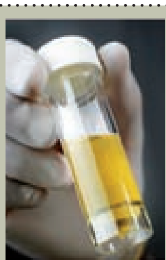
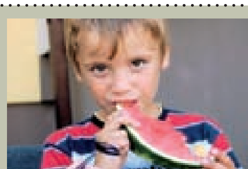
INTERNATIONAL COUNCIL FOR CONTROL
OF IODINE DEFICIENCY DISORDERS

ICCIDD IDD NEWSLETTER

VOLUME 39 **NUMBER 4 NOVEMBER 2011**

IN THIS ISSUE:

Iodine deficiency continues to plague Pakistan

Less than 1 in 5 households have iodized salt and 2/3rds of children have inadequate iodine intakes

Michael Zimmermann ICCIDD Executive Director, Zurich, Switzerland

Pakistan is the 6th most populous country in the world with over 180 million people, and 42% of the population is ≤14 years old. Pakistan is historically iodine deficient; one cause is the heavy monsoon rains that cause regular flooding and erosion that leaches iodine from soils. The worst floods in the country's history occurred in 2010 and 2011, further depleting already iodine-poor soils. The current median urinary iodine concentration (UIC) in school age children is only 75 μg/L, with 64% of children having insufficient iodine intake (1). UNICEF estimates that only 17% of Pakistani households are consuming iodized salt (2).

THE INTERNATIONAL COUNCIL FOR CONTROL OF IODINE DEFICIENCY DISORDERS (ICCIDD) 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.

Recent severe flooding in Pakistan has further depleted soils of iodine

The Pakistani National Nutrition Survey (NNS) (3) revealed a high level of knowledge about iodized salt but a low level of use because of price, availability and adverse propaganda. Testing of the domestic salt for iodine revealed a high level of ordinary salt is being sold as iodized salt.

In a recent study (4) carried out by the University of the Punjab in pregnant women (n = 254) in Lahore during first trimester, UIC ranged from 34 to 142 μg/L with a median value of only 67 μg/L, indicating clear iodine deficiency. Among all pregnant women, 31.5% had slightly visible goiter and only 34.2% were currently using iodized salt. The severity of iodine deficiency among Pakistani pregnant women is likely one reason why 1/3rd of babies born in the country have low birthweight (2).

In the NNS (3), the prevalence of goiter among women in Pakistan was found to be 21% at the national level: 24% in rural areas and 16% in urban areas. The prevalence of goiter among school-age children was 6.7%. UIC measurements revealed that 36.5% of mothers are severely iodine deficient, and the problem is more pronounced in rural areas where 41% of mothers were severely iodine deficient, compared to 27% in urban areas.

Interview with Dr. Muhammad Ashraf Chaudhry

In an interview in The International News of Pakistan on October 23, 2011 (5), Professor Muhammad Ashraf Chaudhry, Head of Community Medicine at CMH Lahore Medical College, Lahore, Pakistan was asked to comment on the adverse effects of iodine deficiency in the country.

Well over 135 million people in Pakistan have insufficient iodine intake and about 70% of the total population is affected by IDD, according to Dr. Ashraf. IDD is the world's most prevalent yet easily preventable cause of brain damage. Dr. Ashraf described the spectrum of health problems linked to iodine deficiency, and that IDD in Pakistan is most commonly seen among the poor, pregnant women and preschool children. Surveys have shown that not over 20 per cent of the population uses iodized salt in our country, which is incredibly low even if compared with countries with similar socio-economic conditions like Bangladesh (78% iodized salt coverage) and Nepal (98%). It is estimated about 2 million children are born each year with mental disorders in Pakistan due to iodine deficiency in pregnant women.

Dr. Ashraf said iodine deficiency is so easy to prevent that it should be considered as a crime to let a single child be born mentally handicapped for that reason. "It is need of the time to create sufficient awareness among public to prevent IDDs."

Dr Ashraf emphasized iodine deficiency can result in loss of 15 IQ points. He added that the main factor responsible for iodine deficiency is a low dietary supply of iodine that can easily be overcome. He suggested that the addition of small amount of iodine to table salt in the form of potassium iodate at very little cost can help prevent the incidence of this serious disorder. Seafood is also a known source of iodine. The most viable option is having Universal Salt Iodization (USI) of edible salt across the country, said Dr Ashraf.

He outlined that strong advocacy is needed for promotion of IDD control legislation and monitoring the enforcement of USI in order to combat iodine deficiency in the country. Training and capacity building of salt processors at the district level can also help. In Pakistan, the majority of the public does not use iodized salt because of a number of misconceptions and it is responsibility of the civil society organizations, media, health professionals, teachers, religious leaders, social workers, salt producers/processors and policy makers to remove these misconceptions.

Dr Ashraf also emphasized that the medical community can play a vital role in advocacy for the usage of iodized salt at the gross-root level. Medical professionals should make the masses aware of the consequences of iodine deficiency and dispel any myths, disbeliefs or misconceptions associated with the use of iodized salt.

The Micronutrient Initiative is focusing on Pakistan

The Micronutrient Initiative, based in Ottawa, Canada, is concentrating efforts on controlling IDD via USI in Pakistan. "The truly sad part about this is that iodine deficiency disorders are avoidable," said Micronutrient Initiative Pakistan director Dr. Noor Ahmad Khan (6). "It takes only a small amount of iodine to prevent them and it does not cost a lot to ensure that our children have access to iodized salt. That is why we are calling on government leaders to renew their commitment to children and women in Pakistan by increasing investment in life-saving vitamins and minerals."

"We have already made significant progress, but still, too many of our children and women continue to suffer from micronutrient deficiencies," said Dr. Khan.

"We need to take immediate action to ensure our children and communities can grow healthy, strong and prosperous."

References

1. *http://www.who.int/vmnis/iodine/status/summary/IDD_estimates_table_2007.pdf*
2. *http://www.unicef.org/infobycountry/pakistan_pakistan_statistics.html*
3. Elahi S, et al. Iodine deficiency in pregnant women of Lahore. J Pakistan Med Assoc 59:741; 2009.
4. *http://www.iccidd.org/media/IDD%20Newsletter/2007-present/National%20%20Nutrition%20Survey%20of%20Pakistan%20 2001-02%20summary.pdf*
5. *http://www.thenews.com.pk/TodaysPrintDetail.aspx?ID=74015&Cat=6*
6. *http://www.micronutrient.org/English/view.asp?x=656&id=38*

These four brothers work at a salt factory in Pakistan. The two brothers in the center of the photograph suffer from stunting and cretinism. This was caused by severe iodine deficiency affecting their mother during her pregnancy.
But all the brothers say they are now using iodized salt in their households for their families. This will prevent cretinism in the next generation and give their children the iodine they need for intellectual development.

With two-thirds of children in Pakistan suffering from Iodine Deficiency Disorders, which can lead to IQs as many as 13 points lower than children with sufficient iodine, there is a pressing need for improved micronutrient programming to address iodine deficiency.

The U.S. CDC's 'Ensuring the Quality of Urinary Iodine Procedures (EQUIP) Program' is 10 years old

Over the past decade, the EQUIP program has become the center of global urinary iodine laboratory quality assurance

Amir A. Makhmudov, Kathleen L. Caldwell Centers for Disease Control and Prevention, Atlanta, GA USA

Urine analysis: the preferred way to measure iodine sufficiency of a population

Urinary iodine (UI) analysis is the most common method for assessing population-wide iodine sufficiency. Because more than 90% of dietary iodine is excreted in the urine, UI concentrations directly reflect iodine intake. Moreover, accurate laboratory measurement of UI concentrations is readily achievable.

EQUIP—assuring reliable UI measurement

Accurate and precise UI measurement is important to accurately assess the status of iodine nutrition around the world. Erroneous laboratory data can lead to sub-optimal—and potentially harmful—public health interventions. The U.S. Centers for Disease Control and Prevention (CDC) established its EQUIP program in 2001 to provide laboratories that measure urinary iodine with an independent assessment of their analytical performance, including reference material and technical support to improve laboratory practices. The program, which is voluntary and free-of-charge, currently works with more than 120 iodine laboratories in more than 65 countries (Figure 1).

About the program

The EQUIP program offers three critical services.

- It provides matrix-matched secondary reference material to laboratories measuring UI. The CDC uses Inductively Coupled Plasma Mass Spectrometry (ICP-MS) to ensure that UI concentrations are assigned to reference materials with a high degree of accuracy and precision. CDC, in turn, uses the National Institute of Standards and Technology (NIST) reference standard materials (SRM2670a, SRM3668 Level 1 and Level 2) to assure the accuracy of its own testing.

- EQUIP maintains a rigorous performance testing program. Three times a year, CDC sends participating laboratories three to five urine samples that have been spiked with iodine (in a range of 10 to 300 μg/L) for UI analysis. Laboratories are asked to report their test data, along with the limit of detection for their analytical method. CDC then returns a comprehensive statistical report allowing each individual laboratory to compare its performance with individual and composite data from all other participating EQUIP laboratories, whose identities are withheld to maintain confidentiality.

- It provides laboratories with analytical guidelines, technical training and consultation upon request. CDC maintains proficiency with iodine spectrophotometric methodologies that are similar to the methods commonly used for UI analysis in laboratories around the world, so its scientists are able to help laboratories eliminate bias and precision problems in their assay systems.

Figure 1: EQUIP member laboratories

Urinary pool preparation at the U.S.CDC

Laboratory training in Kazakhstan

Amir Makhmudov (right) and Kathleen Caldwell are responsible for EQUIP at the U.S. CDC in Atlanta

Together, the three components of the EQUIP program constitute a robust external quality assurance program intended to increase confidence in UI measurements that are the basis for interventions to eliminate IDD across the globe. At the end of each year, laboratories receive a certificate with tabulated progress scores for that year.

About the program: frequently asked questions

Q: Is enrolling in EQUIP a long process?
A: No. When the program receives your application by e-mail or fax, your laboratory will be enrolled immediately.
Q: How much does it cost to participate in the program?
A: Nothing. CDC provides quality-assurance materials and technical assistance free-of-charge as part of its effort to help eliminate iodine deficiency disorders around the world.
Q: The program description mentions a certificate. Does that mean our laboratory receives certification?
A: No. The certificate is merely a way for laboratories to verify their participation in the program and to track their progress over the course of each year. Participation in this program does not provide or authorize certification or accreditation.
Q: If you calculate progress scores, does this mean our laboratory can fail?
A: No. This is not a pass-fail program. Rather, EQUIP emphasizes measurable and sustained progress.
Q: My laboratory was opened recently and still has many improvements to make. Can we still enroll?
A: Yes. Any laboratory can enroll, and CDC encourages all laboratories performing UI analysis to enroll.

EQUIP member profiles

EQUIP member laboratories span the globe, covering every continent except Antarctica. They include governmental, academic and private-sector laboratories, as well as regional and international laboratories (Table 1). Many of these laboratories provide training and technical assistance to scientists based in other institutions within the country or in other countries, extending the reach of health promotion activities related to IDD. They also provide their government officials with critical information needed for national fortification efforts. Collectively, EQUIP members have conducted UI analysis on tens of thousands of specimens to support iodine sufficiency monitoring and public health interventions affecting billions of people throughout the world.

Conclusion

EQUIP is a key tool used to support laboratory quality assurance in an effort to eliminate iodine deficiency in the world. EQUIP's participants utilize the programs inter-laboratory comparison as an effective tool for laboratory performance improvement. To date, 121 laboratories (11 national and 110 international) have participated in EQUIP; currently, 92 laboratories are active participants.

Table 1: Distribution and type of laboratories participating in EQUIP

Continent	Type of laboratory				
	Academic	Government	Research Institute	Medical	Total
Africa	2	8		1	11
Asia	6	12	3	4	25
Australia-Oceania	8	5	1	3	17
Europe	10	23	14	2	49
North America	3	3	5	4	15
South America	2	2			4
Total	**31**	**53**	**23**	**14**	**121**

How to enroll

1. Go to http://www.cdc.gov/labstandards/equip.html and complete the application form.
2. E-mail the completed form to iodinelab@cdc.gov or fax it to (770) 488-4097. A confirmation e-mail will be sent within 72 hours. Your laboratory will be enrolled immediately upon receipt of your form and will receive a set of samples each February, May, and August.

For more information, contact

Centers for Disease Control and Prevention (CDC)
Ensuring the Quality of Urinary Iodine Procedures
4770 Buford Highway N.E.,
Mailstop F-18
Atlanta, GA 30341-3724 USA
Fax number: (770) 488-4097
E-mail address: *iodinelab@cdc.gov*

Iodization of food industry salt is vital to control IDD in Belarus

V. Kachan, T. Mokhort, N. Kolomiets, V. Filonov, S. Petrenko, Z. Zabarovskaya, N. Gusina, G. Gerasimov Belarus IDD control program

For more than 10 years, the Republic of Belarus has aggressively pursued the goal of IDD elimination through universal salt iodization (USI). In June 2000, at the National Conference on IDD Elimination, the "State Strategy for IDD Elimination through USI in Republic of Belarus" was adopted. In 2001, the Government of Belarus adopted a resolution "On IDD Prevention" that introduced mandatory use of iodized salt in the food industry and public catering, and required obligatory use of iodized salt in the salt retail trade. In 2008, provisions of this government decree were included as amendments to Food Safety Law.

Between 1999-2003, national salt producers, the government of Belarus and international donors (UNICEF, TACIS) assisted in reconstruction of the salt industry that resulted in a significant increase in the production and supply of iodized salt to the domestic market and for export (Russia and countries of East/Central Europe). The quality of iodized salt has also considerably improved: the proportion of inadequately iodized salt fell from 10% in 2002 to less than 0.2% in 2009. All salt in Belarus is fortified with potassium iodate (at 40 ppm iodine).

With UNICEF support, the Belarus Ministry of Health conducted a program of education and social mobilization that increased the knowledge in the population of the negative consequences of IDD and the benefits of iodized salt. While sales of non-iodized salt were not completely banned, all vendors were required to carry iodized salt on their shelves. From 2001 to 2009 the proportion of iodized salt in the retail trade (in % of the total salt trade) increased from 35% to 75% (Figure 1). By 2009, 94% of households in Belarus consumed adequately iodized salt (non-iodized salt was utilized mainly for home pickling). Also, by 2004 all enterprises in the food and baking industries in Belarus completely switched to use of iodized salt (except for processing of seafood).

The first national IDD survey was conducted in Belarus in 1997-1999 and showed a moderate level of iodine deficiency; median urinary iodine concentration (UI) was 47 μg/L. After commencement of the national IDD elimination program and the increase in the production and supply of iodized salt, median UI increased up to 129 μg/L in 2003 and thereafter stabilized at the level of 165-180 μg/L (Figure 2).

Table 1: Frequency of transitory thyroid dysfunction (TD) in neonates in different regions of Belarus in 1994 - 1998 and 2004 – 2009.

Regions	1994-1998			2004-2009		
	N*	Number of TD cases	%	N*	Number of TD cases	%
Minsk (city)	55535	363	0.65	116035	11	0.0095
Minsk Region	48912	1264	2.58	85299	12	0.014
Brest Region	58863	2310	3.92	92514	10	0.011
Grodno Region	39271	1627	4.14	65032	12	0.019
Vitebsk Region	41311	1163	2.82	65382	8	0.012
Mogilev Region	41101	2104	5.12	64765	10	0.015
Gomel Region	53602	408	0.76	89429	9	0.010

* N – total number of screened newborns

Table 2: Criteria for elimination of iodine deficiency and results achieved in Republic of Belarus.

Criterion	Goal	Belarus Achievements
Median urinary iodine levels (μg/L):		
General population (schoolchildren)	100-199	170
Pregnant women	150-249	234
Most recent data	Last 5 years	Data from 2006-2009
Salt iodization:		
Proportion of households consuming quality iodized salt	> 90%	94%

Optimum iodine nutrition has been achieved in all regions of Belarus, including those most affected by radioiodine fallout from the Chernobyl accident in 1986. The most recent (2009) national survey of schoolchildren found a median UI of 170 μg/L. In pregnant women (2008-2009), UI was also within the recommended range, at 224 μg/L. According to government health statistics, endemic goiter in children, adolescents and adults decreased significantly over past 10 years; from 380 cases to 85 cases per 100,000 population.

Neonatal thyroid screening was introduced in Belarus in 1991. For economic reasons, it was discontinued in 1998 and resumed again in 2004. All newborns are screened in hospitals, by using dried blood spot collection, on the 3rd – 5th days after birth. In 1994-98, before the USI program was enacted, more than 50% of newborns had TSH levels >5 mIU/L. The cut-off TSH level at that time was 25 mIU/L, and 0.65% of newborns in Minsk and 5.2% of newborns in the Mogilev Region had transitional thyroid dysfunction, i.e. elevation of TSH above the cut-off level that was not present in a subsequent TSH recheck 2-3 weeks later (Table 1).

Figure 1: Proportion of iodized salt (%) of the total volume of salt traded in Belarus in 2001-2009.

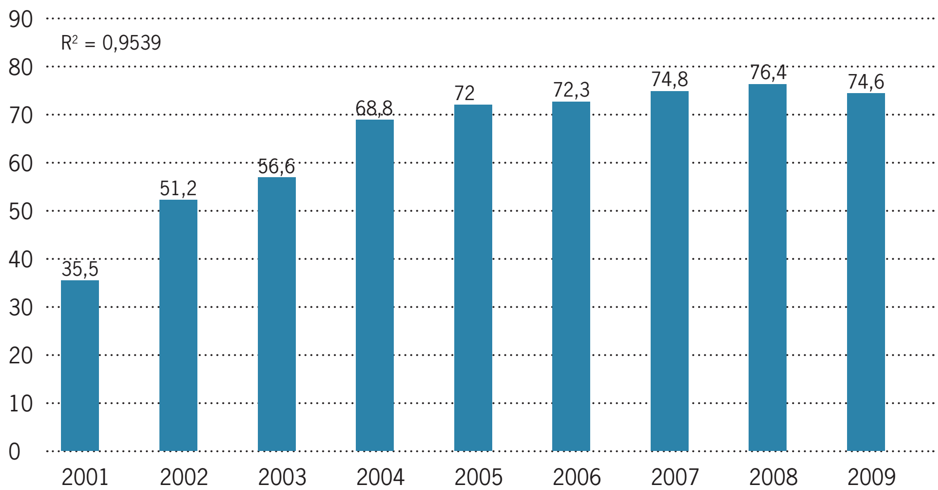
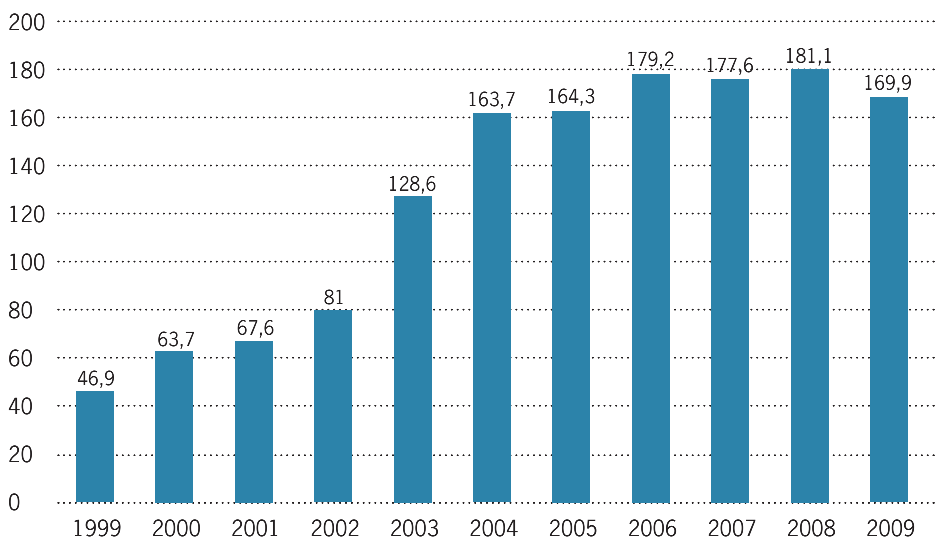


Figure 2: Median urinary iodine levels (μg/L) in schoolchildren in Belarus (1999-2009)



The situation changed dramatically when neonatal TSH screening was resumed in 2004. The proportion of TSH >5 mIU/L dropped from 50% to 8.9% on 2009. The neonatal TSH cut-off level was decreased to 15 mIU/L, and incidence of transitory thyroid dysfunction cases decreased to 0.01 - 0.02% in 2004-2009. These changes can be attributed to the significant improvement of iodine nutrition among pregnant women, and the population in general.

Thus, by 2009, the Republic of Belarus had reached the goal of optimum iodine nutrition of entire population, including pregnant women (Table 2). **This goal has been achieved in a very efficient and pragmatic way: instead of focusing only on table salt, the Belarus government enacted mandatory use of iodized salt in the food industry and in public catering.**

As in other industrialized countries, approximately 75% of the total salt intake in Belarus comes from processed foods. Discretionary use of table salt added during cooking and/or at the table contributes only 15-20% of salt consumed. In some countries (such as Russia and Ukraine) despite well-established iodine deficiency, national IDD prevention programs have been stalled for years, because governments are reluctant to introduce mandatory iodization of table salt as this could allegedly violate the consumer's right for choice and freedom of entrepreneurial activities. Thus, the Belarus experience of mandating iodized salt use by the food industry may be an important lesson for many industrialized counties in Europe that are struggling to introduce effective programs to control iodine deficiency.

The complete version of this article was published in Russian journal *Klinicheskaya i Eksperimentalnaya Tyreidologia,* 2010, v.6, N3, p.30-34.

The Mexican USI program provides ample dietary iodine to low-income pregnant women

García-Solís P, Solís-S JC, García-Gaytán AC et al. Laboratory of Endocrinology and Nutrition, Faculty of Medicine, Universidad Autónoma de Querétaro, Querétaro, México.

See full text of article in: Iodine Nutrition Status in Pregnant Women in Mexico. Thyroid. Epub: October 26, 2011 doi:10.1089/thy.2011.0197.

Iodized salt in Mexico provides adequate iodine for mothers and their babies

Introduction

It has been shown that in some countries, although iodine intake is sufficient in school-age children, there is iodine deficiency in pregnant women. This finding justifies the need for a continuous monitoring of iodine nutrition in these two vulnerable populations. In Mexico, there are no recent data regarding UIC in children and pregnant women, but there is an effective USI program. In 2009, 81% of all marketed salt in Mexico contained an adequate iodine concentration (20–40 ppm), and 94% of samples contained ≥15 ppm of iodine (1). However, the quality of the salt is not homogenous throughout the country. There are places where only 25% of the salt samples have ≥15 ppm of iodine (2). This could contribute to insufficient iodine intake, and to a heterogeneous iodine nutrition status.

Methods

Two hundred ninety-four pregnant women were enrolled. They were receiving prenatal care in the Public Medical Units of the State Ministry of Health during each pregnancy trimester (first, n=60; second, n=103; and third, n=131) in Queretaro, Mexico.

Results

The age, gestational age, and the median of UIC by trimesters are shown in Table 1. The UIC in the first, second, and third trimesters of gestation was 273, 285, and 231 μg/L, respectively. According to the median UIC, iodine intake in the first and second trimesters of gestation was slightly above the requirements, and during the third trimester of gestation, it was adequate. When the median UIC between each trimester was compared, there were no significant differences ($p>0.05$). In the 294 pregnant women studied, the median UIC was 260 µg/L, with a range of 5–1320 µg/L, and the percentages of samples with a UIC below 150 and 50 µg/L were 28% and 6.8%, respectively.

Overall, 69.4% of the participants reported consuming iodized salt, whereas 4.7% declared no consumption of iodized salt, and 25.8% reported that they did not known whether their salt was iodized. Twelve percent of subjects reported daily intake of vitamin and mineral supplements with at least 100 µg of iodine. The frequency of use of iodine-containing products (vaginal douches, antiseptic skin cleaners, or fruit and vegetables disinfectants) or the consumption of iodine-rich foods such as seaweed, as well as smoking, was marginal, being <0.5%. No subjects reported exposure to contrast media. There was no difference between the UIC of women using iodine-containing multivitamins and those who reported the consumption of noniodized multivitamins ($p>0.05$). In addition, there was no difference between the UIC of women using iodized table salt and those who employed noniodized table salt, or those who did not know whether their table salt was iodized ($p>0.05$).

Discussion

The findings indicate that pregnant women without public health insurance in Queretaro, an urban and highly populated locality in Mexico, had an intake of iodine above requirements. This result is in agreement with the fact that only 5% of pregnant women declared not using iodized salt to cook, although a significant percentage of the subjects did not know whether their salt was iodized. This suggests a poor knowledge about the importance of iodine in human nutrition. Other iodine sources such as multivitamin supplements with iodine were consumed only by 12% of pregnant women. These data suggest that iodized salt plays a central role in sustaining iodine nutrition in pregnant women in Queretaro, and this is in agreement with recent national reports of the USI program (1). The National Nutrition Survey in 1999 showed that the median UIC in nonpregnant women of 12–49 years of age was 281 µg/L (3). However, the only previous study in Mexican pregnant women showed that, in three geographic regions in the state of Hidalgo (Pachuca, Ixmiquilpan, and Huejutla), the median UIC was 116, 124, and 109 µg/L, respectively (4). According to the current WHO/UNICEF/ICCIDD criteria, these values correspond to an insufficient iodine intake for pregnant women. Thus, iodine intakes during pregnancy across Mexico may vary.

Table 1: Characteristics and iodine status of Mexican pregnant women in Queretaro.

	First trimester (n=60)	Second trimester (n=103)	Third trimester (n=131)	All (n=294)
Age, years (mean±SD)	23.7±5.4	23.4±5.6	23.7±5.8	23.6±5.6
Gestational age, weeks	9.7±2.4	19.9±3.6	30.3±3.6	22.4±8.6
Median UIC, µg/L	273	285	231	260
UIC below 150 µg/L, %	31.7	22.3	30.5	28.0

These data contrast with several countries that analyzed iodine nutrition status in pregnant women. On the one hand, it has been shown that not fully implemented USI programs fail to achieve optimal iodine nutrition during gestation (e.g., Bosnia and Herzegovina, India, Thailand). In contrast, countries such as Switzerland and the United States reach overall optimal iodine nutrition in pregnancy without mandatory salt iodization; however, they have permanent monitoring of iodine nutrition programs in their population, thus allowing the timely implementation of corrective actions. This continuous monitoring has recently revealed that some subgroups of pregnant women in the United States may be at risk of mild iodine deficiency, which further highlights the importance of a permanent surveillance program.

There was a slight nonsignificant trend toward a reduction of median UIC from the second to third trimester of gestation, together with an increase in the percentage of samples below 150 µg/L of UIC (Table 1). Other studies in countries such as Bosnia and Herzegovina, Iran and Thailand have shown a similar behavior in the median of UIC in the last two trimesters of gestation. This reduction of UIC during pregnancy is more clearly evident in places where iodine intake is borderline sufficient or frankly deficient. These data may suggest a depletion of maternal iodine stores due a maternal-fetal use, renal elimination, and/or inadequate dietary compensation.

Conclusions

Based on the median UIC, iodine intake in Queretaro, Mexico, is slightly above requirements during the first two trimesters, and adequate in the third trimester. The well-functioning Mexican universal iodized salt program seems to supply adequate dietary iodine to pregnant women without health insurance in this region. However, regular monitoring of iodine status is recommended during pregnancy throughout Mexico.

1. Comisión Federal para la Protección Contra Riesgos Sanitarios, Secretaria de Salud 2010 México: Programa: alimentos. Proyecto: sal yodada y fluorada. Available: www.cofepris.gob.mx/wb/cfp/10_sal_yodada_y_fluorurada/_rid/1906?page=1, accessed January 14, 2011.
2. Secretaría de Salud 2003 Programa de Acción: Protección Contra Riesgos Sanitarios. Sistema Federal de Protección Sanitaria. Secretaría de Salud, Ciudad de México.
3. Rivera J, et al. 2001 Encuesta Nacional de Nutrición 1999. Estado Nutricio de Niños y Mujeres en México. Instituto Nacional de Salud Pública, Cuernavaca (México).
4. Castañeda R, et al. 2002 Endemic goiter in pregnant women: utility of the simplified classification of thyroid size by palpation and urinary iodine as screening tests. BJOG 109:1366–1372.

High iodine intakes in school children in Eastern Nepal

Prem Raj Shakya, Basanta Gelal and **Nirmal Baral** Department of Biochemistry, B. P. Koirala Institute of Health Sciences, Dharan, Nepal

Background

Eastern Nepal has three ecological regions (mountain, hill and terai) (Figure 1). A previous national IDD survey in 2007 (1) reported the percentage of children having urinary iodine excretion (UIE) <100 µg/L was 26.1% in the mountain region, 18.9% in the hills and 9.1% in the terai region of Eastern Nepal. The fundamental problem of Nepal is the geochemical structure rises steeply from a few meters above the sea level in the southern plain to the high Himalayas. This is responsible for the leaching of iodine from the soil. People living in mountainous and hilly regions do not have easy access to adequately iodized salt because of long transportation time from the point of production, less coverage of these areas by roads, easy availability of crystal salt at the lowest price and poor storage condition in households.

Figure 1: Ecological division of Eastern Nepal

Assessment of iodine status

In 2010, iodine status in Eastern Nepal was assessed by measurement of UIE among the school children. A total of 829 urinary samples, 829 salt samples and 199 blood samples were collected in the Tehrathum and Morang districts (Figure 1) of Nepal. At the end of the study, all of the primary school age children were supplemented with iodized salt with the "two child logo" (Figure 2) from the Salt Trading Corporation, Nepal. The results (Table 1) show that 90.3% school children from Tehrathum and Morang have adequate iodine intake and optimum iodine nutrition (UIE >100µg/L). The median UIE for Tehrathum and Morang was 333 µg/L (IQR 195-460) and 257 µg/L (IQR 151-354), respectively.

Iodized salt coverage

Two types of salt were collected from the school children during the survey. One type was crystal salt available in 50 kg open containers and sold openly by the retailers. Another type of salt was packet salt available in 1 kg packs, distributed by the Salt Trading Corporation, Nepal. A total of 17.7% (n=147) of school children consumed open crystal salt, including 36.9% (n=127) from Tehrathum and 4.1% (n=20) from Morang. A total of 82.3% (n=682) school children consumed packet salt, including 63.1% (n=217) from Tehrathum and 95.1% (n=465) from Morang (Figure 3). Most of the people of the hill and mountainous regions purchase crystal type of in the winter season and store it for the entire year of consumption. Salt iodine content was estimated by the iodometric titration method.

Overall, 92.8% of school children consumed adequately iodized salt, including 84.6% from Tehrathum and 98.6% from Morang (Figure 4).

Assessment of thyroid function

Serum thyroglobulin (Tg), thyroid stimulating hormone (TSH), free thyroxine (fT4) and free triiodothyronine (fT3) were measured in the blood samples collected from the children. Overall, 80.9% school children were euthyroid, 18.1% had subclinical hypothyroidism and 1.0% subclinical hyperthyroidism (Table 2).

Figure 2: The Nepalese "two child logo" for the promotion of iodized packet salt

Awareness and iodized salt distribution program

Awareness programs were conducted in different schools of Tehrathum and Morang districts with active participation of the school children, teachers and parents (Figures 5 and 6). These focused on the importance of iodine in health and consequences of its deficiency. Active teaching and learning activities were conducted along with pamphlet distribution and interactive sessions. Adequately iodized packet salt (Salt Trading Corporation, Nepal) was distributed to all school children of primary school age with help of their teachers and in the presence of their guardians.

Iodine deficiency in Nepalese school children based on UIE

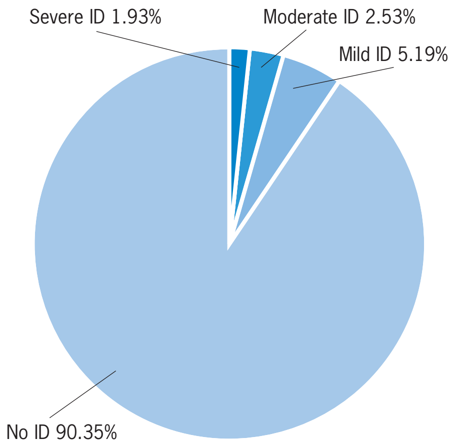


Table 1: Urinary iodine excretion of Nepalese children by gender, age and location

		Severe ID	Moderate ID	Mild ID	Adequate iodine nutrition	Above requirement	Possible Excess
Gender	Male	3 (0.4%)	11 (1.3%)	17 (2.1%)	89 (10.7%)	100 (12.1%)	198 (23.9%
	Female	13 (1.6%)	10 (1.2%)	26 (3.1%)	83 (10.0%)	87 (10.5%)	192 (23.2%)
Age (y)	4 - 6	8 (1.0%)	9 (1.1%)	11 (1.3%)	32 (3.9%)	27 (3.3%)	42 (5.1%)
	7 - 8	4 (0.5%)	3 (0.4%)	10 (1.2%)	35 (4.2%)	43 (5.2%)	96 (11.6%)
	9 - 10	3 (0.4%)	4 (0.5%)	13 (1.6%)	45 (5.4%)	68 (8.2%)	133 (16.0%)
	10 - 12	1 (0.1%)	5 (0.6%)	9 (1.1%)	60 (7.2%)	49 (5.9%)	119 (14.4%)
District	Tehrathum	5 (0.6%)	11 (1.3%)	20 (2.4%)	51 (6.2%)	58 (7.0%)	199 (24.0%)
	Morang	11 (1.3%)	10 (1.2%)	23 (2.8%)	121 (14.6%)	129 (15.6%)	191 (23.0%)
Total		**16** (1.9%)	**21** (2.5%)	**43** (5.2%)	**172** (20.7%)	**187** (22.6%)	**390** (47.0%)

Table 2: Distribution of Nepalese children according to thyroid function status

Thyroid function Status	Tehrathum (n = 95)	Morang (n = 104)	Total (n = 199)
Euthyroid	80 (84.20%)	81 (77.90%)	161 (80.90%)
Subclinical hypothyroid	15 (15.80%)	21 (20.20%)	36 (18.10%)
Subclinical hyperthyroid	0 (0.00%)	2 (1.90%)	2 (1.00%)

Figure 3: Distribution of school children according to their household type of salt.

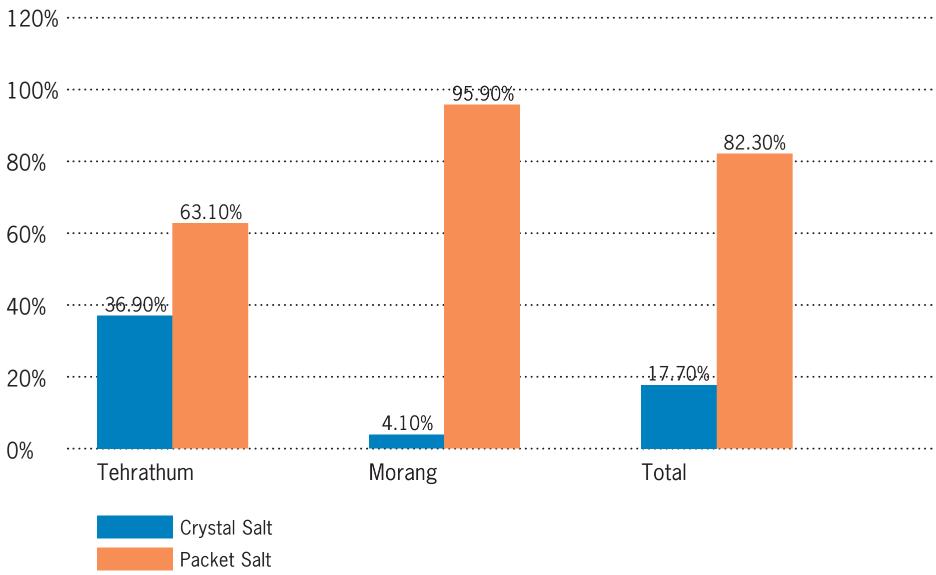
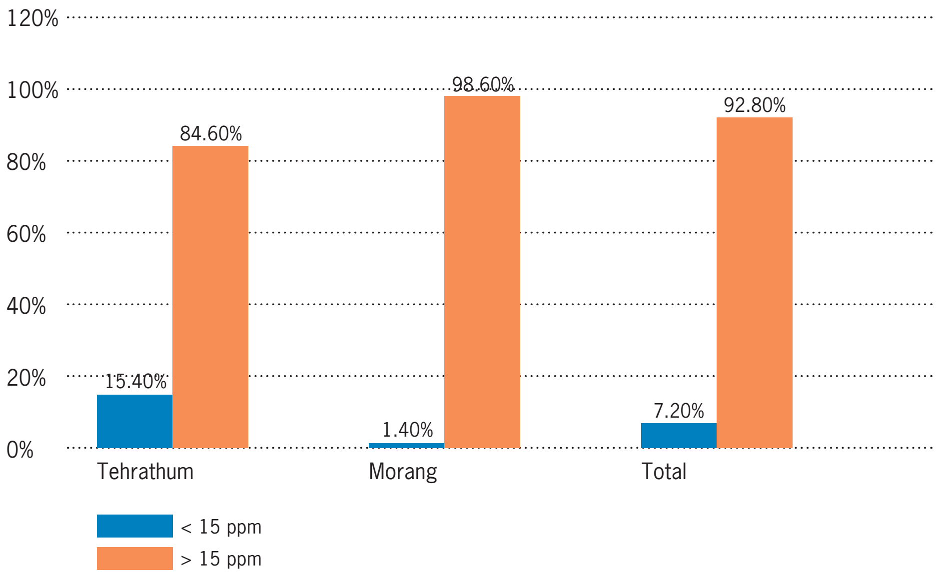


Figure 4: Distribution of children according to household salt iodine content



Conclusion

In conclusion, there has been substantial progress in the last decade towards the elimination of iodine deficiency in eastern Nepal. Improved iodine nutrition reflects the validity of the USI strategy, accompanied by iodine supplementation in remote areas not reached by iodized salt or in population groups who are severely deficient. It is proof of the successful collaboration between all the Nepalese partners in IDD control, in particular the health authorities and the salt industry.

The absolute goal of correction of iodine deficiency is not only to implement programs of salt iodization and to increase urinary iodine but also to normalize thyroid function. Every effort needs to be made to ensure that programs continue to cover at-risk populations if the goal of eliminating IDD is to be reached. Nepal is continuously moving towards the sustainable elimination of IDD. Awareness programs should be continued at the community level to encourage the consumption of iodized packet salt and to improve the salt procurement and storage practices of the people. Monitoring programs should be continued at the community level to ensure optimal iodine status of the population and prevent occurrence of iodine induced hyperthyroidism or other thyroid disorders.

References

1. National Survey and Impact Study for Iodine Deficiency Disorders (IDD) and availability of iodized salt in Nepal 2007. Kathmandu, Nepal: Ministry of Health and Population, Department of Health Services, Government of India and Alliance Nepal.

Figure 5: **Pamphlets are distributed among Nepalese school children to increase awareness about the role of iodine in health.**

Figure 6: **Iodized packet salt was distributed among the school children.**

Careful quantitative monitoring of salt iodine levels in the Philippines is critical to ensure adequate iodine intake

Leah Perlas and **Mario Capanzana** Food & Nutrition Research Institute-Department of Science & Technology (FNRI-DOST), Manila, Philippines

Salt iodization

In the Philippines, in response to an increase in goiter rates from 3.5% in 1987 to 6.7% in 1993 among Filipinos 7 years and older, an Act for Salt Iodization Nationwide (ASIN Law) was passed in 1995. Since the implementation of the ASIN LAW, there has been an increasing national awareness of the importance of iodized salt among Filipinos, from 67.3% in 1998 to 79.5% in 2003, 83.4% in 2005 and 78.5% in 2008 (Figure 1) (1). Based on household salt testing positive to rapid test kits (RTK), there was an increase in use of iodized salt from 24.8% in 1998 to 81.1% in 2008. Surprisingly, in 2008, among those who were aware of the importance of iodized salt, only 53.3% claimed to be users of iodized salt.
The primary sources of information on iodized salt were television and health personnel, based on the 2008 National Nutrition Survey (NNS) conducted by FNRI-DOST.

Figure 1: Trends of household awareness and usage of iodized salt, 1998 – 2008

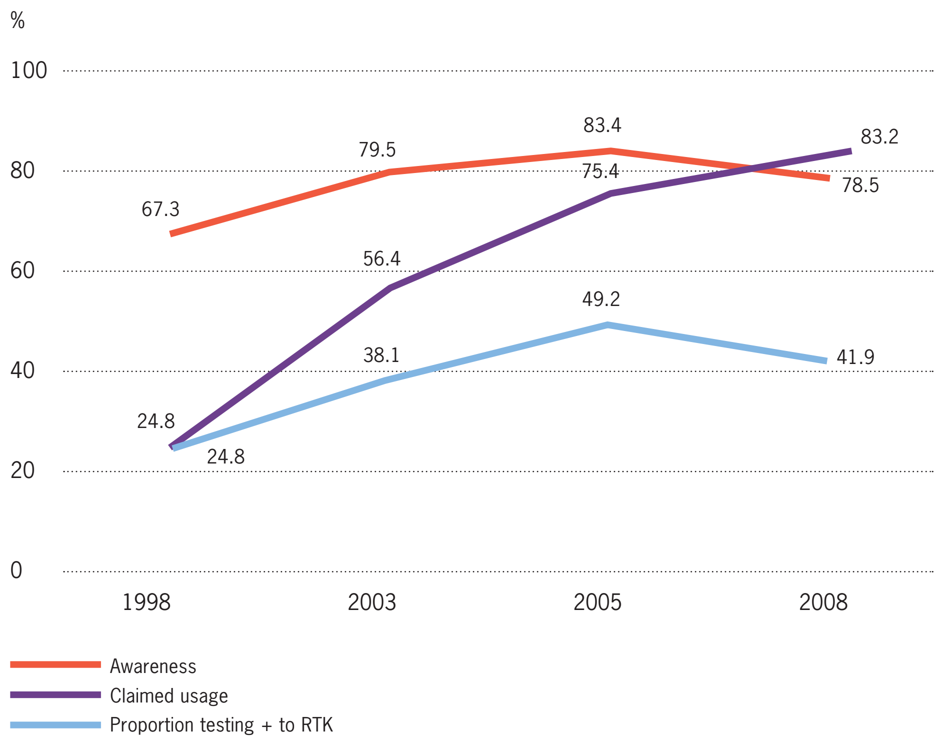


Table 1: Median UIE, iodine levels in household salt and percentage distribution of iodine levels in household salt in the Philippines in 2008

Region	Median UIE (ug/L) 6 – 12 yrs	Iodine levels in salt by WYD checker (ppm)		Iodine levels and % distribution		
		Median	Mean	0 -<15	15-20	>20
Philippines	**132**	**5.28**	**13.74**	**74.8**	**5.7**	**19.5**
I Ilocos	159	13.99	19.35	70.9	2.9	26.2
II Cagayan	233	13.42	22.70	59.0	5.7	35.3
III Central Luzon	191	1.24	10.31	53.3	11.3	35.4
IV-A Calabarzon	170	4.85	17.88	53.3	11.5	35.2
IV-B Mimaropa	115	2.19	11.04	75.3	3.2	21.0
V Bicol	135	8.32	15.02	69.7	6.1	24.2
VI Western Visayas	117	8.06	10.92	81.6	6.8	11.6
VII Central Visayas	119	5.17	9.73	69.6	8.6	21.8
VIII Eastern Visayas	83	7.89	11.61	69.7	8.5	21.7
IX Zamboanga	84	1.14	5.83	83.4	6.5	10.1
X Northern Mindanao	90	4.30	9.53	78.2	7.6	14.1
XI Davao	68	5.24	9.27	83.7	2.3	14.0
XII Soccsksargen	109	5.77	9.93	82.6	3.8	13.6
XIII Caraga	85	5.07	8.48	86.3	2.9	10.9
NCR	202	5.40	21.01	80.6	6.1	13.2
CAR	158	10.43	29.75	88.6	3.0	8.4
ARMM	101	1.87	5.94	92.8	0.7	6.6

Table 2: Progress in the Philippines towards the elimination of IDD, 1998 – 2008.

Indicator	Goal	Achievements 1998	2003	2008
Salt iodization				
Proportion of households using iodized salt,%	> 90	24.8	56.4	81.1
Urinary Iodine				
Median urinary iodine, µg/L				
6-12 years	100-199	71	201	132
Lactating women	100-199	–	111	81
Pregnant women	150-249	–	142	105
Proportion < 50 µg/L, %				
6-12 years	< 20%	35.8%	11.4	19.7
Lactating women		–	23.7	34.0
Pregnant women		–	18.0	25.8

Although there has been a steady increase in proportion of households using salt that tests positive for iodine using RTKs, this may not necessarily indicate an increase in proportion of households using adequately iodized salt. RTK testing may not consistently and accurately quantify the amount of iodine in salt, so it is uncertain if these household salts are adequately iodized or not. The proportion of households using adequately iodized salt is lower when a quantitative test for iodine in salt is used. Using the WYD spectrophotometer to determine the amount of iodine in salt, the proportion of Filipino households using adequately iodized (20 -70 ppm) salt is only 19.5% (Table 1) (1).
Using the international standard (> 15 ppm) as the cut-off, adequately iodized salt was found in 25.2% of the households, far below the goal of 90% of the population using adequately iodized salt. Results of the 2008 survey also show the median iodine level in salt in the survey households was only 5.3 mg/kg (ppm) which was lower than 12.5 mg/kg (ppm) obtained in the 2005 survey (1). This is also lower than the recommended iodine levels in salt mandated by the ASIN Law.

Urinary iodine excretion (UIE) and iodine levels in household salt

Regional differences were found in median UIE among school children 6 – 12 years and in the levels of iodine in household salt. Regions like Ilocos and Cagayan have both median UIEs of 150 µg/L and 233 µg/L respectively, and mean iodine salt levels of 19.4 ppm and 22.7 ppm respectively.

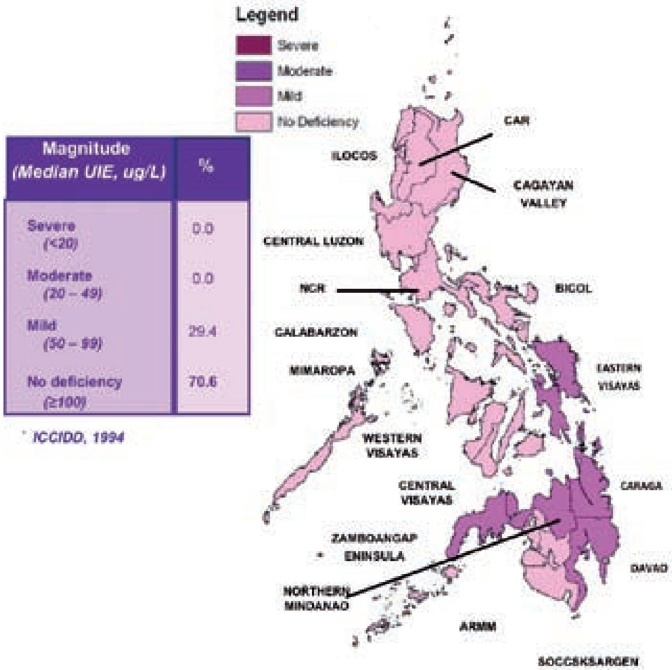


Figure 2: **Severity of IDD among children, 6 - 12 years old: Philippines, 2008**

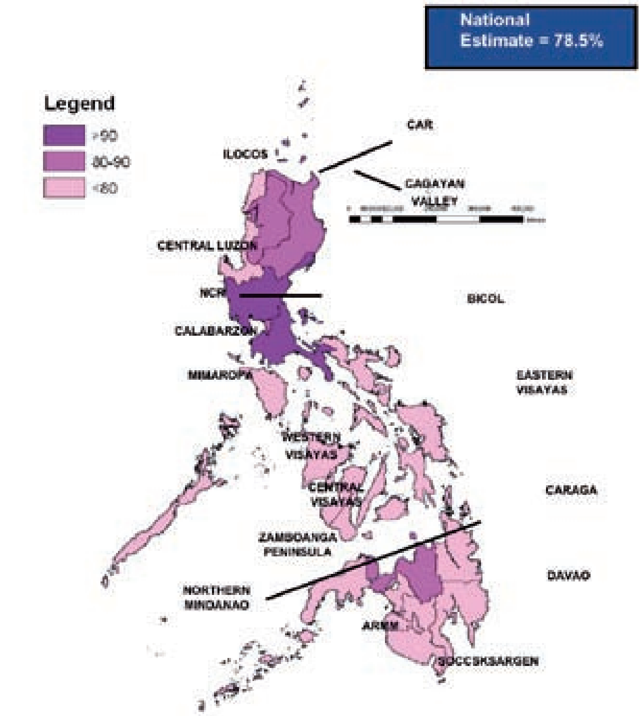


Figure 3: **Household awareness of iodized salt: Philippines, 2008**

On the other hand, regions with deficient UIEs such as Zamboanga and Caraga have median UIEs of only 84 and μg/L and 85 μg/L respectively, and mean iodine salt levels of 5.8 ppm and 8.5 ppm respectively. This trend is illustrated in Figures 2 – 5, where certain regions with no deficiency based on UIE (light colored) correspond to regions with high awareness and higher iodine salt levels (dark colored).

Per capita total household salt consumption based on the NNS report is 4 g/d, but only 1 g/d is iodized salt. This suggests overall iodine intake is likely low, considering the low median iodine level in iodized salt. But iodized salt consumption may actually be higher because it can be consumed in processed and snack foods, since the ASIN law requires "all producers/manufacturers of food-grade salt to iodize the salt they produce, manufacture, import, trade or distribute" and stipulates that "all food manufacturers/processors using food-grade salt are also required to

Municipal council urges town stores and food establishments to sell only iodized salt

Press Release, October 01, 2011. The Presidential Communications Operations Office, PIA Bldg, Visayas Ave, Diliman, Quezon City, Philippines

The municipal council of Siayan town in Zamboanga del Norte, The Philippines, has recently passed an ordinance requiring all sari-sari store owners and food service establishments there to sell and use iodized salt. Municipal Ordinance No. 11-05 sought the support of the store owners and restaurant operators to the government's salt iodization program to address IDD as suffered by some of the residents of municipality, particularly those living in the far-flung barangays.

The municipal mayor has also been tasked to constitute a monitoring team to ensure compliance by store owners and food service establishments with the law. Any store owner caught violating the ordinance shall be fined and/or imprisoned upon the discretion of the court.

Siayan is an interior municipality of Zamboanga del Norte and has been tagged as the poorest town in the country based on the report issued by the National Statistical Coordination Board (NSCB). Reports released by the Municipal Health Office (MHO) also showed that a number of people in the municipality especially those living in far-flung barangays are suffering from iodine deficiency disorders.

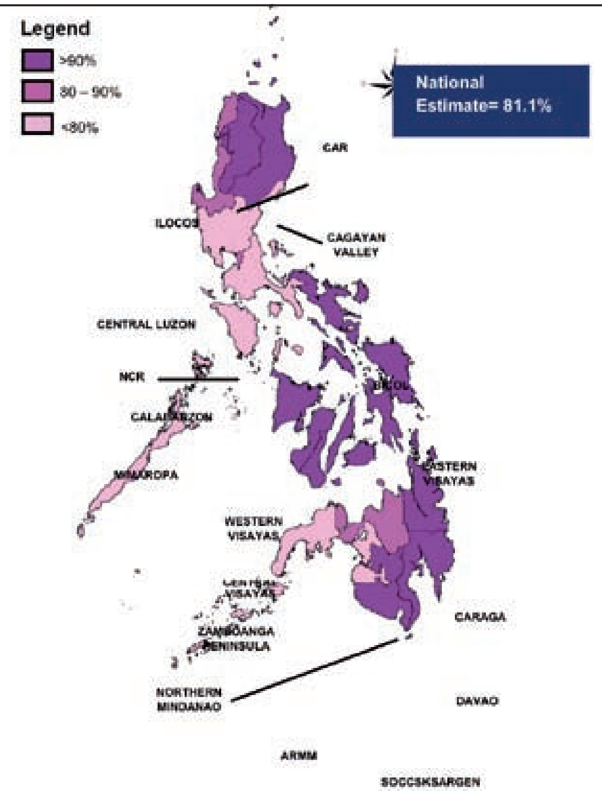


Figure 4: **Proportion of households testing positive using RTK: Philippines, 2008**

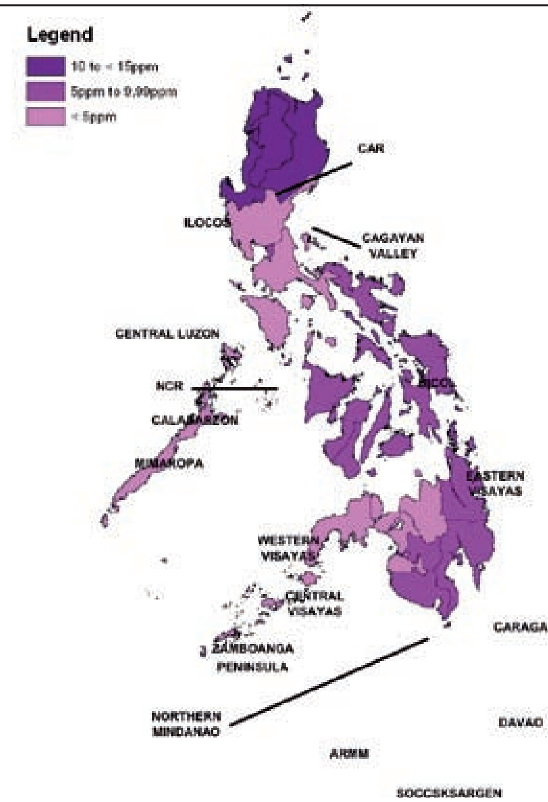


Figure 5: **Median iodine content of household salt using WYD iodine checker: Philippines, 2008**

use iodized salt in the processing of their products”. Laboratory trials conducted on retention of iodine in Filipino processed food after cooking show only small losses (2): retention of iodine in selected processed foods with iodized salt was 86-104% when boiled, 71-107% when fried and 75 to 114% when steamed. Thus, cooked processed food products containing iodized salt can significantly contribute to the requirement for iodine.

Towards elimination of IDD

A study of iodine status defined by UIE among schoolchildren was first done in 1998. Iodine nutrition has improved from mild deficiency (median UIE of 71 μg/L) in 1998 to no deficiency (median of 201 μg/L) in 2003 and 2008 (median of 132 μg/L) (Table 2). This trend coincided with an increase in iodized salt usage. On the other hand, iodine status was suboptimal in 2003 among pregnant women but not among lactating mothers, while median UIE was deficient in both groups in 2008.

When the ASIN law was implemented in 1995, the level of salt iodization mandated was ≥40 mg/kg (ppm) at retail sites. In 2007, however, this level was reduced to 20-70 mg/kg (ppm) across distribution channels whether bulk or retail, imported or local. Considering that the international standard is 20-40 mg/kg, lowering the level of iodization will harmonize the iodine level in the Philippines with other countries, reduce cost and will encourage compliance. However, lowering the mandatory level of salt iodization in 2007 may have contributed to the decrease in the median UIE from the 2003 to the 2008 levels among Filipino school children, pregnant and lactating women (Table 2).

The efforts of the Philippine government towards elimination of IDD in the country is also evident in the sharply lower rates of grade 1 and 2 goiter of 2.2% and 0.2%, respectively, among children 6 – 19 years in 2008 (1). Total goiter prevalence was 3.5% and 6.7% in 1993 and 1998 respectively, among Filipinos 7 years and over. For continued progress in the elimination of IDD, what is needed now is to establish a comprehensive system of monitoring the quality of iodized salt at the production and retail sites.

References

1. Food & Nutrition Research Institute-Department of Science & Technology, 2010. Philippine Nutrition Facts and Figures 2008. FNRI-DOST, Taguig City, Metro Manila, Philippines.

2. Capanzana MV, Saises MC, Trinidad II TE, Garcia RG, Lapis TJ, Guevara MCP, Mercado FA and Lasan CDC. Retention of iodine in selected cooked food seasoned with iodized salt. Presented during the 32nd FNRI Seminar Series. 2006.

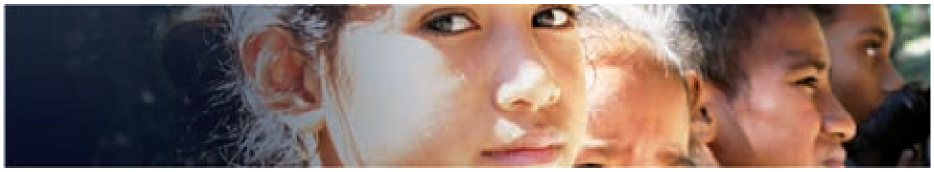
Meetings and Announcements

Timor-Leste launches iodized salt

The Ministry of Tourism, Commerce and Industry (MoTCI), together with the Ministry of Health and with support from UNICEF and USAID launched, on September 9, the iodized salt product in the Aidabakleten suco, Atabae sub-district, Bobonaro district. The launching of iodized salt intends to disseminate information on the consumption of iodine in the Atabae community, thus preventing malnutrition and goiter.

The inspector of the Internal Audit Department of the Ministry of Tourism, Commerce and Industry, Luís Inácio Fernandes, said that the MoTCI cooperates with the Ministry of Health to continue to promote the local salt factory and inform the community about its consumption. Luís Inácio also stressed that MoTCI guarantees the support of this program and intends to expand this initiative to districts with potential for production of iodized salt, especially the districts of Manatuto, Baucau, Manufahi and Covalima. Alongside this initiative, MoTCI strives to find a market for this product when it reaches a larger scale of production.

According to the Vice Minister of Health, Madalena Hanjam, „the Government, regarding the activities of iodized salt production, intends to diminish goiter disease in Timor-Leste, especially in pregnant women and children". Madalena Hanjam called for the consumption of iodized salt produced locally, especially to pregnant women. According with data advanced by the Ministry of Health, 90% of the population of Timor-Leste consumes salt, but 45% do not consume iodized salt, so goiter and malnutrition are still prevalent in Timor-Leste.



Union Health Ministry announces 71 million still iodine deficient in India

Daily News and Analysis, Ankita Chakrabarty New Delhi, Oct 1, 2011

About 71 million people in India suffer from IDD, the Union Health Ministry has said. A mapping of the risk showed that no state or union territory is completely free of the IDD risk, with Uttar Pradesh, Madhya Pradesh and Bihar being the worst hit. Statistics furnished by the Ministry of Health and Family Welfare in its report tabulated last month revealed that 1.3 crore people in UP alone were suffering from IDD. The figures of Madhya Pradesh and Bihar stood at 0.82 crore and 0.62 crore, respectively (1 crore is 10 million). The spread of IDD is far and wide with poverty being a key driver. Ashvini Hiran, COO, Consumer Products Business, Tata Chemicals, said, "Affordability of good and pure salt at the base of the pyramid is an issue. This has led to the consumption of unbranded salt which is either not adequately iodized or, worse, not iodized at all."

In class three towns and below, where a family's monthly income is less than Rs5,000, the budget conscious housewives struggle to get pure and good quality iodized salt at an affordable price, Hiran said. Dr VM Tapshalkar, project director at Impact India Foundation said, "People avoid intake of iodine as they consider it to be costlier." He said IDD might be classified into two groups: subclinical deficiency and clinical deficiency. "Generally in Maharashtra people suffer from subclinical deficiencies like mental retardation and lack of concentration," he added. Maharashtra and Gujarat feature prominently among the troubled states, with 0.62 and 0.46 crore people in the two states affected by IDD respectively. The government said it was doing its best to promote and enforce the use of iodized salt. Salt Commissionerate (an initiative of the Union Ministry of Commerce and Industry) claimed it had over the recent years enlisted support of salt manufacturers and this had led to an improvement in the intake of iodized salt. The industry has also said it is doing its bit. Hiran said, "Innovative consumer activation like nukkad sabha and street plays are also organised in rural markets to educate people on the benefits of iodized salt."

ICCIDD announces its commitment to the United Nations Global Strategy for Women's and Children's Health

The International Council for Control of Iodine Deficiency Disorders (ICCIDD) is one of the NGO partners of the Partnership for Maternal, Newborn and Child Health (PMNCH). The mission of PMNCH is to support the global health community to work successfully towards achieving Millennium Development Goal (MDGs) 4 and 5. The United Nations General-Secretary, Ban Ki-moon, with support and facilitation by the Partnership developed the 'Global Strategy for Women's and Children's Health' which sets out how all partners can work together to save women and children. The Global Strategy was launched at the time of the UN Leaders' Summit for the Millennium Development Goals (MDGs) in 2010, with some US $ 40 billion pledged towards women's and children's health and the achievement of MDGs 4 & 5 – to reduce child mortality and improve maternal health.

Since the launch of "Every Woman Every Child", many partners have come forward with ambitious pledges to do more for women's and children's health. The commitments set out how partners will contribute to achieving better health for women and children around the world, contributing to some of Every Woman Every Child's key outcomes. More than 200 commitments have been made to the Global Strategy since its launch in September 2010, an unprecedented global effort to advance women's and children's health. ICCIDD commitment, along with more than 100 others, including one from the Partnership itself, was announced by the UN Secretary-General on September 20th, as part of the event to mark the one-year anniversary of the launch of the Global Strategy, and to highlight progress to date. The ICCIDD pledge is described in the box on the next page.

ICCIDD commitment:

"Across the globe, the International Council for Control of Iodine Deficiency Disorders (ICCIDD) will strive to ensure that every pregnant, lactating and child-bearing age woman, as well as every child, has access to optimal iodine to allow full realization of their individual mental and physical development potential. ICCIDD will advocate with governments, citizens, and development agencies at national, regional and global level for a strong and sustained commitment to optimal iodine nutrition and a world virtually free from iodine deficiency disorders. This will be done primarily through the strategy of universal consumption of iodized salt using a multidisciplinary approach that involves all relevant partners."

The International Child Development Steering Group recently identified iodine deficiency as one of four key global risk factors for impaired child development where the need for intervention is urgent. The elimination of IDD at global level will contribute to at least 6 of the 8 Millennium Development Goals (MDGs). They are: **1)** Eradicate extreme poverty and hunger; **2)** Achieve universal primary education; **3)** Promote gender equality and empower women; **4)** Reduce child mortality; **5)** Improve maternal health; **6)** Develop a global partnership for development. Currently more than two billion people globally are at risk of Iodine Deficiency Disorders. Ensuring optimal iodine nutrition would lead to full realization of both mental and physical development potential of every woman and child.

Although salt iodization programs have been introduced in many countries, iodine deficiency remains a major global health problem, with 30% of the world's population at risk. The commitment will entail advocacy with national governments, policy makers, program implementers, salt producers, civil society, community, media groups, developmental agencies, donor agencies and all other stakeholders at national, regional and global level. The advocacy efforts will continue even after IDD is eliminated as a public health problem at global level so as to ensure that IDD elimination is sustained for all times to come.

Focus of the support being provided:

- **By age group:** childbearing age women, pregnant women, lactating women and under five children will be the priority focus group. However, optimal iodine nutrition is required for all age groups and thus needs to be ensured for the whole population.
- **By geographic scope:** worldwide, but with a focus on Africa and South Asia, where loss of most of the disability adjusted life years (DALYs) from iodine deficiency can be prevented.

The detailed list of a summary of commitments is available at *http://www.everywomaneverychild.org/commitments/all-commitments*

Meeting

Informal consultation on the public health implications of salt consumption held at the WHO Collaborating Centre, Maharaji Sayajirao (MS) University, Baroda, India, 11-13 October, 2011

An informal consultation on the public health implications of salt consumption was held at Maharaja Sayajirao (MS) University, Baroda from 11 to 13 October, 2011 under the aegis of World Health Organization's South-East Asia Regional Office (WHO-SEARO). The consultation was hosted by the Department of Foods and Nutrition of MS University. The consultation was attended by the representatives from ICCIDD, WHO-SEARO, MI, the Iodine Network, GAIN and experts from other technical agencies and participants from MS University (see photo).

Dr Chandrakant Pandav, ICCIDD Regional Coordinator for South Asia (top left), with the participants at the consultation

Participants deliberated upon various facets of salt consumption and its public health implications. Presentations on public health significance of Iodine Deficiency Disorders (IDD) in the SEAR member countries, experiences with IDD control and prevention programs, overview of non-communicable diseases in SEAR, physiological and epidemiological considerations of dietary sodium, an optimum mechanism for reducing salt consumption while ensuring adequate intake of iodine including iodized salt, and development of appropriate public messages addressing both the reduction of salt consumption and the consumption of iodized salt were made by the experts during the consultation. Dr Chandrakant Pandav made a presentation titled, "Iodine Deficiency Disorders (IDD) in the SEAR Member States: history and trends".

The following recommendations were made at the end of the consultation:

1. In the South-East Asia region, salt reduction strategy and universal salt iodization strategy is compatible.

2. Existing information on the current status of the IDD control program in the countries of the South-East Asia region should be collated and critically analyzed using the program indicators for tracking progress towards sustainable elimination of IDD. ICCIDD is to co-ordinate this process.

3. Information on dietary sources of sodium and sodium consumption in the population groups from South-East Asia should be collected through appropriate surveillance systems (E.g. STEPS or national nutrition surveys). WHOCC and other partners are to co-ordinate this activity.

4. Data collection for 24-hour urinary sodium and iodine excretion should be aligned and integrated to obtain representative/reflective data. WHOCC, ICCIDD and other partners are to co-ordinate this activity.

5. Close collaboration between iodine and salt initiatives should be facilitated. WHO is to co-ordinate this activity.

6. The processed food industry should be engaged and encouraged to reformulate, appropriately label, make available products with reduced salt and to make use of iodized salt in all their products. WHO and other partners are to co-ordinate this activity.

7. Salt reduction strategies should be included as priority agenda item for the tenth South-East Asian Nutrition Research-cum-Action network meeting with view of carrying the agenda forward. WHO and other partners are to co-ordinate this activity.

Abstracts

Comparison of median urinary iodine concentration as an indicator of iodine status among pregnant women, school-age children, and nonpregnant women

The objective of this study was to assess whether the median urinary iodine concentration (UIC) of school-age children or nonpregnant women can be used to accurately represent the iodine status of pregnant women. Using the World Health Organization Vitamin and Mineral Nutrition Information System and a literature review, the authors analyzed associations urinary iodine surveys that included pregnant women and school-age children and/or nonpregnant women in the same location and year using estimates from the smallest geographic level to increase the number of data points. There were 48 survey pairs with pregnant women and school-age children (total sample sizes of 8,622 and 16,844, respectively), and 26 pairs with pregnant and nonpregnant women (sample sizes of 3,222 and 5,520, respectively). The country contributing the most data points was China. When the median UIC in school-age children or nonpregnant women indicated iodine intake was adequate or above requirements, approximately half the time pregnant women had inadequate iodine intake. The authors concluded that adequate iodine nutrition status of school-age children or nonpregnant women may not indicate adequate iodine nutrition status among pregnant women. In order to assess the iodine status of pregnant women, the iodine status would need to be assessed in this group.

Wong EM et al. Food Nutr Bull. 2011;32(3):206-12.

Simulation of total dietary iodine intake in Flemish preschool children

The aim of this Belgian study was to calculate the distribution of total iodine intake among Flemish preschoolers and to identify the major sources contributing to iodine intake. A simulation model using a combination of deterministic and probabilistic techniques was utilized. Scenario analyses were performed to assess iodine intake via dairy products, industrially added iodized salt in bread and discretionarily added iodized household salt. Relevant data from 3-d estimated dietary records of 696 preschoolers 2·5-6·5 years old were used. With a more generalized utilization of iodized salt in bread (44 % of the bakers in 2011 instead of 12 % in 2002), mean iodine intake increased from 159 to 164 µg/d using the McCance and Widdowson's food composition table and from 104 to 109 µg/d using the German food composition table. The percentage of preschoolers with an iodine intake below the estimated average requirement (65 µg/d) decreased from 5-12 to 4-9 %, while the percentage of preschoolers with an iodine intake above the tolerable upper intake level (300 µg/d) remained constant (0·3-4 %). Both in 2002 and 2011, sugared dairy products, milk and iodized salt (21·4, 13·1, and 8·7 %, respectively in 2011) were the main contributors to total iodine intake. In conclusion, dietary iodine intake could still be improved in Flemish preschoolers. The use of adequately iodized household salt and wider use of iodized salt by bakers should be further encouraged.

Vandevijvere S, et al. Br J Nutr. 2011 Nov 7:1-9. [Epub ahead of print]

The effect of maternal iodine status on infant outcomes in an iodine-deficient Indian population.

This study aimed to assess the iodine status of pregnant tribal Indian women and their infants and to determine the impact of maternal iodine status on infant growth and behavior. A prospective, observational study was undertaken to assess the iodine status of pregnant Indian women living in Ramtek, northeast of Nagpur, India. Pregnant women were recruited at 13-22 weeks gestation (n=220), visited a second time at 33-37 weeks gestation (n=183), and again visited at 2-4 weeks postpartum with their infants. The median urinary iodine concentration (MUIC) at recruitment (mean gestational age=17.5 weeks) of mothers was 106 µg/L, which declined to 71 µg/L at the second visit (mean gestation=34.5 weeks) similar to the postpartum MUIC of 69 µg/L, indicating that these women were iodine deficient. Infant (mean age=2.5 weeks) MUIC was 168 µg/L. 20.0% of women at first visit had TSH >97.5th percentile and 1.4% had FT(4) <2.5th percentile. For every pmol/L increase in maternal FT(4) concentration at first visit, both infant weight-for-age Z-score and length-for-age Z-score increased by 0.05 units. Despite three quarters of the women in this study having access to adequately iodized salt (i.e., >15 ppm), these pregnant tribal Indian women were iodine deficient. Increasing the iodine content of salt deemed adequately iodized and iodine supplementation are two strategies that might improve the iodine status of these pregnant women and, consequently, the growth of their infants.

Menon KC, et al. Thyroid. 2011 Oct 26. [Epub ahead of print]

Current trends of 24-h urinary iodine excretion in German schoolchildren and the importance of iodized salt in processed foods

In many countries, iodized salt added to processed food contributes most to iodine supply. Yet it is unclear as to what extent changes in the latter may affect the iodine status of populations. Between 2004 and 2009, 24-h urinary iodine excretions (UIE) were repeatedly measured in 278 German children (6 to 12 years old) (n=707). Na excretion measurements and simultaneously collected 3-d weighed dietary records provided data on intakes of the most important dietary sources of iodine in the children's diet. Longitudinal regression analysis showed a plateau of UIE in 2004-6; afterwards, UIE significantly decreased till 2009 (P = 0·01; median 24-h UIE in 2004-6: 85·6 µg/d; 2009: 80·4 µg/d). Median urinary iodine concentration fell below the WHO criteria for iodine sufficiency of 100 µg/L in 2007-9. Salt, milk, fish and egg intake were significant predictors of UIE (P < 0·005); and the main sources of iodine were salt and milk (48 and 38 %, respectively). The present data hint at a beginning deterioration in the iodine status of German schoolchildren. A decreased use of iodised salt in industrially produced foods may be one possible reason for this development.

Johner SA, et al. Br J Nutr. 2011 Oct 11:1-8. [Epub ahead of print]

Use of iodized salt in households improves the iodine status of pregnant women and school/age children in Donetsk, Ukraine: A double-blind randomized controlled trial

This study analyzed the effect of iodized salt consumption on the iodine status of pregnant women and school children living in the households of Donetsk, Ukraine. 160 households with a healthy pregnant woman and a child aged 6–12 years were assigned to the use of either common or iodized salt. All the women (age 30 years; pregnancy duration 20 weeks) and the children (age 8.5 years) completed the trial without any adverse event. At the baseline visit, the mean household salt iodine content was 10.2 mg/kg and the median urinary iodine (UI) concentration in the women (89 µg/L) and the children (101 µg/L) was not significantly different between groups. The salt iodine content during the trial in the experimental households was 43.3 mg/kg (SD 4.6), higher (p < 0.001) than in comparison households (11.4 mg/kg; SD 5.1). The final UI of the pregnant women (141 µg/L; 95% CI: 123–163) in experimental households was lower (p < 0.05) than of the children (169 µg/L; 95% CI: 147–194), but the net effect of iodized salt consumption on the UI levels of the women (73 µg/L; 95% CI: 66–81) was significantly higher (p < 0.01) than that of the children (59 µg/L; 95% CI: 53–67). Introduction of iodized salt in the households of Donetsk was associated with adequate iodine intake in school age children but it did not achieve sufficient iodine intake in pregnant women.

Firsova NA et al. Russian Journal Klinicheskaya i Eskperimentalnaya Tyreiodologia, N 3, 2011

Iodine status of pregnant and postpartum Japanese women: effect of iodine intake on maternal and neonatal thyroid function in an iodine-sufficient area

The aim of the study was to characterize the gestational change of urinary iodine excretion in Japanese women and to assess the effects of iodine status on thyroid function in mother and infant. A total of 934 Japanese women and their 722 newborn infants were enrolled in the study. Iodine and creatinine concentrations were determined in spot urine samples in the three trimesters of pregnancy and the postpartum period at 34 d after delivery. Thyroid hormone status was measured in each trimester, and neonatal TSH was measured on postnatal d 4. The overall median urinary iodine concentration (UIC) during pregnancy was 219 µg/L, higher than that in postpartum women (135 µg/L). The prevalence of pregnant women with low UIC less than 100 µg/L or high UIC greater than 500 µg/L was 16 and 22%, respectively. Urinary iodine excretion increased from 220 µg/L in the first trimester to 258 µg/L in the second trimester, decreased to 195 µg/L in the third trimester, and then remained at 137 µg/L postpartum. Iodine intake assessed by UIC in Japanese pregnant women is sufficient and not excessive, and these results provide additional information on the reference range for UIC throughout gestation in iodine-sufficient areas.

Fuse Y et al. J Clin Endocrinol Metab. 2011 Sep 28. [Epub ahead of print]

Design: www.imholzdesign.ch Print: Späti Druck AG CH-8750 Glarus

THE IDD NEWSLETTER is published quarterly by ICCIDD and distributed free of charge in bulk by international agencies and by individual mailing. The Newsletter is also distributed to email subscribers and appears on ICCIDD's website **(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.

For further details about the IDD Newsletter, please contact:
Michael B. Zimmermann, M.D., the editor of the Newsletter, at the Human Nutrition Laboratory, Swiss Federal Institute of Technology Zürich, ETH Zentrum, Schmelzbergstrasse 7, LFW E19, CH-8092 Zürich, Switzerland, phone: +41 44 632 8657, fax: +41 44 632 1470, iccidd.newsletter@ilw.agrl.ethz.ch.

ICCIDD gratefully acknowledges the support of the Swiss Federal Institute of Technology Zürich for the IDD Newsletter.

© Copyright 2011 by International Council for Control of Iodine Deficiency Disorders