salt iodization program needs careful monitoring to prevent children from getting too much iodine*

More than two thirds of the 5 billion people living in countries affected by iodine deficiency now have access to iodized salt. In South America, iodine nutrition has considerably improved over the last decade (1). However, high iodine intake as reflected in high urinary iodine concentration (UIC) has been detected in some countries:  $>300 \mu\text{g/L}$  in Brazil, and  $>500 \mu\text{g/L}$  in Chile.

In Brazil, a low iodine intake was detected in the 1994-95 national survey of 20,000 schoolchildren; UIC was  $<100 \mu\text{g/L}$  in more than 50% of children (2). Accordingly, in 1998, the Brazilian Health Authorities increased the fortification level of iodine in salt for human use to 40-100 mg/kg of salt. In 2001, the Thyromobil project examined 2,106 schoolchildren from 21 villages of 8 States in Brazil and reported more than 67% of the children had a UIC  $>300 \mu\text{g/L}$  and 35% had values  $>500 \mu\text{g/L}$  (1). This was confirmed by Duarte et al. (3) who found that 57% of examined schoolchildren ( $n = 829$ ) in Sao Paulo State had UICs  $>300 \mu\text{g/L}$ . Excessive iodine intake (as reflected in a median UIC  $>300 \mu\text{g/L}$  in a population) may be associated with an increased risk of

autoimmune thyroid disease (with hypothyroidism) and also with hyperthyroidism in the elderly (with the risk of atrial fibrillation).

We have recently noted an increased incidence of chronic autoimmune thyroiditis among individuals exposed to more-than-adequate, or excessive, levels of iodine (4). In a recent population survey conducted in Brazil (Sao Paulo metropolitan area), after 5 years of excessive iodine intake by the population (1998 - 2003), 55% of the examined subjects had a UIC  $>300 \mu\text{g/L}$ , with a median of  $306 \mu\text{g I/L}$  (2). The prevalence of chronic autoimmune thyroiditis was 17.6% as compared to 9.4% in 1994 (2), when the population was mildly iodine deficient.

It should be noted that some of the increased incidence of Hashimoto's thyroiditis found in our recent study (4) may be due to improved diagnostic methods. In the past few years, the diagnosis of autoimmune thyroid disease, especially chronic lymphocytic thyroiditis (Hashimoto's disease), has been based on two main parameters: 1) hypoechoic ultrasound pattern that may objectively be measured by a Grey-scale analysis (5) and subjectively

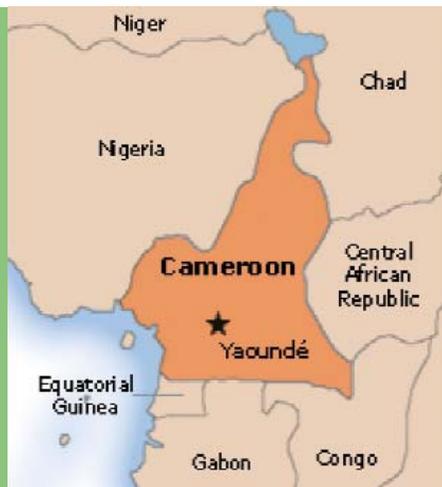
evaluated by a grade 3 or 4 hypoechoic pattern (6); and 2) sera positive for anti-thyroid peroxidase (anti-TPO) antibody. A recent Chinese report (7) may have underestimated the incidence of chronic autoimmune thyroiditis by using only one of these laboratory parameters (anti-TPO antibodies) in their assessments. Use of the more powerful 2-parameter diagnostic approach by other reports in this field would contribute to more meaningful study comparisons.

In conclusion, more-than-adequate, or excessive, iodine intake may lead to autoimmune thyroiditis and hypothyroidism (4). Therefore, in iodine nutrition, the maxim "more is better" should not be a general recommendation for every country around the world.

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# Monitoring the USI program in Cameroon



## Background

A baseline national survey of IDD in Cameroon was conducted by Lantum and collaborators in 1990–1991 (1). During this study, 20 sentinel zones were identified for eventual follow-up and monitoring. The national survey found a goiter rate of 29% in school children 6–12 years old. In 1991, the national Universal Salt Iodization and Consumption

strategy began thanks to a Ministerial Order. In 2002 a country-wide impact evaluation in 13 randomly-selected clusters found the national median urinary iodine concentration (UIC) was 159 µg/L, and the goiter rate was as low as 5.4%, with only one case of endemic cretinism born in 1991 at the onset of the USI program. This study suggested IDD had been eliminated in Cameroon.

## Sentinel study in northwest Cameroon

**Daniel N. Lantum** ICCIDD Regional Coordinator for Francophone West and Central Africa

In 2006, an impact evaluation of USI effects in the Bamoungoum Sentinel zone situated in West Province found a median (range) UIC of 389 (270–735) µg/L, with 80% of children having a UIC >300µg/L, indicating excess iodine intake. The evaluation recommended other sentinel zones be monitored to determine if the Bamoungoum finding was the general trend or an isolated case. In this light, an impact evaluation of Bamessing – a rural district in North-West Province of Cameroon was organized in 2007.

The ICCIDD team visited three randomly selected schools, and all students present on the day of visit were enrolled. On day one, a general health education talk on IDD (cause, manifestations, diagnosis, prevention and control using iodized salt) was given at each school, and a request was made that all children bring a sample of kitchen salt from their households next day for testing for

iodine. On day two, the study team revisited the school, requested the school teachers to line up the children (holding their salt samples) in the court-yard for systematic salt testing. The principle of the test “that on adding starch to iodine, the colour changes,” was demonstrated, and the result of the test and its significance to nutritional status was well discussed. All the samples were collected for eventual quantitative tests at IRLI laboratory at Yaounde. A spot urine sample was collected.

As the three schools selected out of six were situated in different quarters of Bamessing, the children were likely to originate from households all over the community and therefore representative of the entire population. The sample included 180 children between 10–18 years old. By quick inspection, no visible goiters were detected, nor classical cretins. One child at the government school had multiple deformities: bat ears,

gorilla eyes, k-legs, but he was alert. He was 16 years old, suggesting signs of endemic cretinism. Since effective USI began by 1993, that is 15 years ago, all except four children surveyed were possible beneficiaries before birth.

In the field testing of the salt using the Mbi Test Kits, although not all the salt samples were adequately iodized, the grand majority contained some iodine. Then 90 samples were taken to IRLI for analysis by titrimetry to assess the quantitative iodine content. The following results were obtained:

- Range: 2.1 ppm to 163.9 ppm
- Median value: 46 ppm
- Less than 15 ppm: 8%
- 100ppm and above: 6%

The results for the urinary iodine measurements were:

- Total number: 180
- Range: 17.4 – 679.0 µg/L
- Median: 210 µg/L

■ In the sample, only 23% had a UIC in the range of 300–679  $\mu\text{g}/\text{L}$  suggesting excess iodine intake, and none exceeded 1000  $\mu\text{g}/\text{L}$ .

Comparing the findings of Bamessing with those of Bamoungoum where the iodine intake was clearly excessive suggests not all regions of Cameroon are consuming excess iodine. However, similar monitoring exerci-



Cameroonian children line up for salt testing in front of school

ses in sentinel zones with severe IDD in 1990–2000, such as Ngaoundere in Adamawa province and Batouri in Kadey of East Province, are best indicated for targeting by the Ministry of Health (or ICCIDD facilitators) for the next sentinel zone impact evaluation. This study indicates the necessity and value of regular monitoring of country USI/IDD programs using the sentinel zone approach.

## Iodine status during pregnancy in Cameroon

**M.M. Gimou, R. Pouillot, M. Nankap, C. Bilong and D. Sibetcheu** Centre Pasteur du Cameroun, Ministère de la Santé Publique au Cameroun.

The objective of this study was to determine and to compare the iodine status of pregnant women in rural and urban areas twelve years after the implementation of universal salt iodization in Cameroon and to identify cases of iodine-induced hyperthyroidism in the target group. A cross sectional survey of pregnant women, 15–44 years old, was done in May to July 2003 in both an urban area with high iodine intake and in a rural area with severe iodine deficiency, as observed in previous studies (2). Pregnant women were recruited in prenatal health care centers. The availability and the content of the iodized salt they used were evaluated with rapid test kits and titration. Urinary iodine concentration (UIC) and blood TSH were determined.

### Results

In the rural area and in the urban area, a total of 181 and 102 pregnant women were sampled, respectively. The median UIC was lower in the rural area than in the urban area (166  $\mu\text{g}/\text{L}$  vs. 338  $\mu\text{g}/\text{L}$ ); thus, according to international recommendations, the iodine intake was adequate in the

rural area and more than adequate in the urban area (3). Only 6.4% of the entire sample had UIC <50  $\mu\text{g}/\text{L}$ , and 34% had a UIC <150  $\mu\text{g}/\text{L}$ . The prevalence of excessive iodine intake (as reflected in a UIC >500  $\mu\text{g}/\text{L}$ ) was 15% overall; 27% in the urban area and 8% in the rural area.

In the rural and urban areas, no significant difference was found in the median blood TSH, which was 0.98 mU/L and 0.82 mU/L, respectively. In rural and urban areas respectively, 12.2% and 15.7% of women had an abnormally low TSH value, while only 1.1% had an elevated value. The rapid test kits revealed 97.4% of 275 salt samples collected in both areas were iodized. The titrimetric method showed that 1.5% had no iodine content, 18.5% had less than 15ppm, and 3.6% more than 100ppm. Only iodate was found in all salt samples.

In conclusion, this study reaffirms the need to continuously monitor iodine replacement programs to ensure efficacy, notably in controlling iodine deficiency in pregnancy, and reducing excessive iodine nutrition in Cameroon.

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# Pushing iodine into Indonesia's bloodstream

**Personal Stories** Cameron Broadhurst, Intern, The Jakarta Post, Yogyakarta, Jakarta



July 4, 2007- While drinking coffee on the grounds of Yogyakarta's Borobudur temple, an elderly woman approached, trying to peddle the cheap fans she was carrying. But they weren't the most obvious load she bore: a lump almost the size of a second head distended from her neck. Goiters like hers, caused by the swelling of the thyroid gland in the neck, are caused due to an insufficient iodine intake. She did not want to have the operation her doctor had recommended, and the Indonesian word for iodine, yodium, was not one she recognized.

In nearby Magelang, Central Java, 30 to 50 patients a week visit the outpatient clinic at the Center for Research and Development in Iodine Deficiency Disorders. According to the head of the center, Dr. Djoko Kartono, very few of these outpatients are older people with visible goiters who are more difficult to treat, and who can develop hyperthyroidism with the usual capsule supplement. "If we give them iodine capsules, it'll be toxic," he said. Operations on large goiters are also considered highly risky due to the growth's proximity to the remaining thyroid gland.

Instead, most of the clinic's patients are children born to mothers with insufficient iodine intake and who developed neurological defects and cretinism during pregnancy. Treatment for such children includes medication and physical therapy like acupuncture to deal with impaired motility and mental retardation. Although the clinic has not yet been officially approved by the national ethics or science bodies, the IDD center receives many patients from the districts of Srumbung and Dukum. Encouraging the consumption of iodized salt is critical to preventing further birth defects and goiters in local residents.

"We have joint work on controlling cretinism and a good relationship with the staff of the Community



Health Center," said Djoko. But despite some improvements in the locals' situation, "they still have a problem".

With the last major evaluation of IDD conducted in 2003 as part of the National Socio-Economic Survey, all the evidence pointed to significant progress made against a disorder that is the leading global cause of mental retardation, and which can even cause infant death. According to this survey, goiter rates in children had dropped from 29% to 11% since 1982. And as a result of the multi-million dollar Intensified IDD project supported by the World Bank (1997-2003), the proportion of Indonesian households with iodized salt rose from 58% in 1996 to 73% in 2003.

Yet here in Indonesia, it has proven difficult to raise that percentage further since the end of the project in 2003. The latest report in 2005 in fact recorded a slight drop in the percentage of iodized salt consumption to 72.8%.

Dr. Arum Atmawikarta, Director for Community Health and Nutrition at the National Development Planning Board (Bappenas), oversees Indonesia's attempts to rein in the iodine problem. He said Bappenas had formulated an action plan for 2006-2010 to eliminate IDD in Indonesia. The plan aims to increase the availability of iodized salt for prevention and of iodine capsules for treatment. Thirty districts in the country are classified as "severe endemic areas" by the Health Ministry, but Arum

said the difference between the situations in particular districts meant there was a need to change strategy in dealing with the problem. Whereas the Bappenas has previously taken a universal strategy across the country, he said the body and experts from UNICEF had agreed that "one policy does not fit all".

"In South Sulawesi, compared to Manado (North Sulawesi), there are a lot of farmers – they all directly produce salt. We can't control the quality with such mass production. We have to take a more specific approach," said Arum. At a medical conference held in June 2007 in Bangkok by the South East Asian Ministers of Education Organisation (SEAMEO), Arum reported on Indonesia's future plans for IDD:

strengthening political commitments, increasing supply and monitoring of iodized salt, focusing on endemic areas and building social norms. SEAMEO Deputy Director for Program Development Siti Muslimatun has since stated: "Currently Indonesia is strengthening the Universal Salt Iodization by ensuring that all salt for human consumption shall be iodized, irrespective of the raw salt quality."

Yet the reality of the Indonesian salt industry, including around 20,000 salt farmers and 400 producers diversely spread, may contradict official aims. "We can't protect all the people," admitted Arum. "There is a lot of non-iodized salt."

Many households choose to buy non-iodized salt – either because it

is more directly available or it is simply cheaper. The difference in price may be small, but because of the lack of awareness of the need for iodine, it is still significant enough to influence people's salt purchases. The next major health survey to be conducted by Bappenas will take place in August 2007. The salt consumption analysis it includes will be the first new research on the state of IDD in two years, and may reveal whether Indonesia is making progress against the disorder – or standing still.

Major problems such as tuberculosis and malaria are usually considered a more urgent focus for the country's health. But in the background, the struggle against iodine deficiency continues.

# Iodine intakes of pregnant women in Guizhou, China

**Li Xiao-Song, He Ping** Institute of Endemic Diseases Control and Prevention, Guizhou CDC, China

## Background

Guizhou, a poor province of western China with a population of 39 million, has a history of severe IDD. The native concentration of iodine in drinking water is very low, with a range of 0.2–9.7 µg/L. A 1978 survey found goiter rates of up to 60%, and a median urinary iodine concentration (UIC) of 25–63 µg/L. It was estimated there were more than 20,000 cretins in the province. In Guizhou, a salt iodization program was initiated in 1978 in severely-affected areas, and spread to the whole province in 1985. Subsequently, the national universal salt iodization (USI) program in China was implemented in 1995. Since then, monitoring has been done every two years, when 40 schoolchildren are randomly selected from 30 schools, proportional to

regional population size. The monitoring program in 2005 reported the median UIC in schoolchildren aged 8–10 was 289 µg/L, the goiter rate was 4.4% (3.8% by ultrasonography), and population coverage with iodized salt was 99.12%.

## 2006 study of pregnant women

From May to October 2006, 496 pregnant women were sampled from ten counties with varying populations of minority groups (including Miao, Buyi, Dong, Tujia and Han peoples) in different location of Guizhou. UIC was measured in spot urine samples. The overall median UIC was 219 µg/L, within the range of 150–249 µg/L recommended for pregnant women by WHO. The percentage of women with a UIC <100 µg/L was 18.7%. However, in two counties, the

median UIC was low, at 165 and 172 µg/L, and the percentage of values <100 µg/L were 32% and 41%, respectively. There were no significant differences in UIC among the different minority groups.

## Conclusions

The Chinese national USI program has been in place for more than 10 years. The median UIC in pregnant women in Guizhou is well within the recommended range of 150–249 µg/L. However, in some counties, the iodine intake of pregnant women remains low. Therefore, in USI monitoring programs, pregnant women should be regularly included as one of the vulnerable target groups. Also, for pregnant women with low iodine intakes from USI, additional iodine supplementation can be considered.

# Iodine fortification in Australia and New Zealand

Mu Li School of Public Health, The University of Sydney

In the recent decade several studies have shown mild iodine deficiency in school children and pregnant women in Australia. The Australian National Iodine Nutrition Study (NINS) revealed that the median urinary iodine concentration (UIC) of school aged children from 5 states on mainland Australia was 104 µg/L and it was 98 µg/L after weighting for population size. The situation in New Zealand appears very similar to that in Australia. The two countries share a common food standards authority (Food Standards of Australia and New Zealand, FSANZ) so any changes to legislation regarding mandatory food fortification with iodine will need to be agreed between the two countries.

In May 2004 the Ministerial Council asked FSANZ to investigate mandatory fortification of foods with iodine and came up with an Initial Assessment Report. Since then there have been several rounds of public consultations and interest parties' discussions.

The Final Assessment Report is to be considered by the FSANZ Board in late July, 2007. To increase iodine intake, earlier proposals had focused on the possibility of iodizing all salt, along with biscuits and breakfast cereals. But the final proposed standard is the mandatory replacement of salt with iodized salt in bread, the sole vehicle, with a salt iodization range from 35-55 mg of iodine per kilogram of salt. According to

FSANZ dietary estimates, 88% of Australians over the age of two consume bread, with 87% of people in New Zealand above the age of 15 also eating the product.

While this is a major step forward, it is an inadequate response to solve the problem of iodine deficiency in Australia and New Zealand. For more information on the issue of iodine fortification in Australia and New Zealand see:

## Can even minimal news coverage influence consumer health-related behavior?

A case study of iodized salt sales, Australia. Li M et al. Health Educ Res. 2007 Jul 16; [Epub ahead of print]

While iodized salt has been retailed in Australia since the 1960s, sales have remained low, at approximately 10% of total edible salt sales. Salt has never been promoted, advertised or discounted by retailers or manufacturers. Extensive news coverage of health issues has often been shown to influence consumer behavior. But can even modest news coverage generate changes in consumer health-related behavior? The authors reported a significant increase (5.2%) in national iodized salt sales after a brief period of television and newspaper reports about IDD and the benefits of using iodized salt during and after the Australian National Iodine Nutrition Study in 2003 and 2004. They concluded that even brief news media exposure can influence health-related decisions.

## A case for universal salt iodization to correct iodine deficiency in pregnancy: another salutary lesson from Tasmania.

Burgess JR et al. Med J Aust. 2007;186(11):574-6.

The aim of this study was to assess the impact of iodine fortification of bread on the iodine status of pregnant women, and to determine if studies of iodine levels in school-age children were indicative of women's gestational iodine status. A urinary iodine survey was done of pregnant Tasmanian women before and after bread was fortified with iodine in October 2001, including 285 women before and 517 afterward. The results showed that before fortification, the median urinary iodine concentration (UIC) was 76 µg/L, while after supplementation, median UICs were 81-88 µg/L. Differences in median UIC were not significant before and after fortification. The authors concluded that iodine deficiency in pregnancy persists despite being corrected in Tasmanian children. A robust national program for correcting iodine deficiency is urgently needed. Mandatory universal salt iodization has international endorsement, and should be considered the preferred strategy for eliminating iodine deficiency in Australia.

# In Memoriam: François Delange

**Basil Hetzel, Creswell Eastman, Claude Thilly** ICCIDD Executive Board

François Delange died on 15th June 2007 in Brussels following cardiac surgery. His death was a shock experienced by the thyroid scientific community throughout the world. François was a founding member of ICCIDD and served from 1986 as the first ICCIDD Regional Coordinator for Europe. He was an outstanding pediatrician and thyroidologist, particularly in the field of congenital hypothyroidism. He became Professor of Paediatrics at the Free University of Brussels.

He made a major contribution to iodine research in the Democratic Republic of the Congo, as part of the Belgian group led by Dr Andre Ermans and Dr Jacques Dumont. François was responsible for studies over a 10 year period on hypothyroid (endemic) cretinism as seen on Idjwi Island on Kivu Lake (see photograph on following page). His work attracted great interest and led to a visit to Idjwi Island by John Stanbury, a leading thyroid expert.

As Regional Coordinator for Europe, he made extensive country visits to establish cooperation with local scientists. In 1992, he organized the ICCIDD Regional Meeting in Brussels on 'Iodine Deficiency in Europe: A Continuing Concern'. He was Senior Editor of the report that provided the first comprehensive review of IDD status in European countries, including Eastern Europe.

In Germany, Merck KGaA had begun to use a mobile van with facilities for the determination of thyroid size (ultrasound) and storage of urine samples for iodine determination. François was consulted with a view to its use throughout Europe, and he was enthusiastic about the idea. A collaborative team was established at the 1993 and 1994 meetings of the European Thyroid Association, and led to ThyroMobil campaigns on five



continents: Europe, Asia, Africa, Latin America and Australia. The ThyroMobil model was used for the standardized evaluation of iodine nutrition in a total of 38,619 schoolchildren selected from 432 sites in 31 countries. For a detailed summary of the ThyroMobil program, please see: Delange F et al: 'The Story of the ThyroMobil' (Thyroid International 1/2007, Merck Serono).

In 1995, François became ICCIDD Executive Director, following Basil Hetzel. He led the important '7 Country Study in Africa' which investigated salt iodization programs and the occurrence of iodine induced hyperthyroidism, first reported from Zimbabwe in 1995. He was Senior Editor of an authoritative report of the 1996 WHO/UNICEF/ICCIDD meeting on this topic, which resulted in more careful monitoring of salt iodine levels throughout Africa and the world.

In 1997, François organized a meeting on IDD in Europe, in Munich, including a series of papers on thyroid cancer from Eastern Europe following the Chernobyl disaster. Delange was Senior Editor of the Report of the meeting that led to increased support from UNICEF and WHO for new IDD control programs in Eastern

Europe. His colleague, Gregory Gerasimov (who was Sub-regional Coordinator) played an important role in these programs, with strong support from UNICEF.

Following the 1998 ICCIDD Board Meeting, François was responsible for the revised ICCIDD Global Action Plan (1999-2001), emphasizing sustainability of country programs by effective monitoring of both iodized salt and urine iodine levels. This culminated in the 2001 ICCIDD/UNICEF/WHO Handbook on the 'Assessment of Iodine Deficiency Disorders and Monitoring their Elimination - A guide for program managers' in which he played a major role. Beginning in 1996, François represented ICCIDD at the Sub-committee on Nutrition (SCN) of the UN Agencies, to which he reported each year as Executive Director.

In 2001, his magnificent contribution to ICCIDD was suddenly interrupted by illness (severe acute pancreatitis), which led to his resignation. In due course he recovered and continued to produce important papers, focusing on pregnancy and infancy, for which he was the major ICCIDD scientific resource. He was a frequent consultant for WHO, UNICEF, the International Atomic Energy Agency and Belgian Cooperation. It is ironic that, just a couple of months ago, after more than 30 years of scientific work and lobbying of the Belgian government, François was informed that the government was ready to finally introduce legislation on iodine supplementation during pregnancy and lactation.

In early 2007, the ICCIDD Board of Directors nominated François for the newly established 'JT Dunn Distinguished Service Award' for exceptional service to ICCIDD and the elimination of IDD. This was fitting recognition of his outstanding contribution and was much apprecia-



**François Delange, working on IDD in Zaire, addressing a group of adolescent cretins. A normal subject of the same age is standing in the background.**

ted by him. The ICCIDD Executive Group decided to further honor him by, in the future, naming the scientific sessions held by ICCIDD with the Regional Thyroid Associations the 'François Delange Scientific Symposia'.

Among other honors, he received the Merck Prize (ETA) and Doctorates (Honoris Causa) from the Charles University of Prague and Jagiellonian University of Cracow. His professional career, compassionate commitment and dedicated service in the cause of overcoming IDD cannot be overestimated.

We salute him with admiration and gratitude and extend our deep sympathy to his wife Nicole and other family members.

### **Daniel Glinoyer, Jacques Dumont** European Thyroid Association

François was born in 1935, studied medicine at the University of Brussels and graduated with an MD in 1960. He became one of the few medical doctors to obtain double specialty recognition in 1981 (pediatrics & nuclear medicine). His PhD thesis was completed in 1973.

François spent most of his professional career in the department of pediatrics at the University Hospital Saint Pierre, until he retired at the age of 60, in 1995. This allowed him to pursue and develop his life long interest in IDD within ICCIDD.

François received many professional awards, including the ETA Merck prize in 1997, and authored or co-authored 12 books, 361 publications including original articles, chapters of textbooks, monographs, and proceedings of international congresses. His research activities began in 1960, and from the start, his interests were the clinical and experimental aspects of the physiopathology of pediatric thyroid disorders. His main interest was the study of IDD.

François was also a pioneer in the use of neonatal screening for congenital hypothyroidism (CH). Under his leadership, systemic screening for CH was initiated in Europe at the end of the 1970s, using TSH determination as the prime target. He had to fight hard with his American colleagues who, at that time, advocated total T4 determination as the main target of screening for CH.

A great clinical scientist, and for his wisdom, courage, idealism, scientific honesty, and witty sense of humor, François will be deeply missed by all those who knew him well, his many friends in Brussels and around the world, and probably even his few enemies. We feel honored to have been his lifelong friends.

# Meetings and Announcements

## **UNICEF Publication: 'Protecting Children's Brain Development. A Strategic Review On Sustained Universal Salt Iodization In Eastern And Southern Africa' (Nairobi, Kenya, January 2007)**

UNICEF Eastern and Southern Africa Regional Office (ESARO) seized the opportunity of the ICCIDD Annual Meeting of its Board in Cape Town on 23-24 April 2005, to invite National Leaders of the universal salt iodization

(USI) efforts to a special Regional Strategy Review Session on April 25-26, 2005. The Eastern and Southern Africa regional strategic review meeting was organized by UNICEF ESARO in close coordination with UNICEF New York, ICCIDD, the Micronutrient Initiative (MI) and the Global Network on Sustained Iodine Nutrition. National managers of IDD elimination programs and key partners were invited from ten countries

(Angola, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Rwanda, South Africa, Tanzania, and Zimbabwe) to discuss how to sustain the progress made and how to accelerate efforts toward sustainable elimination of IDD in countries of Eastern and Southern Africa.

See: [http://206.191.51.240/documents/idd\\_\\_ESARO\\_final.pdf](http://206.191.51.240/documents/idd__ESARO_final.pdf)

### **Salt of the earth: Xinjiang to spend 20 million yuan a year fighting iodine deficiency**

Northwest China's Xinjiang Uygur Autonomous Region plans to spend 20 million yuan (2.6 million U.S. dollars) a year on subsidies for its needy population, an effort specifically aimed at combating iodine deficiencies by promoting healthy salt. About 4.5 million poverty-stricken people in Xinjiang will get the approximately 5 yuan per person subsidy to enable them to buy iodine-enriched salt from the market instead of the low quality product hawked by illegal dealers, said Kuresh Mahsut, vice chairman of the autonomous region. At least 30 counties, about one third of Xinjiang's total, have not yet eliminated iodine deficiency and related diseases among residents, the local government said. In Lop County of Hotan Prefecture and Wushi County of Aksu Prefecture, only 20 percent of the residents regularly use iodine-enriched salt, far below the minimum 95 percent requested by the central government. Despite the fact that the government started an iodized salt program in 1995, about 100 million Chinese still live in areas, such as Tibet, Xinjiang and Qinghai, where iodine deficiencies are common.

See: <http://english.peopledaily.com.cn/200705/21/archive.html>

### **South Asian Regional Workshop on IDD/USI**

Coordinated by the UNICEF Regional Office for South Asia, a Regional Workshop on 'Micronutrients in Maternal and Child Health and Development in South Asia: IDD/USI' was held in Jaipur, Rajasthan, India, 26-28 March 2007. During the closing session, a summary of the main issues of the Workshop included:

■ Progress has been made in South Asia but there is a continued need to

push the IDD/USI agenda collectively with partners. Bhutan is the only country in the region that has been declared IDD free, and Sri Lanka is in the process of being certified. In the 4 UNICEF 'Make or Break' countries in the region, progress has been made, but the main challenges include: 1) in Afghanistan, production and importation of non-iodized salt and co-ordination; 2) in Bangladesh, small producers and monitoring; 3) in India, political commitment and monitoring; and 4) in Pakistan, political commitment, small producers and lack of legislation.

■ Small scale producers in many cases may need to be phased out. This needs to be accepted if USI is to succeed. There is a need to define small scale producers and medium scale producers as challenges and solutions will vary. [ed. note: see report on small scale producers in the May 2007 issue of the *IDD Newsletter*].

### **The 2007 FANS-IUNS Congress**

The 10th Asian Congress of Nutrition will be held in Taipei, Taiwan, September 9-13, 2007, at the International Convention Center. The theme of the conference is "Diet, Nutrition and Optimal Health: From Food Supply to Nutrigenomics." For more information, please see the website: <http://www.2007ACN.org.tw/>

### **The 78th Annual Meeting of the American Thyroid Association**

The 78th Annual Meeting of the American Thyroid Association will take place in New York City at the New York Sheraton Hotel & Towers from October 3 - 7, 2007. There will be a Translational Symposium on "Iodine" on Sunday, October 7, 2007, chaired by Dr. Gerard Burrow, ICCIDD.

Meeting details can be found online at [www.thyroid.org](http://www.thyroid.org).

### **The 32nd Annual European Thyroid Association Meeting**

The 32nd Annual European Thyroid Association meeting will take place in Leipzig, Germany, on Sept 2-7. There will be a "Satellite Meeting of the ICCIDD West Central Europe Region", chaired by Aldo Pinchera and Gerard Burrow, on Saturday, September 1-5, 2007.

For further information on the congress, see: [www.eta2007.de](http://www.eta2007.de).

### **The 2007 Meeting of the Board of the Global Network on Sustained Iodine Nutrition**

The Board of the Global Network on Sustained Iodine Nutrition met in Beijing China, on July 30-31. There was a special session organized by the Chinese Ministry of Health and UNICEF to discuss the national USI and IDD Elimination program. A special report commissioned by the Network Board on use of iodized salt in processed foods was presented by Justus de Jong, Representative of EU Salt. The Chair of the Board of the Network, Alan Court, who is Director of the Program Division of UNICEF, made an official visit to Tibet as a guest of the Government and was accompanied by Gerald Burrow, ICCIDD Chair.

# Abstracts

## Iron deficiency predicts poor maternal thyroid status during pregnancy.

Zimmermann MB et al. *J Clin Endocrinol Metab.* 2007 Jun 12; [Epub ahead of print]

Pregnant women are often iron deficient, and iron deficiency has adverse effects on thyroid metabolism. Impaired maternal thyroid function during pregnancy may cause neurodevelopmental delays in the offspring. The objective of this study was to investigate if maternal iron status is a determinant of TSH and/or TT4 concentrations during pregnancy. In a representative national sample of Swiss pregnant women (n=365) in the 2(nd) and 3(rd) trimester in 1999, samples of urine and blood were collected, and data on maternal characteristics and supplement use was recorded. Concentrations of TSH, TT4, hemoglobin, mean corpuscular volume, serum ferritin (SF), transferrin receptor (TfR) and urinary iodine (UI) were measured. Body iron stores were calculated and stepwise regressions done to look for associations. The results showed that the median UI (range) was 139 (30-433) µg/L. In the 3(rd) trimester, nearly 40% of women had negative body iron stores, 16% of woman had a TT4 <100 nmol/L and 6% had a TSH >4.0 mU/L. Compared to the women with positive body iron stores, the relative risk of a TT4 <100 nmol/L in the group with negative body iron stores was 7.8. Of the 12 women with TSH >4.0 mU/L, 10 of them had negative body iron stores. SF, TfR and body iron stores were highly significant predictors of TSH and TT4. The authors concluded that poor maternal iron status predicts both higher TSH and lower TT4 concentrations during pregnancy in an area of borderline iodine deficiency.

## Increased prevalence of hyperthyroidism as an early and transient side-effect of implementing iodine prophylaxis.

Gokowski F et al. *Public Health Nutr.* 2007;10(8):799-802

The objective of this study was to assess the prevalence of hyperthyroidism just after

implementation of iodine prophylaxis among adults from an area with iodine deficiency. A total of 1648 adults (age 16 years and older) were sampled from an area of southern Poland during two nationwide epidemiological surveys. Of these, 1424 adults with negative medical history for thyroid disorders qualified for final analysis. The authors compared thyroid dysfunction in participants prior to (1989-1990) and after implementation of iodine prophylaxis (1997-1999). The results showed an increase in the serum concentration of anti-thyroid microsomal antibodies from 4.9% in the years 1989-1990 to 12.1% after introduction of iodized household salt. The prevalence of hyperthyroidism (defined as thyroid-stimulating hormone < 0.4 mU/L) significantly increased in the equivalent period from 4.8 to 6.5%. The authors concluded that a sudden rise in iodine intake after implementation of iodine prophylaxis among adults from the area with iodine deficiency may lead to an increase in thyroid autoimmunity and prevalence of hyperthyroidism. Those possible early side-effects appear to be only temporary and are acceptable when compared with the evident benefits of adequate iodine intake.

## Effects of selenium and iodine deficiency on bone, cartilage growth plate and chondrocyte differentiation in two generations of rats.

Ren FL et al. *Osteoarthritis Cartilage.* 2007 May 7; [Epub ahead of print]

The purpose of the study was to investigate the roles of combined selenium and iodine deficiency in bone development as a possible experimental model of Kashin-Beck osteoarthropathy. Sprague-Dawley rats were randomly divided into selenium deficiency (-Se-I), iodine deficiency (+Se-I), combined selenium and iodine deficiency (-Se-I), and selenium and iodine sufficient (+Se+I) groups. Growth of bone and cartilage, and the expression of type X collagen (ColX) and parathyroid hormone-related peptide (PTHrP) were measured in two generations of rats (F(0) and F(1)). The results showed that the tibial length in -Se-I rats was significantly shorter in F(1) generation. In +Se-I of F(1) rats, the thickness of the growth plate cartilage, and the

proliferative zone was smaller, while in -Se-I rats the growth plate, and the proliferative and hypertrophic zones were also thinner in F(1) generation. In articular cartilage, ColX expression was increased in the deep zone in -Se-I rats of F(0) generation, and in -Se+I, +Se-I and -Se-I rats of F(1) generation. PTHrP expression was increased in the middle zone of -Se+I, +Se-I and -Se-I rats of both F(0) and F(1) generations. In the growth plate cartilage, ColX and PTHrP were expressed in the hypertrophic zone. ColX expression was significantly weaker in -Se+I and -Se-I rats in both F(0) and F(1) generations, while PTHrP expression was stronger in -Se+I, +Se-I and -Se-I rats in both F(0) and F(1) animals. The authors concluded that combined selenium and iodine deficiency impaired the growth of bone and cartilage. The changes in the expression of ColX and PTHrP induced by combined selenium and iodine deficiency were compatible to measurements of ColX and PTHrP in Kashin-Beck osteoarthropathy.

## A field survey of iodine supplementation of primary school children and their parents in a rural village in the endemic area of iodine deficiency disorder, northeastern Thailand.

Wiwanitkit V. *Rural Remote Health.* 2007;7(2):599.

IDD is an important health problem in Thailand. Due to the geographical limitation of marine salt distribution, the Northern and Northeastern regions of Thailand are endemic areas of this disorder. In this study, a cross-sectional survey on the domestic use of iodine-enriched salt by the people in a rural village, Non Sam Ran, Borabue district, Mahasarakarm province in the northeastern region of Thailand was conducted. A salt survey was undertaken in the village, involving the specific health knowledge of both primary school students and their parents, and including a home visit with kitchen salt sampling. As a result of this survey, despite the smallness of the sample, concern is raised regarding the application of public health information about IDD due to a taste preference for non-iodized salt, and the quality control of the manufacture of iodine-fortified salt.

THE IDD NEWSLETTER is published quarterly by ICCIDD and distributed free of charge in bulk by international agencies and by individual mailing. The Newsletter also appears on ICCIDD's website ([www.iccidd.org](http://www.iccidd.org)). The Newsletter welcomes comments, new information, and relevant manuscripts on all aspects of iodine nutrition, as well as human interest stories on IDD elimination in countries.

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