



# IDD NEWSLETTER

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**FOREWORD**

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## Focus on women

Women are disproportionately affected by iodine deficiency. During pregnancy and lactation, the maternal requirement for iodine increases sharply to make allowances for the developing fetus and then a breastfeeding infant. If prior to pregnancy, a woman's iodine status is even mildly inadequate, the deficiency could be difficult to correct once pregnancy occurs. Uncorrected, it may become progressively worse, with potentially devastating consequences for the baby's developing brain. Despite being the primary beneficiaries of iodine interventions, pregnant and lactating women have not been included in national surveys of iodine status until recently, and in 2016 global data is still scarce. In Europe, the available studies suggest that iodine deficiency may affect as many as two-thirds of the examined pregnant populations (*p. 6 "Pregnant women in Sweden and Turkey are mildly iodine deficient despite optimal iodine intakes in school-children"*). However, reliable data is lacking, and more research is needed to find out whether IDD programs are effective in reaching pregnant women and what impact they have on the intellectual development of the child, particularly in regions with marginal iodine deficiency. A first of its kind pan-European project called EUthyroid will help to close the data gap and provide a basis for future harmonization of IDD prevention and monitoring efforts across Europe (*p. 3 "EUthyroid: a new pan-European initiative to ensure adequate iodine intakes"*).

Where iodization programs have been effective for at least 2 years, with salt adequately iodized and consumed by more than 90% of the population, the iodine needs of pregnant women will likely be covered by their diet, and the iodine stored in the thyroid gland will be sufficient to ensure adequate hormone synthesis. Indeed, universal high coverage of iodized salt can mitigate other risk factors for iodine deficiency among women (such as low socio-economic status or rural residence), leading to much greater equity in iodine status throughout the population (*p. 12 "Iodization success in Sierra Leone makes women iodine sufficient"*). But a new study of household access to iodized salt suggests that socio-economic disparities are still a barrier in many countries to achieving universal coverage, which is why equity should be addressed explicitly in salt iodization policies (*p. 10 "How access to iodized salt changed in a decade: 2000-2010"*).

Despite the ongoing efforts, in many countries with uneven or lapsed iodized salt distribution, pregnant women remain at risk of iodine deficiency (*p. 11 "Almost all women in Alexandria are iodine sufficient"*). It is now recommended that pregnant women in these countries receive 100–200 µg/d of iodine containing supplements in addition to iodized salt, depending on the severity of deficiency among SAC. But this can only be achieved if supplements contain sufficient iodine to meet maternal needs (*p. 14 "Prenatal vitamins in Brazil contain too little iodine for pregnant women"*). If provided in adequate quantities, iodine supplements can have an unexpected benefit. A recent study in Morocco suggests that correcting iodine deficiency in women who are overweight or obese could improve their lipid profile and lower the risk of cardiovascular disease (*p. 9 "Iodine supplements reduce cardiovascular disease risk factors in women"*).

These and more articles can be found in this issue. We hope you enjoy reading them.

Michael Zimmermann M.D. and Gosia Gizak  
The Editorial Team

# EUthyroid: a new pan-European initiative to ensure adequate iodine intakes

This article is based on information provided on the EUthyroid project website (<http://euthyroid.eu>) and Henry Völzke et al. *Ensuring Effective Prevention of Iodine Deficiency Disorders. Thyroid 2016, 26(2).*

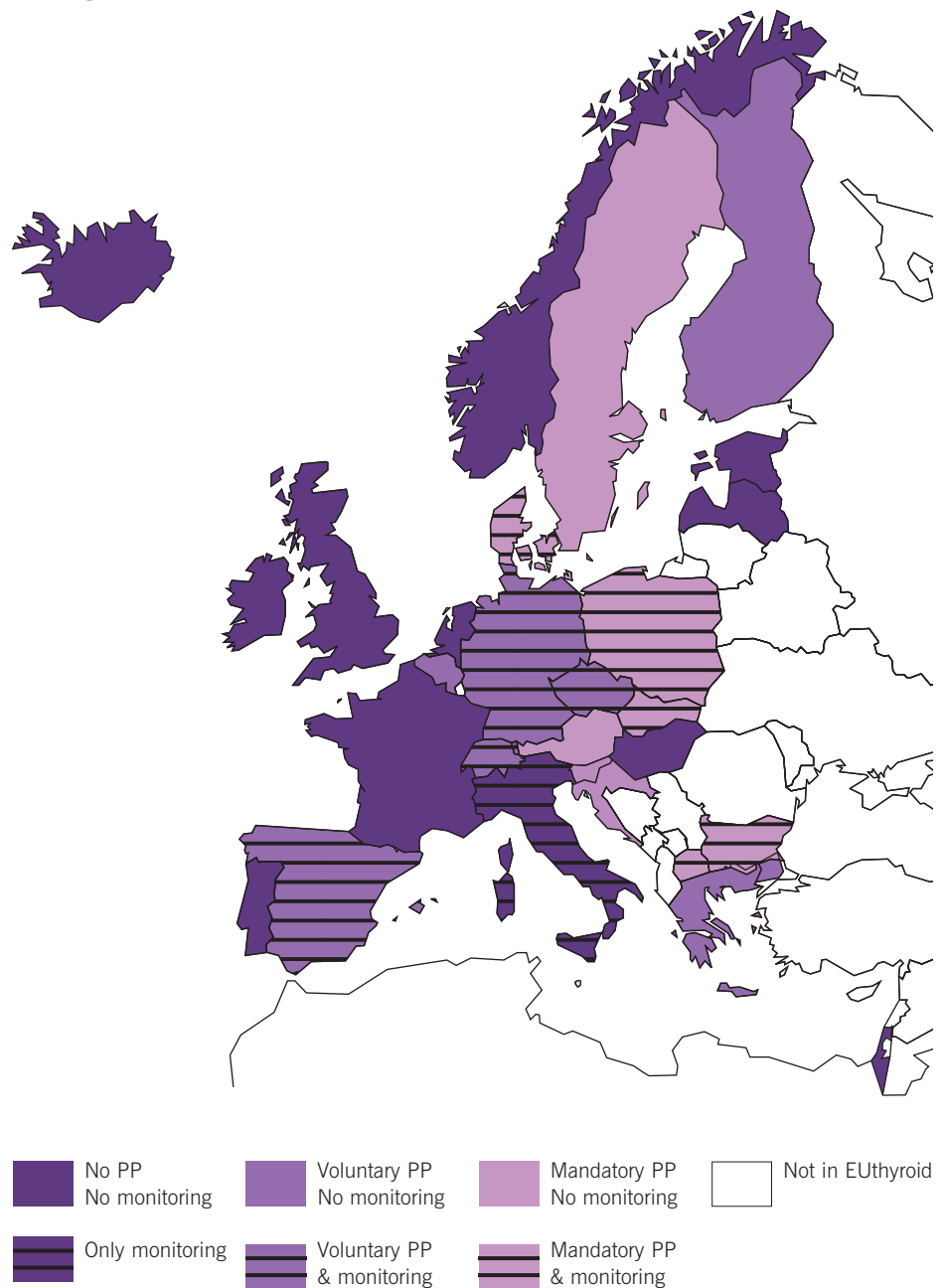
Programs set up to prevent iodine deficiency disorders (IDD) may not remain effective as a result of changing government policies, commercial factors, and human behavior that may affect them in unpredictable ways. To ensure that IDD prevention is effective, we need standardized monitoring and a better understanding of health outcomes and economic benefits. A new pan-European research initiative called EUthyroid has been launched to address these gaps.

## The case for monitoring is compelling. So why is Europe lagging behind?

The West and Central Europe region has a total population of about 600 million in over 40 countries and territories, with populations ranging from 0.3 to 82 million (1). For a number of years, the World Health Organization has drawn attention to the fact that many Europeans are affected by iodine deficiency. As recently as in 2007, a quarter of the countries in the region were classified as iodine deficient (2), and there has been little progress in the intervening years.

The European continent represents a complex patchwork of iodine prophylaxis: there is no harmonized approach to ensure that iodine intake of its population is sufficient to prevent health problems. Due to regional differences in eating habits, the natural iodine intake is heterogeneous. Despite the major global expansion of salt iodization over the past five decades, up to 400 million people from 20 countries across Europe have no or limited access to iodized salt (3). Only a small number of countries carry out regular monitoring of iodine intake, and the amount of comparable data is very limited: a recent review found that at least 14 countries have not performed a national survey of iodine status in the previous two years, and at least 17 are thought to have no monitoring at all (Figure 1) (3).

**FIGURE 1** In Europe, IDD prevention programs (PP) and monitoring are heterogeneous.





**Staying focused on the goals could improve IDD prevention programs**

While goiter as a result of iodine deficiency is widely known, it is less acknowledged that thyroid hormones regulate normal growth and development. Many governments may still be unaware of the adverse effects of ID on reproduction and fetal brain development. There is irrefutable evidence that improved iodine status in regions with severe iodine deficiency will reduce the rates of cretinism and adverse effects on neuro-cognitive function in children. And there is a growing number of studies showing that exposure to even mild iodine deficiency during pregnancy may have a negative impact on cognition and educability (3). And even small changes in the mean population IQ may affect the economy and well-being of societies (4). To overcome iodine deficiency and its consequences in Europe, the World Health Organization has called for a review of the situation in Europe through uniform monitoring as a basis for improved prevention.

### **But how good are the assessment methods of iodine status?**

Studies that measure urinary iodine concentration (UIC) directly face a challenge: gold standard methods such as inductively coupled plasma-mass spectroscopy are costly and, therefore, not feasible for most field studies. Some alternative methods show good correlation with the best, but results from different methods and laboratories may still vary considerably. In general, UIC analysis is demanding, and it requires well-trained and experienced laboratory personnel. Participation in an external quality assessment program is helpful (such as the

EQUIP program of the U.S. Centers for Disease Control and Prevention). In UIC analyses it is important to consider within-person variability that is caused by day-to-day variation in intake and hydration status. UIC measurements from spot samples can be relied upon for sufficiently large study populations (at least 100 study participants) and can use urinary creatinine to correct for hydration status. Alternatively, day-to-day variation can be addressed by repeating the measurements in a sub-group of study participants.



### **How valid are international maps of iodine status?**

WHO and IGN publications have provided maps illustrating the current status of iodine supply across the world. Epidemiological researchers usually strive to achieve good internal validity of single surveys or trend studies performed by single centers. However, external validity may be hampered by applying different UIC measurement methods (or in the case of thyroid

examination, different ultrasound devices, probes, or observers). This may limit the comparability of studies, which is essential for accurate mapping. A multinational iodine survey with centralized standardization and quality assurance would help map the regional disparities in iodine supply. In Europe, population studies such as the proposed European Health Examination Survey (5) would offer a good opportunity for routine monitoring of UIC levels.

### **Do not ignore the costs**

Prevention programs have to be beneficial for individuals and societies. To allocate limited resources efficiently in healthcare systems is one of the major aims of prevention. For example, in Germany the estimated annual economic impact of endemic goitre was €1 billion before the national IDD prevention program was established. Studies of projected healthcare costs have estimated that IDD prevention programs can be highly cost-effective (6). But there is currently no comprehensive analysis evaluating the cost-effectiveness of established IDD programs. Such analyses will be essential for meaningful discussion with health authorities in countries that have remained mildly or moderately iodine deficient or that are considering switching from voluntary to mandatory prevention programs.

### **Keeping our eyes on the goal**

In light of the overwhelming evidence that IDD prevention is effective in regions with severe iodine deficiency, it is easy to forget that data are also needed from mildly-to-moderately iodine deficient regions. Indeed, little research has been published on outcomes following the implementation of iodine fortification programs in mildly iodine-deficient regions (7,8). What's more, only few studies compare the rates of hyper- and hypothyroidism in populations that have IDD prevention programs. The benchmark for this approach is the Danish longitudinal study DanThyr, which combines repeated cross-sectional and cohort studies with analyses of registry data. More projects like DanThyr and disease-registry data are urgently needed to determine what outcomes can be tolerated safely under IDD prevention programs.

## EUthyroid: an initiative to make Europe smarter

EUthyroid is the first pan-European initiative to investigate the iodine status of the European population, and in parallel to address the above-mentioned systemic gaps in data collection, outcome research, and cost-analysis identified as barriers to achieving effective IDD prevention. Launched in June 2015 and supported by the European Union's Horizon 2020 research & innovation programme, the project will receive almost €3.5 million in funding over three years (see Box).

Dr. Henry Völzke, Professor of Clinical-Epidemiological Research at the Institute of Community Medicine, University of Greifswald, Germany, is the principal coordinator of EUthyroid and has been instrumental in pushing the project forward. "Currently in Europe there is no uniform dataset for iodine intake. Therefore, we can only speculate about the magnitude of health problems resulting from a deficient iodine intake. The fact is that even in Germany many children are born with intellectual disabilities. In this respect, I am very pleased as an epidemiologist and physician to see that, with EUthyroid, the EU has now opened a new opportunity to change this unsatisfactory situation. I am convinced that an improved iodine intake can make Europe more intelligent," he enthused.

Within EUthyroid, 30 partners from 27 countries pool the expertise of renowned epidemiologists, endocrinologists, nutritionists, and health economists, many of whom are also representatives of the Iodine Global Network for West and Central Europe Region.

### Focus on iodine deficiency during pregnancy

The EUthyroid network will perform research into the current situation regarding iodine intake and the health consequences of iodine deficiency in the countries involved. The main task will be to standardize data collection and perform a cost-to-benefit analysis of existing programs. The overarching goal will be to provide the basis for harmonizing and improving the iodine intake across Europe in cooperation with national authorities. A particular focus will be placed on pregnant women and the potential impact of iodine deficiency on the intellectual development of the child. EUthyroid will examine this issue using three separate mother-child studies taken from regions of differing iodine intake. For example, it is estimated that as many as 50% of all newborns in Germany have been exposed to iodine deficiency during pregnancy, which could lead to adverse affects. However, reliable data is not available in Europe.

With the establishment of central databases and structures for inter-laboratory comparison as well as the introduction of quality assurance measures for data collection, the conditions are already being created that, over the three-year duration of the project, will lead to improvements in the iodine intake of the European population.

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## EUthyroid project

Start date: **1 June 2015**

Duration: **36 months**

Total budget: **€3,375,330**

### Participants

22 Member States of the EU (exceptions being Cyprus, Lithuania, Luxembourg, Malta, and Romania) and 5 countries from the IGN West & Central Europe (Iceland, Israel, Macedonia, Norway, and Switzerland) corresponding to 95% of the Union's population.

### EUthyroid objectives:

- Build capacity of national studies to enable collection of standardized data on the iodine intake of the population (general population and pregnant women) to create a map of iodine status across Europe
- Compare national IDD programs and dietary habits to identify sources of dietary iodine
- Harmonize and standardize data collection of future studies
- Analyze the effectiveness and the cost-to-benefit ratio of existing prevention programs
- Develop appropriate measures toward an improved and unified iodine intake
- Analyze three mother-child studies from regions with different iodine intake
- Establish thyroglobulin as a biomarker for individual iodine status.



**Prof. Dr. Henry Völzke from the University of Greifswald is the principal coordinator of the EUthyroid project.**

# Pregnant women in Sweden and Turkey are mildly iodine deficient despite optimal iodine intakes in school-age children

Surveys estimating iodine deficiency traditionally used the results from school-age children (SAC) as a proxy for iodine status in the general population. Recently, this approach has been challenged: children tend to consume disproportionately more iodine from milk and dairy products, and SAC are not the primary beneficiaries of iodine interventions. The primary target groups are pregnant and lactating women, whose iodine requirement increases dramatically to maintain the thyroid function of the developing fetus and then infant (1).

In 2007, WHO found that the median urinary iodine concentration (UIC) among pregnant women was lower than in school-age children in several national surveys that had data for both groups. In three surveys, iodine nutrition was adequate in SAC, but inadequate in pregnant women (2). In 2011, a review of population-based surveys in SAC and pregnant women from the same year and locality concluded that adequate iodine nutrition of SAC may not reflect adequate iodine nutrition status during pregnancy (3).

## Turkey

Surveys in SAC across the country between 1997 and 1999 confirmed that iodine deficiency was rife. In Trabzon Province, SAC were severely iodine deficient (median UIC of 14  $\mu\text{g}/\text{L}$ ). Monitoring studies performed after the mandatory iodization of table salt in 2007 showed that ID had been successfully eradicated in most regions: Trabzon was defined as iodine sufficient, with a median UIC in SAC of 145  $\mu\text{g}/\text{L}$ . In 2011–2012, a population-based study of pregnant women in Trabzon demonstrated that, although iodine status had been rectified in SAC, pregnant women remain deficient (4). In a group of 864 healthy pregnant women, who were not using iodine supplements, the median UIC was 102  $\mu\text{g}/\text{L}$  (well below the optimal pregnancy range of 150–249  $\mu\text{g}/\text{L}$ ), and there was a significant decline as the pregnancy progressed (122  $\mu\text{g}/\text{L}$  in the



1st trimester, 97  $\mu\text{g}/\text{L}$  in the second and 87  $\mu\text{g}/\text{L}$  in the third trimester). There was a corresponding decrease in free T3 and free T4 levels in the serum, which may partly be explained by physiological changes in thyroid hormone metabolism in pregnancy, as well as the gradual worsening of iodine status. Of the 864 women, 90.7% reported that they were using iodized salt, 3.5% reported that they were not using it, and 5.8% stated that they did not know about the importance of using iodized salt.

## Sweden

In Sweden, nationwide surveys in SAC indicate that iodine nutrition is adequate: in 2006–2007, the MUIC of 857 SAC aged 6–12 years was 125  $\mu\text{g}/\text{L}$ . A recent study combined the results of two cross-sectional regional surveys of iodine status in a total of 459 pregnant women in Värmland and Uppsala counties (5). For the Värmland cohort, the spot urine samples were collected between January 2006 and July 2007. For the Uppsala cohort, between January 2010 and July 2012. The median UIC in the total study population, collected during the third trimester, was 98  $\mu\text{g}/\text{L}$  (interquartile range 57–148  $\mu\text{g}/\text{L}$ ). In Sweden, nationwide iodine prophylaxis with iodized table salt was established in 1936, and iodized salt is still the main source of iodine in the Swedish diet. However, iodine fortification (40–70 mg/kg) of edible salt is voluntary. In 2012, only 27% of all salt sold in Sweden was iodized. In addition, Swedish children

consume on average 485 g/day of milk and dairy products which is much higher than the mean 227 g/day consumption of adult women.

## Supplementation will benefit pregnant women where iodized salt is not covering their needs

In order to assess the iodine status of pregnant women, urinary iodine excretion should be measured specifically in this group. In Europe, the available data suggests that iodine deficiency may affect as many as two-thirds of the examined pregnant populations (6). Where iodization programs have been effective for at least 2 years, with salt adequately iodized and consumed by more than 90% of the population, the iodine needs of pregnant women will likely be covered by their diet, and the iodine stored in the thyroid gland will be sufficient to ensure adequate hormone synthesis and secretion. But in countries with uneven or lapsed iodized salt distribution, pregnant women should receive 100–200  $\mu\text{g}/\text{d}$  of iodine containing supplements in addition to iodized salt, depending on the severity of deficiency among SAC.

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# Maintaining IDD elimination in Mongolia

**Qian Ming** IGN Regional Coordinator for China and East Asia and **N. Bolormaa** IGN National Coordinator for Mongolia

Mongolia is administratively divided into 21 aimags (provinces) and the capital city of Ulaanbaatar (UB). The aimags form five regions: Western, Khangai, Central, Eastern and UB (Figure 1). In 2014, the population of Mongolia was only 2.97 million, with almost a half (46.5%) living in UB.

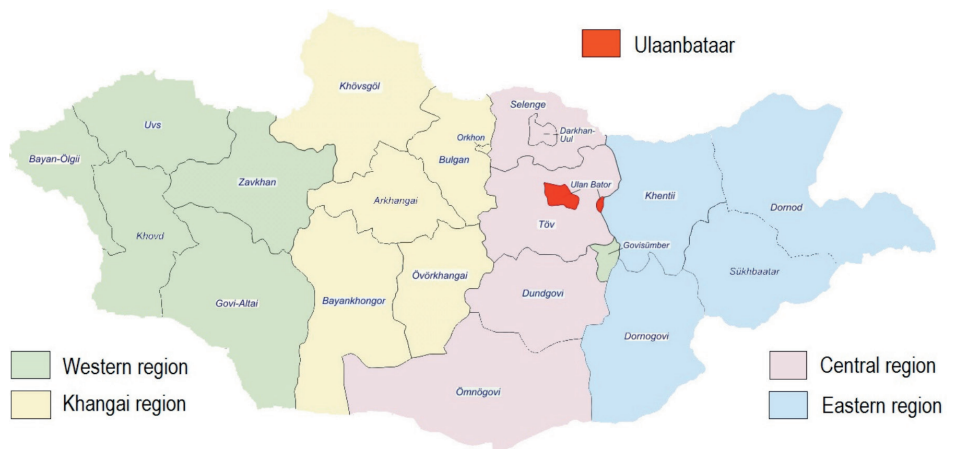
## Political commitment

Mongolia’s first official goiter studies dating back to the 1960s reported total goiter rates (TGR) of 32–45% among 7–12 year-olds in UB (1). During the 1970s and 1980s, the TGR continued to fluctuate between 23% and 47%. In 1992, the Ministry of Health (MOH) conducted the first national preliminary survey on iodine deficiency with the technical assistance of UNICEF. The results showed that Mongolia’s population was at risk of severe iodine deficiency (2). In response to the pledge made by world leaders in the 1992 World Declaration on Nutrition to end all forms of malnutrition, the Government of Mongolia adopted its first four-year National Program on the Elimination of IDD in January, 1996. Iodized salt had been introduced the year before. To promote IDD education, the government declared the first Sunday in September as the “National IDD Day” (Figure 2) (3).

## Securing the legal framework and international support

During the first national IDD program (1996–2010), the government published or revised a series of regulations and standards related to the control of IDD. The key event was the adoption of the Salt Iodization and Prevention of Iodine Deficiency law in 2003, which stipulated that all edible salt must be iodized, and only iodized salt must be imported and distributed in Mongolia, and used in food production. The adoption of this law has spurred a decade of tremendous progress against IDD (4).

**FIGURE 1** Aimags, the largest administrative units of Mongolia, are grouped into five regions.



The government’s efforts met with support from the international community. International agencies, including UNICEF, JICA, WHO, IGN, ADB and UNPPA provided material, technical, and financial assistance. Since 1992, UNICEF has been the main technical and financial supporter of the national program. Today, the program’s different components are administered by the State Specialized Inspection Agency (SSIA), the Ministry of Health (MOH), and the Ministry of Food and Agriculture (MOFA). SSIA is in charge of external quality control and regulatory monitoring of iodized salt at production, distribution, and sale. The MOH monitors the progress, and the MFA is responsible for iodine provision and legislation. The fortificant KIO<sub>3</sub> is procured with JICA’s support.

## Monitoring progress through nutrition surveys

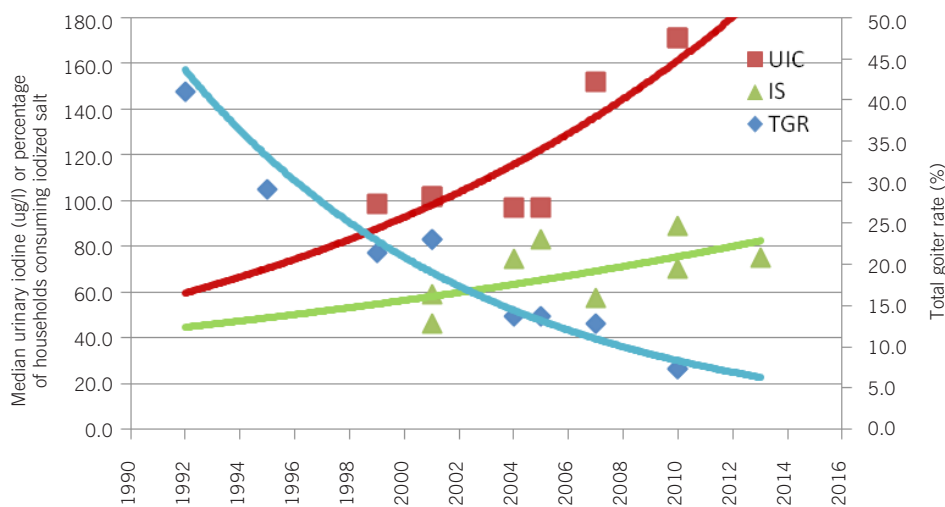
To assess the impact of the IDD program on the population’s iodine status, National Nutrition Surveys (NNS) were conducted in 1993–1995, 1999, 2004, and 2010 by the Nutrition Research Center of the Public

Health Institute under the MOH with the support of UNICEF and WHO. The surveys followed the standard design recommended by WHO/UNICEF/IGN and typically included goiter assessment by palpation, urinary iodine (UIC) in school-age children and reproductive-age or pregnant women, IDD awareness, and household coverage of iodized salt measured by titration or other quantitative methods. Neonate TSH was measured as part of NNS2 (1999) and NNS3 (2004). In addition, the National Statistical Office conducted a Multiple

**FIGURE 2** Poster promoting National IDD Day in Mongolia.



**FIGURE 3 Trends in TGR (%) and MUIC ( $\mu\text{g/L}$ ) in SAC, and household coverage of iodized salt from 1992 to 2013. There is a clear decrease in TGR and a corresponding rise in iodine intake and iodized salt coverage.**



Indicator Cluster Survey (MICS) in 2005, 2010, and 2013 to assess the household coverage of iodized salt using semi-quantitative methods. In 2013, the MICS was combined with two other major nationwide household surveys: the Reproductive Health Survey and the Demographic and Health Survey (DHS), with support of UNICEF and UNFPA.

### Latest survey shows adequate iodine intakes

The fourth NNS in 2010 enrolled 1120 children aged 7–11 years old, 932 pregnant women, and 1494 breastfeeding women. The median UIC among children has increased to 171.2  $\mu\text{g/L}$ , while the TGR by palpation has decreased to 7.3%. The median UIC among pregnant women is 151.5  $\mu\text{g/L}$ , within the adequate iodine intake range for pregnancy. The coverage of any iodized salt is also high, at 89.1% (Figure 3), although less than 10% of the edible salt available on the market is currently produced by Mongolian enterprises. But the progress has not been equal in all regions: the iodized salt coverage in Khangai and Western regions has been improving at a slower rate, and the TGR remains higher than in other regions.

### Lessons learned

Passing national legislation and standards, and formalizing the IDD prevention efforts into a national program have helped to create an environment that motivates all government stakeholders to maintain a high

level of commitment. The national surveys are performed by a highly-trained team in cooperation with experts and clinical doctors, and they provide regular, valuable data that allows the government to keep an eye on the goal. The next national survey (scheduled for 2016) should include goiter examination by ultrasound, neonate TSH levels, and an IQ survey to provide even more actionable information on the effectiveness of IDD prevention.

### Challenges ahead

To sustain the success of the IDD elimination program in the long term, it is essential to maintain the existing political will and commitment to mandatory iodization and educate the population about the benefits of iodized salt. A failure to do so is likely to diminish the government resources allocated to the control of IDD, which in turn will affect the production, control of imports, and monitoring at factory and market levels. Due to the early implementation of salt iodization, Mongolia has been largely unaffected by endemic goiter or cretinism. A new national advocacy

meeting or workshop should be planned to renew the government's commitment to the control of IDD, to ensure that the country remains free of the most serious consequences of deficiency in the long term.

### Western and Khangai regions

The Western and Khangai regions of Mongolia have seen the slowest progress to date. Salt production is spread out over the sparsely populated land and is often in the hands of small enterprises, which may be preferred over brands from other regions but may lack the technical capacity to iodize salt. A special project should evaluate the prevalence of IDD across the two regions and propose a strategy to improve their access to iodized salt.

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Efforts are needed to reach the sparsely populated and mountainous regions of Mongolia with adequately iodized salt.



# Iodine supplements reduce cardiovascular disease risk factors in women

Excerpted from: Herter-Aeberli I et al. Iodine Supplementation Decreases Hypercholesterolemia in Iodine-Deficient, Overweight Women: A Randomized Controlled Trial. *The Journal of Nutrition*, July 22, 2015

A randomized controlled trial in Morocco shows that iodine supplementation improves the lipid profile in overweight women who are moderately or severely iodine deficient.

In iodine deficiency, thyrotropin (TSH) levels increase to stimulate iodine uptake by the thyroid. In moderately-to-severely iodine deficient areas, many adults have elevated TSH with serum thyroxine (T4) and triiodothyronine (T3) levels in the normal range: a pattern consistent with subclinical hypothyroidism. Because iodine deficiency continues to affect approximately one-third of the global population, it remains a common cause of subclinical hypothyroidism worldwide. Iodine repletion of iodine-deficient individuals normalizes their increased serum TSH. Studies have shown that overt and subclinical hypothyroidism may increase the risk of dyslipidemia, and in some studies subclinical inflammation. Even within the normal TSH range, and in iodine sufficient populations, higher TSH predicts higher total cholesterol, higher BMI, and mortality from coronary artery disease. In this study, the authors investigated whether correcting iodine status would not only reduce serum TSH but also lower and normalize the elevated blood lipids.

## Double burden of malnutrition in Moroccan women

Morocco has enacted national legislation which mandates compulsory salt iodization, but because of poor compliance by the salt industry and a lack of enforcement many regions remain iodine deficient. The national median urinary iodine concentration (UIC) in children is only 69 µg/L. At the same time, Morocco has seen a rapid increase in rates of overweight and obesity as well as elevated blood lipids and type 2 diabetes. The trial was conducted from December 2013 to May 2014 at the district health center of Amizmiz, southern Morocco, in the foothills of the Atlas Mountains. Previous studies reported that young women in the region were iodine deficient. The authors enrolled 163 women between the ages of



Overweight increases the risk of elevated blood lipids.

20 and 50 (premenopausal) and with a BMI between 27 and 40 (overweight or obese). The women were assigned at random to receive treatment (200 µg daily potassium iodide tablets) or placebo (identical-looking tablets without any iodine) for six months.

## Iodine supplementation lowers plasma TSH and elevated lipids

After six months, the women who received iodine had a clearly improved iodine status and a modestly improved thyroid function. The median UIC increased from 38 (95% CI: 34–45) µg/L to 77 (95% CI: 59–89) µg/L, and TSH was 33% lower in the treatment group than in the placebo group. Iodine treatment also had a clear impact on the prevalence of elevated blood lipids: after six months, total cholesterol in women who had elevated cholesterol at baseline was reduced by 11%, and only about a fifth of treated women remained hypercholesterolemic (vs. 34.8% in the placebo group). Iodine had no significant effect on HDL cholesterol or TGs, which is consistent with other studies.

A correlation between TSH and serum lipids, even within the normal range of TSH, has been identified before. In the Nort-Trondelag Health Study in >30,000 euthyroid individuals, serum TSH was significantly positively correlated with total cholesterol, LDL cholesterol, and TGs and negatively associated with HDL cholesterol. Among euthyroid Hispanic individuals (n = 2771), after adjustment for age, sex, and BMI, serum TSH was positively associated with total cholesterol and TGs.

Overweight and obesity in women increases the risk of subclinical hypothyroidism, hyperlipidemia, insulin resistance, and subclinical inflammation. It is not clear why TSH concentration is higher in obesity or whether it could be an independent risk factor for cardiovascular disease. One potential link is leptin, the adipocyte-derived hormone which is increased with increasing body fat, and which has been linked to subclinical inflammation.

## More studies are needed

Although the median UIC almost doubled as a result of iodine supplementation, at six months it remained below 100 µg/L, the WHO cut-off indicating adequate intake. It is likely that the progressive reduction in total cholesterol might be even greater if followed until optimal iodine status has been achieved. Further research should also determine whether these findings can be applied to other populations with varying severity of iodine deficiency and metabolic risk factors.

*If confirmed, this effect may also be important in many higher-income countries, such as Russia, Finland, or Italy, where iodine deficiency persists and there is a growing prevalence of obesity and cardiovascular disease.*

# How access to iodized salt changed in a decade: 2000–2010

Excerpted from: Thach Duc Tran, Basil Hetzel & Jane Fisher. Access to iodized salt in 11 low- and lower-middle-income countries: 2000 and 2010. Bull World Health Organ 2016, 94:122–129

Since 1994, universal salt iodization has been recommended by the WHO and UNICEF as a safe and cost-effective strategy to ensure sufficient dietary iodine intake (1). Most countries passed salt iodization legislation and introduced IDD control programs to ensure that more than 90% of households have access to adequately iodized salt. Global household coverage of iodized salt (HHIS) increased dramatically during the 1990s from less than 10% to 66% (2). In 2011, ca. 70% of all households globally had access to adequately iodized salt.

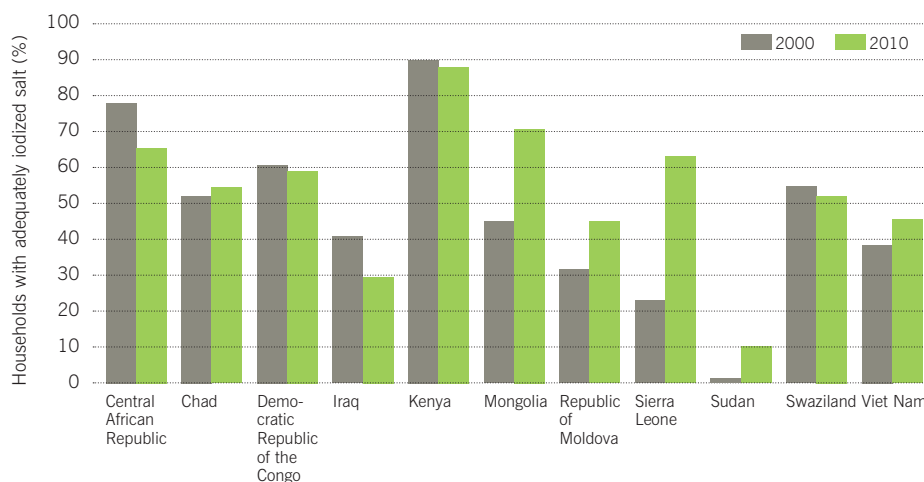
HHIS is a key indicator in Multiple Indicator Cluster Surveys (MICS) – international surveys initiated by UNICEF. Based on MICS conducted in 2000 and 2010 in 11 low and lower-middle income countries (Central African Republic, Chad, Democratic Republic of the Congo, Iraq, Kenya, Mongolia, Republic of Moldova, Sierra Leone, Sudan, Swaziland, Viet Nam), the authors calculated two indices of household salt iodization: (i) the proportion of households with adequately iodized salt (i.e., to at least 15 ppm), and (ii) the proportion of households with adequately iodized salt among households with any iodized salt. They also explored the associations between these indices and socio-economic variables (HDI, GDP) within and between countries.

## HHIS has increased but socio-economic disparities remain

Based on data from 105,162 households in 2000 and 144,018 households in 2010, coverage of adequately iodized salt increased by 6.1% on average (from 46.3% to 52.4%), but with regional differences: coverage fell by 13.0% (from 77.5% to 64.5%) in the Central African Republic but improved by 40.4% (from 22.2% to 62.6%) in Sierra Leone (Figure 1).

Disparities in access to adequately iodized salt are apparent, both between rural and urban areas and between the poorest and the richest ones in 2000 and 2010. In 2000, the coverage in urban areas was 20.9%

**FIGURE 1** The proportion of households with adequately iodized salt varied widely between the 11 low and lower-middle income countries, in 2000 and 2010



higher than in rural areas, but the gap decreased to 8.7% in 2010. Similarly, the proportion of households in the richest quintile with adequately iodized salt was 25.0% higher than in the poorest quintile in 2000, but this declined to 19.3% in 2010. Even though the inequalities have been reduced in the past decade, the socio-economic and geographical differences remain substantial in many countries.

These findings can inform strategies for achieving the global goal of more than 90% of households with adequately iodized salt. First, the largest improvement in the decade 2000–2010 was in the countries that started at very low levels and had buy-in from national governments and support from international donors and other agencies (Mongolia, the Republic of Moldova, Sierra Leone and Sudan). This group of countries appears to be scaling-up salt iodization programmes effectively. Countries with coverage of 50% or higher, in which salt iodization had been scaled up, appeared to face challenges to make further improvements (Chad, the Democratic Republic of the Congo, Kenya, Swaziland and Viet Nam). Some countries are expe-

riencing significant difficulties, including military conflicts which undermine progress (Central African Republic, Iraq). Second, the substantial socio-economic disparities in access to adequately iodized salt in many countries are suggesting that equity should be addressed explicitly in salt iodization policies. Finally, countries affected by war require explicit additional support from international agencies to achieve universal salt iodization during and following military conflict.

In conclusion, the achievement and maintenance of universal salt iodization appears a remote goal for many resource-constrained countries and requires explicit renewed efforts by governments, bilateral and multilateral agencies and civil society to avoid the burden of iodine deficiency disorders in the population.

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# Almost all pregnant women in Alexandria are iodine sufficient

**Nawal A. Elsayed, Samar Abdel-Mohsen, Samiha A. Mokhtar, Dalia I. Tayel** Nutrition and Biostatistics Departments of Public Health, Alexandria University, Egypt and **Mohga M. Fikry** Maternal and Child Health Department, Alexandria Health Directorate

## Background

In Egypt, the national salt iodization program was implemented in 1996, and a national screening and management program for neonatal hypothyroidism began in 2000–2001. Alexandria is one of 29 governorates of Egypt, which lies on the Mediterranean sea. Historically, Egypt has a high prevalence of iodine deficiency disorders (IDD), particularly in the New Valley governorate in the western desert. But there is little data on the prevalence of iodine deficiency among pregnant women. To address this gap, a study was carried out to assess urinary iodine concentrations (UIC) in pregnant women, and to estimate the prevalence of neonates with elevated values of thyroid stimulating hormone (TSH).

The study recruited 400 healthy women in the 3rd trimester of pregnancy from six government-run healthcare facilities across the Alexandria governorate. The women gave a spot urine sample for UIC analysis. Following birth, blood samples were collected from the newborns by heel prick to measure TSH. In addition, salt samples were collected from retail shops in each of the governorate's six districts and analyzed for iodine content by titration.

## Iodine intake is adequate in all but one district

The median UIC in 400 women was 170 µg/L, with the highest median recorded in El-Gomrouk district (231 µg/L), and the lowest in El-Agamy district (74 µg/L). El-Agamy was the only district with a median UIC below the range indicating adequate iodine intakes (150–249 µg/L). Iodine content in salt ranged from 50 to almost 70 ppm across the six districts, and it was adequate across the governorate. There were no stillbirths or neonate congenital anomalies, and the TSH levels were found to be within the normal range in all newborns in the study.

TSH in neonates can be a valuable indicator for iodine deficiency. The increase in the number of neonates with moderately elevated TSH concentrations is thought to be proportional to the degree of iodine deficiency during pregnancy (3). A previous study in pregnant women conducted in Abbassia district (Cairo governorate) reported a mean ( $\pm$ SD) urinary iodine concentration of 102.9 ( $\pm$ 3.11) µg/L (2). Because urinary iodine concentrations are typically not normally distributed in the population, it is likely that the median UIC would have been lower,

(81%), and it is lower in rural areas (87.1% compared with 96.3% in urban regions).

This variation in coverage at the sub-national level may partly explain why there are differences in the median UICs across the districts. It may also serve to emphasize the importance of monitoring iodine status in vulnerable populations and encourage iodine supplementation of pregnant women in areas at risk for deficiency. Education activities to increase the intake of iodine-rich foods is also recommended.



**Uneven coverage with adequately iodized salt might lead to pockets of insufficient iodine intake in young women and iodine deficiency during pregnancy**

indicating deficiency. In the same study, the proportion of newborns with TSH levels indicating hypothyroidism (>5 mIU/L in whole blood) was 8.85%. While at odds with these findings, results from Alexandria may suggest that TSH is not always a sensitive indicator.

According to the latest Demographic and Health Survey (DHS 2014), 90.9% of households in Egypt are using iodized salt, but this proportion is lowest among households in the lowest wealth quintile

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# Iodization success in Sierra Leone makes women iodine sufficient

Excerpted from: Rohner F, et al. Iodine status of women of reproductive age in Sierra Leone and its association with household coverage with adequately iodized salt. *Nutrients* 2016, 8, 74;

Sierra Leone's modern history has been overshadowed by a brutal civil war which ended in 2002. Although the country has experienced substantial economic growth in recent years, the ruinous effects of the unrest continue to be felt. According to a World Bank report, stunting and malnutrition are rife, and UNICEF estimates that 45% of households do not consume iodized salt, leaving children unprotected from iodine deficiency disorders. More recently, the 2014 Ebola outbreak overburdened the weak healthcare infrastructure, leading to a humanitarian crisis situation and a negative spiral of weaker economic growth. Salt iodization has been a recent public health success which stands out clearly against this backdrop.

## Previous iodine status estimates are out of date

In the vast majority of West African countries, including Sierra Leone, data on iodine status are mostly from the early 2000's. Sierra Leone's most recent nationally-representative data were collected in 2003 (1). In that survey, the median urinary iodine concentration (UIC) in school-children was 158 µg/L, which is considered adequate. However, important differences across the districts were reported, with the districts in the Northern region having lower median UICs. In addition, the net primary school enrolment ratio in the period 2008–2012 was about 75%, and it was likely even lower in 2003. Consequently, the UIC estimate from the 2003 survey may have been an overestimate because children not attending school were excluded.

## Dramatic improvement in iodized salt coverage

In 1994, the Government mandated that all salt imported to Sierra Leone be iodized at 35 mg/kg (7). Since then, assessments have reflected a steady increase in the proportion of iodized salt, from 23% in 2000 to 80% in 2013 (2,3). However, these assess-

ments provide only qualitative information which cannot estimate whether iodization levels are adequate. The 2013 Sierra Leone Micronutrient Survey (SLMS) quantitatively measured salt iodine content and household coverage of adequately iodized salt. The survey also measured the iodine status of Sierra Leonean pregnant women, non-pregnant non-lactating women, and non-pregnant lactating women.



Iodized salt in Sierra Leone improves the iodine status of all women irrespective of their socio-economic status

The SLMS was a cross-sectional household survey with PPS cluster sampling. From the randomly selected households, all pregnant women were enrolled, and a proportion of non-pregnant women. To produce maps of iodine deficiency, median iodine concentrations for non-pregnant non-lactating and lactating women were calculated at the cluster level. The proportion of women with UIC less than and equal to or greater to 100 µg/L in each cluster was calculated to illustrate areas of iodine deficiency, sufficiency, and excess.

## Results

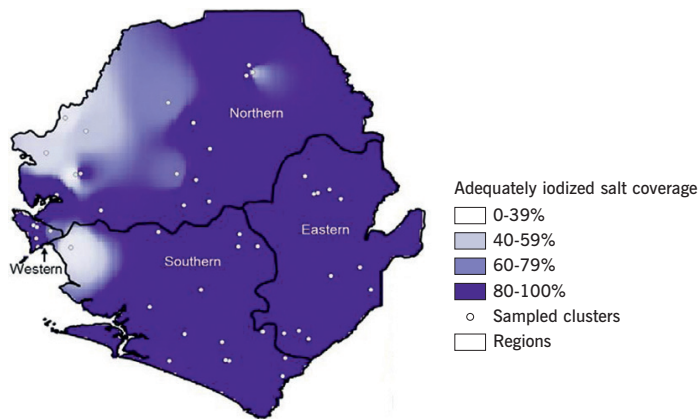
The median household size was 5.5 members, 60.4% of households were located in rural areas, 72.7% were male-headed, 99.8% used “natural” cooking fuel (e.g., charcoal or wood), 62.2% had “unimproved” sanitation facilities, and 76.5% drank safe water. The mean age of non-pregnant women was 27.7 years and of pregnant women was 23.4 years. No formal school attendance was reported by 55.5% of non-pregnant and 52.8% of pregnant women. In addition, 68.6% of non-pregnant and 79.8% of pregnant women were illiterate as measured by a simple reading test administered during the interview.

## HHIS

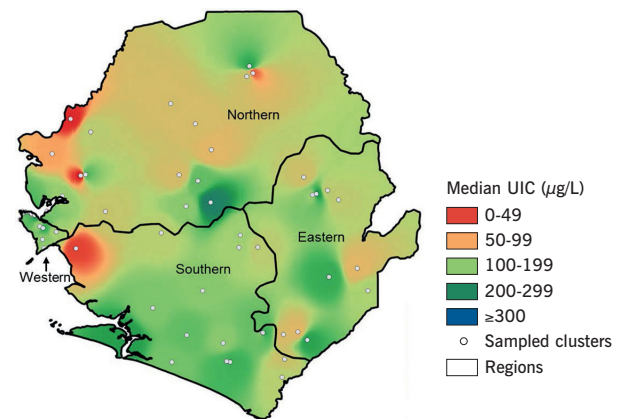
The vast majority (87.0%) of salt collected was not in the original package. Despite this fact, the proportion of salt samples which were adequately iodized was quite high: 80.7% (95% CI: 73.1, 86.5). But the country has not yet achieved universal salt iodization (at least 90% coverage of adequately iodized salt). As shown on the interpolated map of iodized salt coverage, relatively small areas with substantially lower coverage bring the overall coverage down (*Figure 1*).

Most of the areas with low-coverage are coastal zones, where the population harvests the salt without subsequent salt iodization. Salt continues to be harvested on a small scale in Sierra Leone, and the majority of table salt is imported. While the main salt producers in West Africa are Senegal and Ghana, it appears from trade figures that 75% of the salt imported to Sierra Leone originates from India. But this estimate is based on trade figures rather than a comprehensive market assessment, so variations may be expected. That said, the quality of imported iodized salt appears to have improved over the past decade. The Sierra Leone Standards Bureau enacted legislation in 2011 defining standards for imported iodized salt and establishing a monitoring system.

**FIGURE 1** Geographic distribution of coverage of adequately iodized salt ( $\geq 15$  mg/kg), Sierra Leone, 2013.



**FIGURE 2** Geographic distribution of median urinary iodine concentrations among non-pregnant women aged 15–49 years, Sierra Leone, 2013.



In general, urban and wealthier households had a higher coverage of adequately iodized salt than rural and poorer households. Only 27.3% of all responding women reported ever having heard about iodized salt, and among these women 31.4% were able to name the benefits of iodized salt (prevention of goiter or iodine deficiency, improvement of health or intelligence).

#### Pregnant women

The median UIC among pregnant women in Sierra Leone is 175.8  $\mu\text{g/L}$ , which is considered adequate. Because the SLMS was a household-based survey, the sample of pregnant women is small, and the analysis of sub-groups may have limited use. Nonetheless, for several sub-groups, such as women age 25–34 years of age, rural women, women in the Northern region, women who have never attended school, women in the lowest and highest wealth quintiles, and women living in households without adequately iodized salt, the median UIC are below the threshold for adequate iodine status. Pregnant women living in households with adequately iodized salt had significantly higher UICs than women in households with inadequately iodized salt. Although not statistically significant, the median UIC progressively increases with educational level. By contrast, there is no such progressive change in median UIC with wealth index or age.

#### Non-pregnant women

At the national level, the median UICs indicate adequate iodine status for both non-lactating non-pregnant women (medi-

an UIC=203.3  $\mu\text{g/L}$ ) and lactating non-pregnant women (median UIC=175.6  $\mu\text{g/L}$ ). In contrast to pregnant women, the median UICs in nearly all subgroups were substantially above the threshold of 100  $\mu\text{g/L}$  which defines iodine sufficiency in these groups. Only lactating women residing in households where salt was inadequately iodized had a UIC below 100  $\mu\text{g/L}$ . And like pregnant women, non-pregnant women living in households with adequately iodized salt had substantially higher UICs than women in households without adequately iodized salt. In contrast to pregnant women, and probably due to the larger sample size, UIC was also associated with age, urban residence, region of residence, educational level, and household wealth. In non-lactating women, there was a progressive increase in UIC with educational level and household wealth, but not with age.

Figure 2 shows the geographic distribution of median UICs. A comparison with Figure 1 shows considerable overlap between the levels of coverage with adequately iodized salt and median UIC, demonstrating a positive association between consumption of iodized salt and iodine sufficiency. With the exception of the Western region (with the capital city), poorer coverage with iodized salt and lower median UICs are concentrated in western parts of Sierra Leone.

#### **Iodized salt is an equitable solution to iodine deficiency**

An important finding in this study was that differences in iodine status between subgroups were much smaller in house-

holds with adequately iodized salt, which implies that provision of iodized salt acts as an equalizer. For example, in households with inadequately iodized salt, the UIC for women in rural households was below the 100  $\mu\text{g/L}$  cut-off for adequacy, and the UIC in urban women demonstrated iodine sufficiency. When adequately iodized salt was used, both urban and rural women demonstrated iodine sufficiency, and the UIC difference between urban and rural women was substantially lower. This shows that, even with the persistence of other dietary and non-dietary risk factors for iodine deficiency, these risks are largely mitigated by provision of iodized salt, which leads to much greater equity in iodine status throughout the population of non-pregnant Sierra Leonean women. And crucially, it highlights the importance of extending the coverage of adequately iodized salt to the remaining 20% of households, especially to the most disadvantaged households in which UIC is the lowest.

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# Prenatal vitamins in Brazil contain too little iodine for pregnant women

Excerpted from: Villagelin D, et al. Prenatal vitamin compounds available in Brazil are not suitable for adequate iodine supplementation of pregnant women. *Thyroid* 2016, 26(2)

Maternal iodine deficiency results in altered maternal and fetal thyroid hormone synthesis, which is proportional to the degree and duration of iodine deprivation (1). A recent meta-analysis demonstrated differences in the prevalence of iodine deficiency disorders in individuals from different age groups living in different regions of Brazil (2). Although data remain scarce in pregnant women, there is some indication that they could be at risk of iodine deficiency (3,4).

Because of high iodine intakes in children, the Brazilian National Health Surveillance (ANVISA) recently reduced the amount of iodine added to salt (5). We aimed to: (i) identify the availability of dietary supplements for pregnant women in Brazil; (ii) verify the amount of iodine present in these supplements; and (iii) correlate these levels with the new global recommendations of the American Thyroid Association (ATA) (1). We obtained nutritional information from available dietary supplements used by pregnant women and analyzed these data based on information on the package inserts using the federal agency (ANVISA) system of drug control and regulation, the ANVISA's Electronic Label. In addition, we contacted the pharmaceutical companies responsible for each product and consulted the Brazilian Dictionary of Pharmaceutical Specialties (2015).

We identified 25 dietary supplements for pregnant women currently in use in Brazil. Forty-eight percent of these supplements contained no iodine (12/25 products), 16% (four products) contained 1–149 µg of iodine, and just nine products (36%) had the recommended amount of iodine (i.e. 150 µg) as recommended by the ATA, the European Thyroid Association (ETA), and the World Health Organization (WHO).

Despite a mandatory program of salt iodization in Brazil, recent studies have found that pregnant women may be at risk

of iodine deficiency. On the other hand, fewer than half of dietary supplements commercially available and used by pregnant women in Brazil contain iodine in amounts recommended by international guidelines. Based on our findings, we propose that urgent measures are taken to protect both pregnant women and their offspring from the consequences associated with iodine deficiency.

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**Supplements taken during pregnancy should provide sufficient iodine to meet the needs of the mother and the baby.**

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# Are American alligators getting enough iodine in their diet?

*Excerpted from: Boggs ASP et al. Urinary iodine and stable isotope analysis to examine habitat influences on thyroid hormones among coastal dwelling American alligators. General and Comparative Endocrinology 2016, 226:5–13.*

The American alligator (*Alligator mississippiensis*), generally a freshwater species, is known to forage in marine environments despite the lack of a lingual salt secreting gland found in other crocodylids. Estuarine and marine foraging could lead to increased dietary uptake of iodine. The iodine content of estuaries has been shown to be dependent on the marine end-member sources, with more iodine in the saltier environments. Additionally, marine prey contain more iodine than freshwater prey. Therefore, coastal environments provide an iodine-rich diet compared to freshwater environments.

A diet overly rich in iodine can induce hypothyroidism or hyperthyroidism in some species and has been linked to hyperthyroid biomarkers in neonatal American alligators.

To explore the influence of dietary iodine on thyroid hormone health of coastal dwelling adult alligators, this study investigated the seasonal cycles in plasma thyroxine (T4) and triiodothyronine (T3) concentrations, and urinary iodine concentrations (UIC). It also analyzed the animals' long-term dietary patterns through stable isotope analysis of tissue. The study was carried out at the Merritt Island National Wildlife Refuge (MINWR) in Florida. Although MINWR consists primarily of estuarine and marine ecosystems, it supports a robust alligator population.

## Effect of dietary iodine on thyroid hormones

The thyroid hormones among the adult alligators varied seasonally or by size class. Plasma T4 concentrations varied seasonally for the small adults but not for the large adults. A peak in plasma T4 concentrations in July and August was followed by depressed plasma concentrations from October to April in this study; this seasonal trend is seen in many reptiles and has been hypothesized to be related to environmental temperature. It has also been observed that larger reptiles display a decrease in daily fluctuations of body temperature as well as



an increase in the average body temperature, which in turn is positively correlated with plasma T4 concentrations. The size of the alligator is also a significant positive correlate for urinary iodine, which may suggest that adult alligators allocate more foraging time in marine/estuarine environments than juvenile alligators.

*Livestock and wildlife are also vulnerable to iodine deficiency*

In previous studies, small adults from MINWR (which includes the breeding female population) had significantly elevated T3 levels when compared with freshwater populations, which correlated positively with their UICs, and were associated with thyrotoxicosis in neonates. Similarly, in the present study, there was a significant correlation between T3 and UI ( $p = 0.05$ ) in small adults. The authors hypothesize that this correlation could indicate increased marine/estuary foraging among the small adults, and it could be further evidence that maternal over-contribution of iodine could affect the thyroid health of neonates. More research is needed to examine this possibility. Secondly, the correlation between elevated T3, UIC, and size suggests that large adult alligators are able to regulate increased

iodine intake through increased excretion to maintain steady plasma T3 concentrations compared with their smaller counterparts.

## Dietary iodine

For the stable isotope analysis, a total of 314 alligators were captured from 2006 to 2013 to collect a keratin tissue sample. The body size of individuals ranged from 40.4 cm to 184.5 cm snout-to-vent length (SVL) and the sex ratio was male biased 2.4:1 (male:female). Consistent with other findings in this study, the analysis found that reliance on marine/estuarine prey resources increased with increasing body size, with the highest intake in the large male adult alligators. Increased time spent in marine environments for marine foraging described through increased UI and a highly marine isotopic signature among the large male population could explain why large males did not have seasonal differences in plasma T4 concentrations. Therefore, large male alligators in coastal environments could have consistent plasma T4 concentrations throughout the year due to the availability of iodine in their diet and more stable body temperatures.

Both UIC and stable isotope analysis demonstrate that adult alligators in coastal environments are marine foragers, which influences their thyroid health.

# "Goiter...and Beyond": Philippines celebrates Goiter Awareness Week

Theo San Luis IGN National Coordinator for the Philippines



"Goiter...and Beyond" was the slogan and message of the keynote address delivered on January 29 to culminate the events of the 10th Goiter Awareness Week (GAW) held in Dapitan City in the Province of Zamboanga del Norte (ZdN) in Region 9 in Mindanao, Southern Philippines. According to the 2013 National Nutrition Survey conducted in school-age children, Region 9 is the only geographical area that remains iodine deficient. The Region's median urinary iodine concentration (UIC) of 68  $\mu\text{g/L}$  is also the lowest among the country's 17 regions, while the national median UIC is currently adequate, at 168  $\mu\text{g/L}$ , up from 132  $\mu\text{g/L}$  in 2008. The Goiter Awareness Week is observed each year in the 4th week of January following a Presidential Proclamation in 2006. This year's GAW was the second time the activities were held in Mindanao to highlight the problem of iodine deficiency on the country's second largest island.

The observance of GAW in Mindanao reflects the determination of the Department of Health to eliminate iodine deficiency before the next NNS is scheduled to take place in 2018 (the national surveys are performed every five years). In addition to iodine deficiency in school-age children, the 2013 NNS reported insufficient iodine intakes in pregnant and breastfeeding women across Region 9 and the neighboring Region 10, as evidenced by the median UICs of 51  $\mu\text{g/L}$  and 64  $\mu\text{g/L}$  in pregnant women and 48  $\mu\text{g/L}$  and 53

$\mu\text{g/L}$  in women who were breastfeeding (in Region 9 and 10, respectively). Since 2013, ICCIDD Philippines (now IGN Philippines) has been assisting provincial, city, and municipal government units in conducting awareness campaigns through lay fora among pregnant and lactating women, briefings among DOH field personnel, and advocacy meetings with local chief executives.



**Dr Theo San Luis, the national coordinator of the IGN Philippines, at the closing events of the 10th Goiter Awareness Week in Dapitan City, Philippines.**

In August–September 2015, the IGN National Coordinator Theo San Luis, and ZdN Provincial Health Officer Eduardo Luayon carried out meticulous and extensive screening of women from every municipality in ZdN to test for goiter and analyze the iodine content in household salt using RTKs and WYD checkers. A prior study of household salt conducted by GAIN had shown that, in Region 9, as many as 82% of household salt samples were poorly iodized (at 0–5 parts per million), and only 1.2% of samples were adequately iodized (at 40 ppm). The screening events, held at schools, town halls, and village health cen-

ters, attracted large numbers of residents. Many women were diagnosed with thyroid nodules, and those with very large goiters were scheduled to have them surgically removed. A surgical program exists at the ZdN Medical Center, which is a designated referral center for thyroid surgery, allowing it to treat at least 6 patients a day all year round.

The key message of "Goiter...and Beyond" emphasizes that IDD is a spectrum of disorders. And although goiter is the most evident manifestation of IDD, its effects on brain development in infants and children have been stressed in audio-visual presentations, radio and TV interviews, and printed materials developed for public consumption. The Goiter Awareness Week has a memorable slogan in Tagalog: "Goiter Suguin, Isip Patalinuhin, Iodized Salt Gamitin," translated as "Goiter Prevention, Intellectual Enhancement, and Iodized Salt Use." The slogan can be seen on tarpaulins and banners displayed in public places and distributed on leaflets and as colorful fans useful in the tropical Philippines. An advertorial to mark the 20th anniversary of the ASIN Law (Republic Act 8172 mandating the use of iodized salt for human and animal consumption) was published by the National Nutrition Council last December to highlight the role of the national salt iodization program in eliminating IDD.

The Dapitan City meeting was preceded by the 31st Annual Convention of the Philippine Thyroid Association on January 23 in Manila, featuring two lectures to clinical topics given by Dr. Hossein Gharib of the American Thyroid Association and a talk on "IDD and the terror it creates" by Theo San Luis from the IGN Philippines. Additionally, PTA and Merck sponsored a workshop devoted to thyroid disease on January 28 in Dipolog City, the capital of Zamboanga del Norte. The workshop was attended by city and municipal health officers, private medical practitioners, trainees, and other health care providers.



# Headshots 4 Hunger: a campaign to support effective altruism

**Headshots 4 Hunger** is a unique campaign dedicated to fighting micronutrient deficiency by donating proceeds to just two effective charities: the Iodine Global Network and Project Healthy Children. Its creator is Jenn Korman, a St. Louis-based photographer with a passion for effecting positive change in the world, and founder of **Don't Wait Donate**.

## **IGN: What prompted you to start the Don't Wait Donate project and website?**

*Jenn Korman:* **Don't Wait Donate** was founded to make it easy for people to find and support organizations creating measurable and sustainable results. We want the most prominent narratives about charitable organizations to feature those who are setting a higher bar for the non-profit world. The most common thing that I hear when I talk to people about charitable giving is a fear of corruption and wondering where donations actually go. People want to support great causes, but they're jaded by an industry that has frequently failed with regards to transparency, efficiency, and measurable impact.

## **In your recent blog you talk about effective altruism. But why have you chosen to support salt iodization?**

On a personal level, I am drawn to salt iodization because of its specific impact on women and children. I first heard about the power of salt iodization when reading Nicholas Kristof and Sheryl WuDunn's book, *Half the Sky*. I remember being amazed at the huge impact that such a simple ingredient could have on the lives of individuals and entire communities. *Don't Wait Donate* focuses on food fortification because of its strong track record of success and its cost-effectiveness. We looked to reputable charity evaluation resources like GiveWell and Giving What We Can to find high-impact organizations.

## **When did you realize that Headshots was a winning formula?**

Headshots 4 Hunger is the first initiative of Don't Wait Donate. It's a pop-up headshot studio that raises funds and awareness for



hidden hunger. So far, we have hosted 16 studios at co-working spaces, universities and corporate events/training programs. I knew that I was onto something with Headshots 4 Hunger when I scheduled 9 events in the first month of the initiative. With the growing popularity of LinkedIn, a good headshot is a must. Since October, I have taken 268 headshots and I'm starting to get more consistent interest from larger groups (50+).

## **During a headshots event you talk to many people about iodine deficiency. What is their typical reaction?**

After doing a few events, I realized that headshots afforded me five to ten minutes of a person's undivided attention. This is an opportunity to tell them face-to-face why food fortification matters. I would estimate that about 75% of the people that I photographed had never heard of hidden hunger or food fortification. Most were excited about the idea and seemed surprised that programs like this existed. Many people have donated over the suggested donation after hearing about the cause, but I have yet to have someone donate after the event. That is the ultimate goal, and I am working on shaping my messaging to have the highest overall impact.

## **What do you think drives people to support your unique campaign?**

People are definitely drawn in by the need for a headshot! When you look through LinkedIn, you see a lot of selfies, cropped family photos, and out-of-date headshots. We make headshots convenient and pair it with something that people can feel truly good about. It has proven to stir up a lot of interest.

## **Finally, how can people reach you to book an event? Is there anywhere you wouldn't travel?**

To book a Headshots 4 Hunger studio for your company or community, visit *our website* or reach out to me directly at [Jenn@dontwaitdonate.org](mailto:Jenn@dontwaitdonate.org). This February, I had the privilege of traveling to San Diego and Denver for the first two Headshots 4 Hunger events outside of St. Louis. They were huge successes and it was awesome to take the message outside of Missouri. I am willing to travel just about anywhere to host an event, but I'm also working to recruit photographers from different regions to scale my efforts.

## **Do you see your campaign going global?**

The concept of Headshots 4 Hunger is really simple and I can definitely see it spreading nationally and internationally. I want to create a strong network of photographers who use their talents to support food fortification programs. In the next few years, I want Headshots 4 Hunger to be a recurring event on every college campus. I also want to establish Headshots 4 Hunger events as staples at large companies that are consistently hiring new employees.

## MEETINGS AND ANNOUNCEMENTS

## Basil Hetzel's letters and manuscripts collection is available online

Preface by **Creswell J Eastman** AM MB BS MD FRACP FRCPA FAFPHM

Current Board Director of IGN and former Regional Coordinator for Asia Pacific Region and Vice Chairman of ICCIDD

In March 1985, while in India attending an international workshop on control of Iodine Deficiency Disorders (IDD) in South East Asia sponsored by the WHO and UNICEF, Basil Hetzel put forward a proposal to establish the International Council for Control of Iodine Deficiency Disorders (ICCIDD). With the support of Rolf Carriere, David Haxton and several others, Hetzel persuaded the Executive Director of UNICEF and other international public health bodies to subscribe to his vision of a world virtually free from iodine deficiency disorders. This could be achieved through affected countries accepting and implementing iodized salt consumption programs and taking responsibility for monitoring progress and sustainability of these initiatives. One very important reason for his ability to influence others was that his arguments were underpinned by strong scientific evidence that irreversible brain damage, and not endemic goitre, was by far the most important consequence of iodine deficiency – and that it could be prevented. In 1983, Basil Hetzel had published an article in *The Lancet* entitled 'Iodine deficiency disorders (IDD) and their eradication';

this created a new paradigm for thinking about iodine deficiency and its adverse outcomes and forever changing the way we dealt with this problem and its eradication.

Hetzel's expanded vision of ICCIDD was for an international, multidisciplinary, collegial organization of experts, providing technical expertise to countries afflicted with IDD. He proposed an inclusive approach, well beyond the application of simply advocating iodine supplementation, recognizing that sustained success would also be dependent upon strong advocacy to mobilize the political will of relevant stakeholders, particularly in developing countries. In 1986, a year after putting forward his proposal in India, the ICCIDD was formally established at a meeting in Kathmandu with Basil Hetzel taking on the central role of Executive Director. In the early days Hetzel spent much of his time seeking funding, travelling and recruiting others to this fledgling organization. He was ably supported by a Board of Directors with John Stanbury as its Chairman, backed up by dedicated and experienced professionals serving as Regional Coordinators covering specific geographical

regions of the world to sustain the efforts of a truly global organization.

What has been achieved? From 1986 to 2005 while Basil Hetzel was at the helm of ICCIDD it matured and prospered to be a highly respected international organization, acknowledged as the global leader in the fight to eradicate IDD from our planet. From no more than a handful, the number of countries adopting Universal Salt Iodization exceeded 100 during this time, protecting an estimated 1 billion people from the ravages of IDD. All of this achieved at minimal cost and little fanfare. However, the battle is not yet over. ICCIDD, now rebadged as the Iodine Global Network (IGN), continues to provide global leadership in eradicating IDD. Basil Hetzel's legacy is indisputable. His untiring efforts and the achievements of ICCIDD over two decades have now been preserved in this historical collection of papers and manuscripts. Making these records available to all is a tribute to his prodigious memory, meticulous record-keeping and supportive staff.

Dr. Basil Hetzel's collection is available via the online library of the University of South Australia: <http://bit.ly/1Quz5Ee>

## Symposium on iodine and pregnancy

**The IGN will hold a Symposium on Iodine and Pregnancy for health professionals on 17 March 2016, at the Royal College of Obstetricians and Gynaecologists, London, UK**

A number of recent studies have found that UK pregnant women are mildly-to-moderately iodine deficient. This is a concern, as a study published in the *Lancet* in 2013 showed that iodine deficiency in pregnancy was linked to lower IQ and reading ability in children up to 9 years. The aim of this symposium is to:

- Review the role and importance of iodine in pregnancy
- Discuss the iodine status in pregnancy in the UK
- Promote strategies for optimal iodine nutrition in pregnancy in the UK

This symposium will bring together experts from across Europe, including several members of the UK Iodine Group (Professor John Lazarus, Dr Mark Vanderpump, Dr Sarah Bath, Professor Margaret Rayman, Mr Michael Marsh, and Professor Kate Jolly) and the Iodine Global Network (Professor Michael Zimmermann, Dr Jonathan Gorstein).

This event is available for health professionals only.

To take advantage of late registration, please contact Janis Hickey: [j.l.hickey@btf-thyroid.org](mailto:j.l.hickey@btf-thyroid.org). On social media, please use the hashtag: **#UKIodineMeeting**

The event is supported by:



thewaterloofoundation\*



# Three decades of the IDD Newsletter

The IDD Newsletter began as a black&white, two page pamphlet in 1985 and gradually evolved into a global colorful quarterly publication, now frequently quoted in the medical and epidemiological literature. The late Prof. John T. Dunn, one of the IGNS founding fathers, started the IDD Newsletter and was editor until his death in 2004. This issue marks the IDD Newsletter's 10th anniversary under the editorship of Prof. Michael Zimmermann at the Swiss Federal

Institute of Technology (ETH) in Zurich, Switzerland. Under first Prof. Dunn's and now Prof. Zimmermann's stewardship, the IDD Newsletter has steadily gained in stature, strengthening its role as the focal point in the global fight against IDD.

While still true to its original identity and character, the IDD Newsletter strives to stay at the forefront of IDD research, program, and policy developments. In 2016, it boasts a 10,000-strong global readership among the

rising generation of academics, thyroidologists, IDD program managers, development agencies, and nutrition policymakers.

We thank our many international collaborators for their contributions and we look forward to further successful years. Thanks to the generous support of ETH Zurich and Kiwanis, the electronic and paper editions of the IDD Newsletter can be distributed to its growing international audience.

Evolution of the IDD Newsletter over the 30 years of ICCIDD (now IGN).



In the early years, the IDD Newsletter was two-page pamphlet. Later the publication expanded and the layout continues to evolve. Since December 2014, the Newsletter bears the new IGN logo.

## The IGN annual Board and Management Council meeting

This year, the IGN (formerly ICCIDD) will celebrate its 30th anniversary.

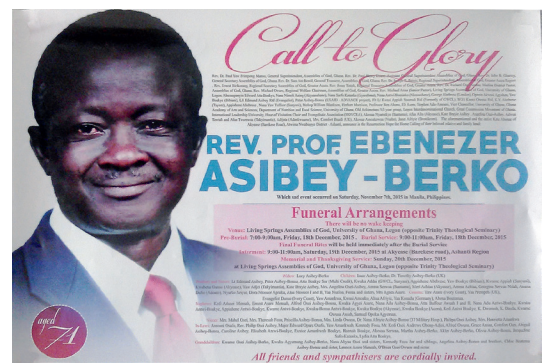


This year, the Iodine Global Network's annual Board Meeting will take place jointly with the meeting of its Management Council, in London on March 16–20. The meeting will bring together many of the IGN's key members and supporters from North and Latin America, Europe, Africa, Asia, and the Middle East. It will be an opportunity to summarize an eventful year, which saw the election of Dr. Jonathan Gorstein as the new Executive

Director, and much anticipated progress with IDD policy and monitoring in several key countries. The meeting will be an opportunity to summarize the lessons learned from a series of regional workshops on the sustainable eliminations of IDD held throughout 2015 in Middle East & North Africa, Central and Eastern Europe, East & Southern Africa, and South-East Asia with the support of UNICEF and other partners. This year's event will hold special significance, as this April the IGN celebrates its 30-year anniversary. The meeting will bring together some of the IGN's founding members and the up and coming generation of IDD leaders. The event is organized by Prof. John Lazarus, the IGN's Regional Coordinator for West & Central Europe, who is also head of the UK Iodine Group, and a partner in the EUthyroid initiative. It will be held jointly with the Symposium on Iodine and Pregnancy (#UKIodineMeeting).

## In Memoriam

Prof. Ebenezer Asibey-Berko (1944–2015)



Professor Asibey-Berko passed away on November 7, 2015 at the age of 71. With his death, the Iodine Global Network lost a prominent National Coordinator in Ghana, and a fierce advocate of USI in the country. His contributions in the area of iodine and nutrition in Ghana were very significant; he was a trusted advisor on iodine matters and nutrition, educator, author and an inspirational Christian leader to many. He passed away while on a speaking engagement at an academic conference in the Philippines. In the wake of his death, an outpouring of condolences and tributes came from around the world. Prof. Asibey-Berko is survived by his wife Lucy, two sons, and many grandchildren. A memorial and thanksgiving service was held on December 20.

## ABSTRACTS

**Iodine status of vulnerable populations in Henan province of China 2013–2014 after the implementation of the new iodized salt standard.**

The standard of salt iodine content in China has been adjusted several times since the implementation of universal salt iodization (USI) in 1995. The new standard was adjusted from  $35 \pm 15$  to  $30 \pm 9$  mg/kg in Henan province in 2012. The authors aimed to determine whether the vulnerable populations were iodine sufficient after the adjustment and to provide a guideline for the USI policy in China. Two cross-sectional surveys of iodine status in vulnerable populations, including reproductive-age, pregnant and lactating women, infants <2 years, and children aged 8–10 years, were conducted in Henan province in 2013 and 2014. In 2013, the median urinary iodine concentration (MUIC) of reproductive-age women was 200.1 µg/L and that of school children aged 8–10 years was 221.0 µg/L. In 2014 the MUIC in both groups showed a significant decline compared to 2013 ( $p = 0.012$  and  $p = 0.001$ , respectively). The MUICs of the pregnant women were 204.2 µg/L in 2013 and 202.5 µg/L in 2014, but indicating adequate iodine intakes. In 2013, the MUIC was 169.1 µg/L among lactating women and 203.2 µg/L among infants <2 years, both significantly lower than in 2014 ( $p < 0.001$  and  $p < 0.001$ , respectively). Iodine status of the vulnerable populations is still adequate as a whole in Henan province after decreasing the salt iodine content.

Yang J et al. *Biol Trace Elem Res*. 2016 Jan 18. [Epub ahead of print]

**The new emergence of iodine deficiency in the UK: consequences for child neuro-development.**

While randomized controlled trials in severe iodine deficiency have shown that iodine deficiency in pregnancy causes impaired offspring cognition, less is known of the effects in regions of mild/mild-to-moderate deficiency. The United Kingdom is now classified as mildly iodine deficient by WHO, based on a 2011 national study of 14–15-year-old schoolgirls. As pregnancy is the most critical time for brain development, we evaluated iodine status in pregnant women in Surrey ( $n = 100$ ) and Oxford ( $n = 230$ ). The median urinary iodine concentration was 85.3 µg/L in Surrey women. Oxford women had similarly low status. We investigated whether that level of iodine deficiency was associated with adverse child cognitive effects using stored samples and data from the Avon Longitudinal Study of Parents and Children cohort. In adjusted analyses, we found a significant association between low maternal iodine status in early pregnancy (urinary iodine-to-creatinine ratio <150 µg/g) such that children had an approximately 60% greater risk of being in the bottom quartile of scores for verbal intelligence quotient, reading accuracy and comprehension. UK women who might become pregnant should ensure they have adequate iodine status to avoid compromising their children's brain development.

Rayman MP, Bath SC. *Ann Clin Biochem*. 2015 Nov;52(Pt 6):705-8.

**Serum thyroglobulin as a biomarker of iodine deficiency in adult populations.**

The objective of this study was to clarify which factors may influence the serum Tg level in an adult population and how this may affect Tg as a biomarker of iodine deficiency (ID). Two identical cross-sectional studies were performed before (C1a: 1997–98,  $n = 4649$ ) and after (C2: 2004–05,  $n = 3570$ ) the Danish mandatory iodine fortification (IF) of salt (2000). Additionally, a follow-up study of C1a was performed after IF (C1b: 2008–10,  $n = 2465$ ). The studies took place in two regions with mild (Copenhagen) and moderate (Aalborg) ID before IF. Multiple factors were associated with serum Tg. Some were directly related to iodine intake (cohort, urinary iodine concentration (UIC) level and region), and some were likely mediators of iodine intake effects on Tg (thyroid nodularity, thyroid size and autonomy with low TSH). Others were caused by aggravation of ID (childbirths and smoking) or TSH stimulation of the thyroid. Estimated 24-hour urinary iodine excretion was a more sensitive predictor of Tg than UIC. Iodine supplement users had low median Tg values compared with non-users both before and after IF. Multiple factors should be taken into consideration when evaluating Tg as a marker of ID in adult populations; still, Tg is a sensitive marker of ID. We suggest including a reference population with known sufficient iodine intake when Tg is used to evaluate ID.

Krejbjerg A, et al. *Clin Endocrinol (Oxf)*. 2016 Feb 6. [Epub ahead of print]

**Salt intake and iodine status of women in Samoa**

The objective of this study was to determine iodine nutrition status and whether iodine status differs across salt intake levels among a sample of women aged 18–45 years living in Samoa. A cross-sectional survey was completed and 24-hr urine samples were collected and assessed for iodine ( $n = 152$ ) and salt excretion ( $n = 119$ ). The median urinary iodine concentration (UIC) among the women was 88 µg/L (Interquartile range (IQR) = 54–121 µg/L). 62% of the women had a UIC <100 µg/L. The crude estimated mean 24-hr urinary salt excretion was 6.6 (standard deviation 3.2) g/day. More than two-thirds (66%) of the women exceeded the World Health Organization recommended maximum level of 5 g/day. No association was found between median UIC and salt excretion (81 µg/L iodine where urinary salt excretion  $\geq 5$  g/day versus 76 µg/L where urinary salt excretion <5 g/day;  $p = 0.4$ ). Iodine nutrition appears to be insufficient in this population and may be indicative of iodine deficiency disorders in Samoan women. A collaborative approach in monitoring iodine status and salt intake will strengthen both programs and greatly inform the level of iodine fortification required to ensure optimal iodine intake as population salt reduction programs take effect.

Land MA et al. *Asia Pac J Clin Nutr* 2016, 25(1)

**Adequacy of iodine intake in three different Japanese adult dietary patterns: a nationwide study.**

Iodine intake is thought to be high in Japan due to regular seaweed consumption. Subgroups that do not have a traditional Japanese diet may consume insufficient amounts of iodine. 390 adults aged 20 to 69 years from 20 areas throughout Japan completed four-day diet records and collected a 24-h urine sample. Dietary patterns were extracted from 31 food groups by cluster analysis. The iodine adequacy of each dietary pattern was examined using Dietary Reference Intakes for Japan. Three dietary patterns, labelled "Cluster I (Rice and vegetables)" ( $n = 101$ ), "Cluster II (Meat, non-Japanese noodles, and sugar-sweetened beverages)" ( $n = 34$ ), and "Cluster III (Fish, Japanese noodles, and alcohol)" ( $n = 60$ ), were identified in male subjects. Another three patterns, "Cluster I (Rice and vegetables)" ( $n = 22$ ), "Cluster II (Fish and Japanese noodles)" ( $n = 33$ ), and "Cluster III (Bread and non-Japanese noodles)" ( $n = 140$ ), were found in women. Although the habitual iodine intake of almost all participants was above the estimated average requirement (EAR), iodine intake was much lower in Cluster II in men and Cluster III in women. The mean participant age was the youngest in these clusters. Although Japan is known as a high iodine-consuming country, individuals who do not eat a traditional Japanese diet consume low amounts of iodine. Since younger people tend to have Westernized dietary patterns, iodine deficiency might be given additional consideration hereafter in Japan.

Katagiri R et al. *Nutr J*. 2015 Dec 30;14:129.

**Iodine status among pregnant women after mandatory salt iodisation in Turkey**

Various changes occur in thyroid hormone metabolism during pregnancy, and iodine requirements increase significantly. The purpose of this study was to investigate iodine status among pregnant women in Trabzon, formerly a severely iodine deficient area but shown to have become iodine sufficient following mandatory iodisation of table salt based on monitoring studies among school-age children (SAC) in the area. A total of 864 healthy pregnant women participated in the study. None were using iodine-containing supplements. All were screened for use of iodised salt, obstetric history, thyroid function tests and urinary iodine concentrations (UIC), and thyroid ultrasonography was performed. Median UIC was 102 (IQR = 62–143) µg/L. Median UIC of the patients according to trimesters were 122 µg/L at the 1st, 97 µg/L at the 2nd and 87 µg/L at the 3rd trimester. UIC in the 1st trimester was higher compared with the 2nd and 3rd trimesters ( $p < 0.017$ ). Nodules were present in 17.7% of women ( $n = 153$ ). The rate of iodised salt usage among pregnant women was 90.7%. Our study demonstrates that, although the iodine status among SAC has been rectified, ID is still prevalent among pregnant women. Current knowledge is in favour of iodine supplementation in this group with 100–200 µg/day of iodine-containing supplements in addition to iodised salt.

Anafiroglu I et al. *BJN* 2016, 115:405–410

**THE IDD NEWSLETTER** is published quarterly by the Iodine Global Network 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 the Iodine Global Network's website ([www.ign.org](http://www.ign.org)). The Newsletter welcomes comments, new information, and relevant articles 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, [idd.newsletter@hest.ethz.ch](mailto:idd.newsletter@hest.ethz.ch).

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