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IODINE global**network**

Georgia celebrates sustained optimal iodine nutrition

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IN THIS ISSUE

IODINE GLOBAL NETWORK is a nongovernmental organization dedicated to sustained optimal iodine nutrition and the elimination of iodine deficiency throughout the world.

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Sustained optimal iodine intakes in Georgian children and pregnant women provide evidence of effectiveness of universal salt iodization (USI). Georgia's success demonstrates that correctly implemented USI meets the dietary iodine needs of all population groups in both urban and rural settings.

The most susceptible group for iodine deficiency disorders (IDD) is pregnant women, whose infants, if iodine deficient in utero, are at high risk of irreversible mental impairment. Salt iodization has been the key strategy for control of iodine deficiency disorders in over 120 countries (1). Where universal salt iodization (USI) has been achieved and sustained for at least two years, the iodine needs of the general population and pregnant women will be covered by the diet, and the thyroid gland will maintain optimal function (2). Georgia has successfully sustained USI for over a decade, and a new national survey confirms that school-age children and pregnant women have optimal iodine intakes.

A goiter hotspot

A former Soviet republic, Georgia is the home of the Caucasus Mountains and a natural hotspot of IDD. High prevalence of goiter (40–52%) and cretinism were reported historically (3). As Georgia lacked domestic sources, the Soviet authorities directed shipments of iodized salt to Georgia's most affected areas from Ukraine and Armenia. Between 1955 and 1986, iodine deficiency was virtually eliminated: goiter rates decreased, and cretinism cases disappeared (3).

In 1996, the newly independent Georgia initiated efforts to implement universal salt iodization in response to reports of re-emerging IDD. Small surveys of the Southern Caucasus in 1996–1998 under the Atlanta-Tbilisi Health Partnership (4) demonstrated TSH elevations among 63% of newborns. In 1998, a national survey found that 80% of school-age children had urinary iodine concentrations below 100 μg/L (5).

Legislation and enforcement: a cornerstone of Georgia's effective USI program

Thanks to joint efforts of the Georgian government, UNICEF, and other international partners, the State Goiter Control Program under the Ministry of Labor, Health and Social Affairs (MOLHS) was transformed in 1998 into a National Program for IDD Elimination coordinated by the Georgian Parliament. A series of key laws were enacted which lay the foundation for the USI success that we see today. Salt iodization was made mandatory, and a previous iodization standard (40±15 mg/kg as KIO_3) was elaborated on (3). However, two laws stand out as particularly important for bringing iodized salt from salt producing countries: a VAT exemption on iodized salt imports, and a strict ban on the imports of non-iodized salt.

Enforcement of the new laws led to a fast and dramatic improvement in household coverage of adequately iodized salt, from 8.1% in 2000 to >90% in 2005 (5, 6). In the 2005 national survey, out of 957 salt samples tested with rapid test kit, only 39 (4.1%) contained no iodine. Iodine concentration was validated in 136 samples using iodometric titration: 94.1% were adequately iodized (6). The median urinary iodine concentration (UIC) in school-age children (SAC), a proxy for the general population, was 321 μg/L. It was concluded that, thanks to USI, Georgia met the primary WHO criteria for IDD elimination (6). There was some concern about the persistent prevalence of goiter in SAC (32.4%, n=4420), but it is now believed that it was a consequence of a long-standing iodine deficiency rather than recent changes in iodine nutrition. Although thyroid size decreases once iodine deficiency is corrected, this effect may take years to observe on a population level and is dependent on continued consumption of adequately iodized salt.

A new sentinel study and national survey

In 2015, the Iodine Global Network (IGN) established an alliance with the Georgian National Centers for Disease Control and Public Health (NCDC), UNICEF, and professional groups of endocrinologists to

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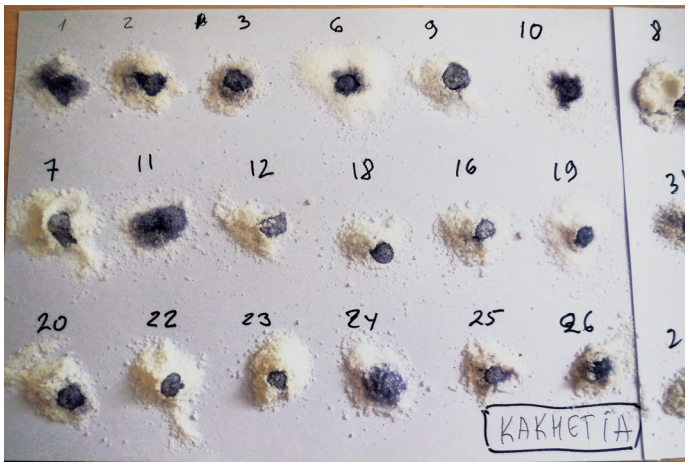
Children in Georgia are protected against IDD thanks to a well-implemented USI program.

strengthen iodine monitoring, and update the information on the current iodine status. Working closely with NCDC, the IGN provided resources for launching UIC analysis at the "Test Diagnostika" laboratory in Tbilisi and connecting with the Regional Iodine Reference Laboratory in Almaty (QUICK Network). Following a request from NCDC, the IGN supported a small-scale assessment of iodine nutrition in 2016 conducted at three sentinel sites using a convenience sampling methodology. The study found optimal iodine intakes in both SAC and PW (7). Yet, because the median UIC in both populations was close to the upper bracket of the normal range, NCDC and UNICEF agreed to conduct a nationwide survey.

Conducted in May–June 2017, the survey covered 1219 SAC of both sexes (aged 8–10 years) from all administrative regions of Georgia (7). SAC assessment was subdivided into two strata: (i) General (nationwide) and (ii) Mountain (mountainous regions of Adjara and Svaneti with historically high prevalence of severe iodine deficiency). In the general stratum (n=894), 67.4% of SAC resided in urban and 22.6% in rural areas. In the mountain stratum (n=325), most of SAC (95.3%) resided in rural areas. A countrywide sample of PW consisted of 663 records from antenatal clinics in all but one region of Georgia. Household salt samples (n= 1087) were analyzed for iodine content by titration.

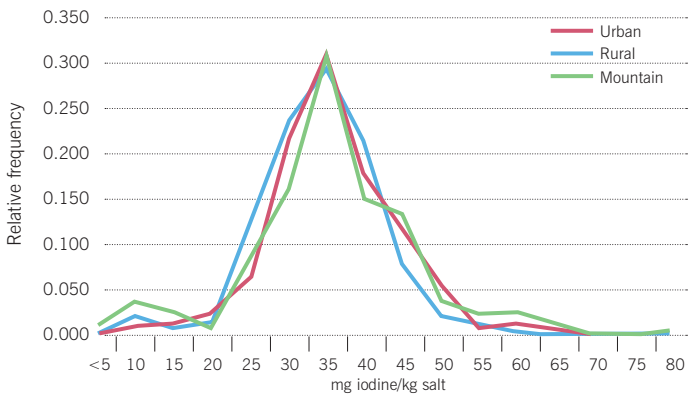


All household salt samples tested positive for iodine with rapid test kits (RTKs) in the District of Lagodekhi, Georgia in a small sentinel survey in 2016.

Sustaining excellent coverage with adequately iodized salt

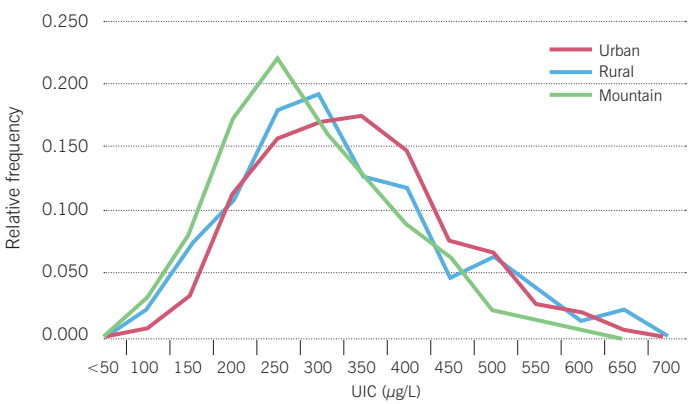
The survey confirmed excellent iodized salt coverage: over 90% of households in Georgia have access to iodized salt with iodine content ≥15 mg/kg both in the general and the mountain stratum. Nationwide, 86.4% of salt was iodized according to the Georgian standard, 80.5% in the mountain stratum. Only 3.9% of samples did not meet the WHO-recommended standard of ≥15 mg/kg. Salt iodine concentration in urban areas was higher than in rural areas, while both were adequate (respectively, 33.4 mg/kg and 31.8 mg/kg, p<0.01) (Figure 1). The quality of iodized salt was remarkably good from all major brands of salt imported from various countries (mostly Ukraine, Iran and Azerbaijan).

FIGURE 1 **Iodine concentration in salt in 2017 was adequate across all strata. Salt iodine in rural areas was significantly lower (p<0.01) than in urban areas (7).**



Cohort	N	Mean iodine (mg/kg)	SE	95% CI
Urban	569	33.4	0.35	32.7 to 34.1
Rural	264	31.8	0.47	30.9 to 32.8
Mountain	254	33.4	0.68	32.1 to 34.8

FIGURE 2 **Adjusted urinary iodine concentration (UIC) in school-age children (SAC) in 2017 shows optimal intake across all strata, with the highest UIC in urban areas and lowest in the mountainous regions (7).**



Cohort	N	Median UIC (μg/L)	Inter-quartile range
Urban SAC	579	304	233–380
Rural SAC	268	275	212–361
Mountain SAC	299	247	178–368

School-children are iodine sufficient

The raw UIC data in SAC were corrected for individual variation using a second (repeat) urine collection from a sub-sample of 192 SAC. The adjusted UIC distribution showed less variance than the single spot UIC. The adjusted national median UIC in SAC was 298 µg/L, which is within the optimal range. Median UIC was lower in rural than in urban SAC, and the mountain stratum had lower UIC than the rural and urban SAC combined (Figure 2). While those are ample differences, median UIC in all the SAC groups was clearly above the threshold for iodine deficiency.

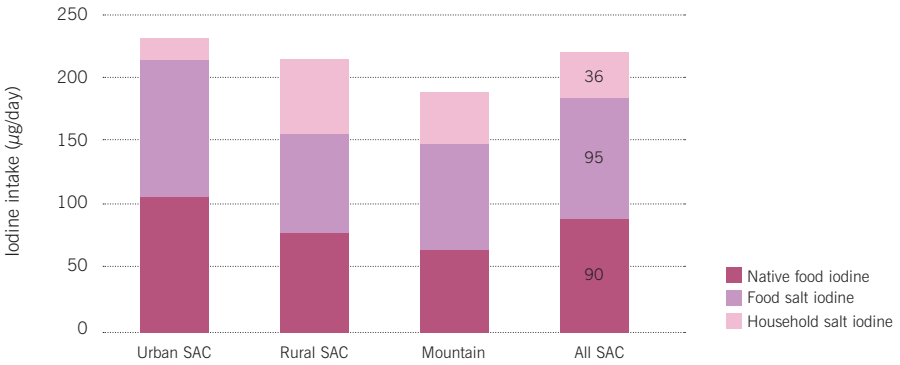
Using the adjusted UIC and body weight, the survey estimated iodine intake in SAC. The results were compared against the age-specific Estimated Average Requirement (EAR) and the Upper Limit (UL) of recommended iodine intake to estimate the prevalence of intakes outside the desired range. Nationwide, only 1.8% of SAC had iodine intakes below the EAR and 1.3% above the UL. These findings are lower than the prevalence (2.3%) that would be expected in an iodine-sufficient population. Only a small difference in iodine intake was found between the general SAC population and those who reside in the mountainous regions of Adjara and Svaneti.

Based on an analysis of urinary sodium concentrations, the survey concluded that the dietary sources of iodine in SAC include processed foods (95 µg/day = 43%), foods with native iodine (90 µg/day = 41%), and iodized household salt (36 µg/day = 16%) (Figure 3).

Optimal iodine intakes have been sustained in pregnant women

The median UIC in PW (n= 634) was 211 µg/L, which lies in the middle of the adequate range (150–250 µg/L). The median UIC in the 1st trimester (n= 541) was 211 µg/L, which confirms that women enter the pregnancy with adequate iodine stores. The median UIC was 226 µg/L in rural PW, and 205 µg/L in urban PW. Only 6.8% of women reported taking an iodine supplement at the time of giving a urine sample. As could be expected, they had a higher median UIC than women who never took a supplement (227 µg/L and 211 µg/L, respectively). But given the high dispersion of UIC values typical for spot urine collections, differences of this magnitude are considered to be minor.

FIGURE 3 Dietary iodine sources among school-age children (SAC) (7).



Going forward: conclusions and recommendations

- **Georgia has made impressive progress to establish USI for IDD elimination in a relatively short time.** The results of the 2017 survey confirm that Georgia has sustained an effective USI program: household coverage of adequately iodized salt has remained firmly above 90%, and both SAC and PW have optimal iodine nutrition, in rural, urban and mountainous areas.
- **Monitoring iodine nutrition and coverage of adequately iodized salt should be continued and strengthened.** Sentinel surveys conducted annually are a practical, efficient, and cost-effective monitoring tool as long as Georgia sustains USI.
- While median UIC in SAC remains close to the upper limit of the optimal range, the intake estimates provide evidence that consumption is not excessive, therefore, **there is no urgent need to alter the current salt iodization standard.** A potential decrease even by 10 mg/kg (25%) could results in suboptimal iodine intake in some PW and, potentially, in SAC from mountainous regions, where the median UIC was lower. This would put at risk Georgia's IDD elimination strategy and risk eroding optimal iodine nutrition of the entire population.
- **Health professionals (endocrinologists, obstetricians, pediatricians, general practitioners, etc.) should be discouraged from recommending iodine supplements to PW and SAC** unless inadequate dietary iodine intakes are strongly suspected (e.g. in patients who practice veganism or have extremely low salt intakes for medical or lifestyle reasons).
- **The findings should be published and disseminated among policymakers, experts, and scientists.** They should be presented to the general public in a balanced manner with the help of mass media.

References

1. World Health Organization. 2014. Guideline: Fortification of food-grade salt with iodine for the prevention and control of iodine deficiency disorders.
2. Andersson M et al. 2007. Prevention and control of iodine deficiency in pregnant and lactating women and in children less than 2-years-old: conclusions and recommendations of the Technical Consultation. Public health nutrition; 10, 1606-1611.
3. Kazakh Academy of Nutrition. 2013. Georgia. Available at: http://kan-kaz.org/english/files/georgia_vignette.pdf
4. Tbilisi-Atlanta Healthcare Partnership interim report (1992-98): Summary of accomplishments. Available at: http://medicine.emory.edu/atl_tbl/INTRO/accomp_summary.htm
5. Sehnishvili Z et al. 2007. Elimination of iodine deficiency in the Republic of Georgia. IDD Newsletter, May 2007.
6. Suchdev PS et al. 2009. Progress toward Eliminating Iodine Deficiency in the Republic of Georgia. Int J Endocrinol Metab; v.3, 200-207
7. Gerasimov G and van der Haar F. 2017. Report on the national assessment of iodine nutrition status and iodized salt use in the Republic of Georgia. UNICEF and the Iodine Global Network.

High dietary salt intake may cause excessive iodine intakes in the Iraqi Kurdish community

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Kurdish school-children in northern Iraq get most of their daily iodine from iodized salt.

Iodized salt is the main way of achieving iodine sufficiency in many countries. A recent dietary survey in the Kurdish area of northern Iraq has demonstrated that the population is more than sufficient in iodine due to their use of salt in food preparation.

The study, led by researchers at the University of Nottingham (UK) interviewed 410 healthy individuals (aged between 6 and >60 yrs) from 115 families about their diet in spring 2017. They also analyzed the iodine content of drinking water, salt, and a wide range of local foods to calculate dietary iodine intakes.

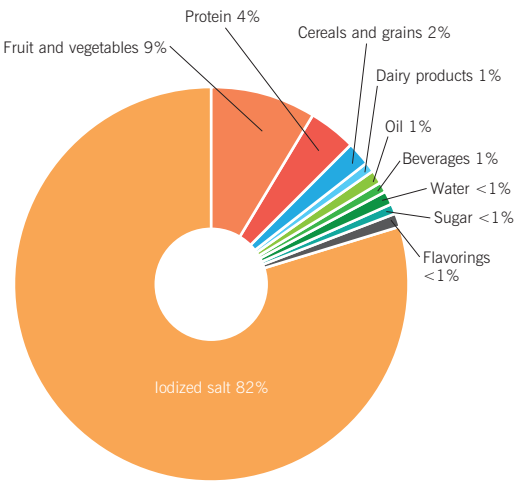
The typical diet was rich in fresh fruits and vegetables, cereals and grains but low in dairy products and seafood. Meals are home-cooked with little processed food available. The estimated daily intake of iodine supplied by food and drinking water was 119 µg when intake of iodized salt was excluded. The daily intake of salt estimated from the dietary questionnaires was 13.8 g, considerably higher than the World Health Organization recommended intake of 5 g per day (or <2000 mg of sodium per day) (1). When consumption of iodized salt was considered, the daily iodine intake was calculated as 668 µg –considerably greater than the WHO recommended daily allowance of 150 µg (1). Iodized salt, therefore, appears to supply 82% of total dietary iodine intake for this population (Figure 1). In this region, iodized salt is mainly imported from Turkey and Iran. Iraq produces a small amount of salt by evaporation of saline water in the Kirkuk area, which is traditionally used in the south of the country.

Urinary iodine and sodium concentrations confirm the dietary questionnaire data

A significant correlation was observed between urinary iodine concentration (UIC) and urinary sodium for all participants, confirming that iodized salt intake is the main source of iodine in this population. Median UIC was 379 (range 58–1380) µg/L, reflecting excessive iodine intakes. Around 80–90% of participants had UIC values ≥100 µg/L and over 55% had UIC values ≥300 µg/L.

In 2017 (2), out of 177 countries with available data, 63% of countries had iodine intake classified as adequate, 11% had insufficient intake, and 6% had excessive intakes. There was no data on which to assess the iodine status of populations in 20 countries, including Iraq. The highest median UIC recorded was for Uganda at 464 µg/L. The median UIC recorded in the current study would place the Kurdish area of Iraq fourth in a list of countries ranked according to UIC after Uganda, Somalia, and Colombia.

FIGURE 1 Sources of iodine in the diet of the Iraqi Kurdish population. The estimated average intake of iodine was 668 µg/day.



References

1. World Health Organisation (2012). Guideline: sodium intake for adults and children. World Health Organization, Geneva.
2. Iodine Global Network. Global Scorecard of Iodine Nutrition in 2017 in the general population and in pregnant women (PW). IGN: Zurich, Switzerland. 2017

Sudan takes a milestone step toward the elimination of iodine deficiency

A report from the inauguration of the first salt iodization plant in Port-Sudan, Red Sea Province

On February 7, 2018 the Shafie factory for iodized salt production in Port-Sudan, the capital city of the Red Sea State, is ready to open its doors.

Engineers and workers are awaiting the arrival of the President and Ministers to officially inaugurate the new plant.

On February 7, Sudan was one step closer toward achieving >90% national coverage of adequately iodized salt and eliminating the scourge of iodine deficiency disorders. The first salt iodization plant in Port-Sudan, Red Sea Province, was officially inaugurated by Sudanese President Omar al-Bashir. The launch, attended by senior Cabinet officials and international agency partners, is the culmination of over a decade of concerted efforts to bring adequately iodized salt to the population of Sudan.

Sudan has a history of poor iodine nutrition and unsuccessful attempts to iodize the country's salt supply. The most recent household survey (MICS), completed in 2014, found that only about 8% of households were using adequately iodized salt. Political instability was an important factor that prevented commitment and progress. In 2015, Sudan established the National Committee for Salt Iodization, which set 2019 as the final date to eliminate the use of non-iodized salt in Sudan.

"Establishment of this factory achieves the objectives for which the national committee was formed," said Dr. Abdou Daoud Suliman, Sudan's State Minister for Industry and Head of the National Committee for Salt Iodization.

Shafie Factory for Iodized Salt Production, established by Sudan's Etaam Foundation, will have a production capacity of 10 metric tons (MT) per hour, which is sufficient to cover almost 40% of Sudan's expected consumption of iodized salt. The reason for its location is that almost all of Sudan's salt is produced along the Red Sea coast, traditionally through solar evaporation of brine.

Shafie is the first out of three production facilities planned in the region. Ali Osman Mohamed Taha, former Sudanese first Vice-President and Chairman of the Board of Directors of Etaam Foundation, said that an additional production line is already in preparation. Eventually, the goal is also to export iodized salt, as "there is need for iodized salt in the neighboring region."

The Iodine Global Network was represented in Port-Sudan by Dr. Izzeldin Hussein, IGN Regional Coordinator for MENA, who was proud to congratulate Sudan on this milestone step, which took many years and a great deal of commitment to bring about.

"It is a hard-won achievement for the people of Sudan, who are now on track toward achieving universal coverage of adequately iodized salt, and eliminating intellectual impairment caused by iodine deficiency," he said.

Together with international partners, the IGN contributed to the ongoing advocacy efforts, and in 2016 extended financial and technical support to Sudanese salt producers and investors to enable transfer of high-capacity iodization technology between the Spanish salt manufacturer Serra and the Sudanese Government and industry. As the next step, the IGN will work with partners to establish quality control and monitoring systems and provide training on salt iodization techniques, equipment maintenance, and quality and inventory management.

"We take this opportunity to reiterate the IGN's commitment to helping Sudan reach the goal of USI, as we continue to provide technical and implementation support," added Dr. Hussein.

The President of Sudan Omar al-Bashir opens the country's first iodized salt plant in Port-Sudan. It comes as a culmination of more than 12 years of efforts to promote iodized salt to improve iodine nutrition in Sudan.

The President inspects the first lot of adequately iodized salt produced at the Shafie plant. It will soon produce 10 MT of iodized salt per hour and help to improve the population's iodine status.

Dr. Izzeldin Hussein holds a handful of adequately iodized salt produced at the Shafie plant. The IGN provided technical assistance and enabled the procurement of salt iodization machines from Spanish salt producer, Serra.

Philippines implements a new plan to eliminate non-iodized salt

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The Philippines is a country of more than 7000 islands, of which around 2000 are inhabited. Its complex history, marked by successive waves of migration and colonization, has given rise to multiple ethnicities and dialects, while its geography has influenced the creation of one of the most decentralized government systems in Asia. Since achieving independence in 1946, the nation has faced successive decades of political instability, followed by a period of sustained economic growth since 2010. The Philippine population is the 12th-largest in the world and the seventh-largest in Asia at an estimated 106 million. The country is also thought to have entered its "demographic window," with 70% of its population being of working age and a median age of 23.4 years (1).

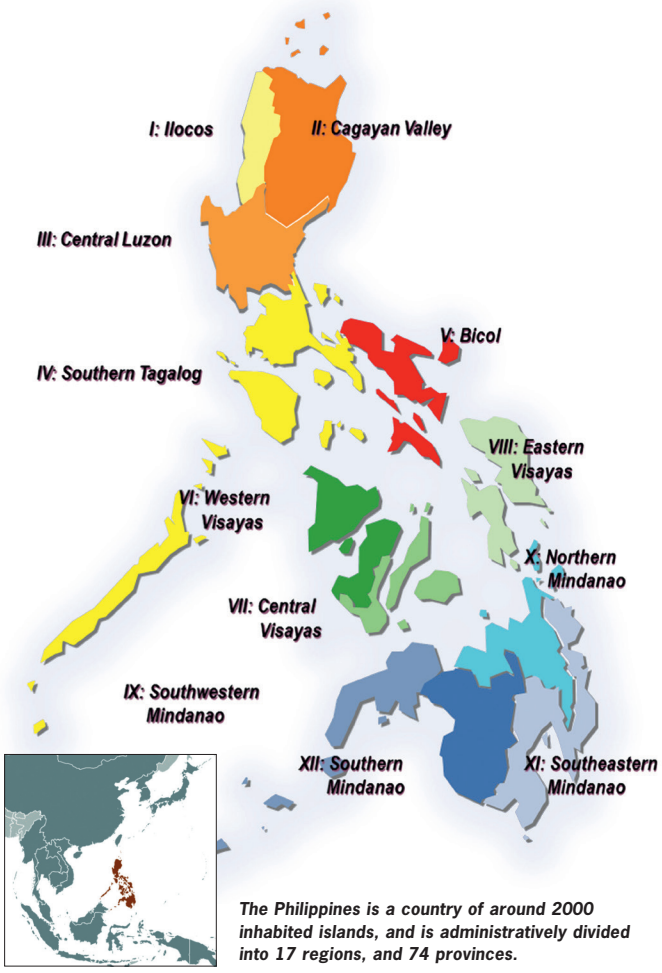
"ASIN" means salt

To tackle increasing rates of goiter, in 1995 the government passed the Act for Salt Iodization Nationwide known as the ASIN law ('Asin' meaning salt in Filipino). The law requires the iodization of all salt for human and animal consumption, including salt used in food processing. According to the Implementing Rules and Regulations of the ASIN law, food processors can be exempted from this requirement if they can demonstrate that iodized salt has an adverse effect on their food products (2). However, a claim with supporting evidence must be approved by the Food and Drug Administration, and no claims have been submitted to date. The ASIN law is implemented through the National Salt Iodization Program (NSIP).

In 2010, the National Nutrition Council (NNC) began to actively coordinate the USI program and formed a multi-sectoral Technical Working Group (TWG). The TWG coordinates implementation of the National Salt Iodization Strategic Plan, which operates in five-year cycles (2011-2016 and 2017-2022). Targets of the 2011-2016 Plan were for >90% of households to consume adequately iodized salt, and for median urinary iodine levels of school-age children (SAC), and pregnant and lactating women to be in the adequate range. These targets have been only partially met.

Is the country iodine sufficient?

The first National Nutrition Survey (NNS) completed after the adoption of the ASIN law showed that SAC were mildly iodine deficient, with a median urinary iodine concentration (MUIC) of 71 µg/L. Successive surveys at five-year intervals in 2003, 2008 and 2013, painted a more optimistic picture for SAC, showing that iodine deficiency was no longer a public health issue at the national level (Figure 1). Data at the sub-national level has revealed discrepancies in iodine nutrition across the country's 17 regions, reflecting their socioeconomic and geographic diversity. However, between 2008 and 2013, the iodine intakes among SAC have improved such that only one region is still thought to be iodine deficient compared to 5 regions in 2008. The 2013 NNS indicates that the median UIC is insufficient (<100 µg/L) in only 11 of the 74 provinces.



The Philippines is a country of around 2000 inhabited islands, and is administratively divided into 17 regions, and 74 provinces.

FIGURE 1 Trends in iodine nutrition in 1998-2013. Median urinary iodine concentration (UIC) in Filipino school-age children (SAC), and lactating and pregnant women according to the National Nutrition Surveys.
Horizontal lines indicate adequate nutrition in SAC and lactating women (solid line), and pregnant women (dashed line).

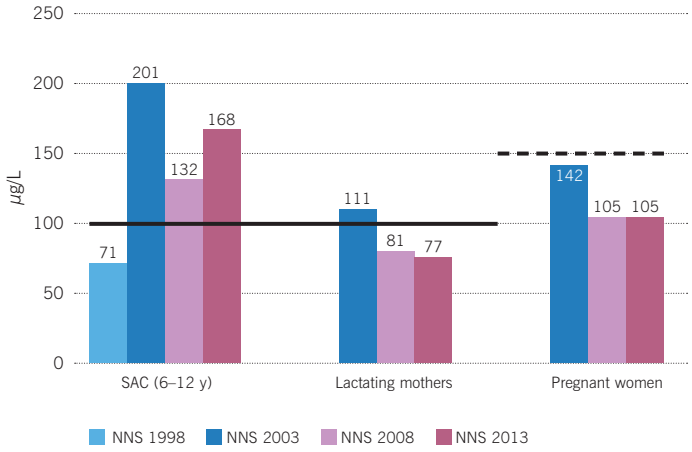
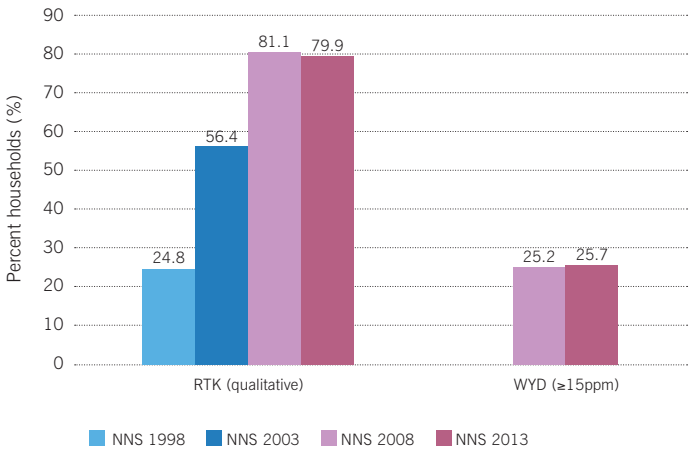


FIGURE 2 Trends in household coverage with iodized salt in 1998-2013.
RTK, rapid test kit (qualitative measurement); WYD, WYD Iodine Checker (quantitative measurement).



Although the iodine status of SAC is used as a proxy for the general population, it is increasingly recognized that it may not represent population groups whose iodine requirements differ, such as pregnant women. This is evident in the Philippines, where iodine intakes among lactating and pregnant women are inadequate and appear to be decreasing despite the optimal intakes in SAC (Figure 1). This problem appears to be widespread with all 17 regions reporting iodine deficiency among lactating women, and 16 regions among pregnant women (3).

Poor correlation with household availability of iodized salt

Although the salt industry in the Philippines is centralized, with 4 national firms owning 24 facilities importing/processing 80% of the national supply of household salt, national surveys have consistently found that access to adequately iodized salt has been poor. In 2013, household use of iodized salt was estimated at around 80% based on rapid test kits (RTKs), but only 25.7% based on the quantitative WYD Iodine Checker (Figure 2). RTK is a qualitative method which can confirm the presence or absence of iodine in salt but cannot accurately measure its concentration. According to the WYD, the median iodine concentration in salt in 2008 and 2013 was only 5.3 and 5.6 ppm, respectively. Additionally, in 2013 no single region had salt iodine levels above the international standard of ≥15 ppm. Only Malaysia, Vanuatu, Tuvalu, and DPRK have lower coverage of adequately iodized salt in the East Asia and Pacific Region, and none of these four countries has a mandatory salt iodization law. This lack of improvement in iodized salt coverage has occurred despite significant action by the TWG and the support of the UNICEF-GAIN USI Partnership Project between 2008 and 2013.

A closer look at the sub-national data collected as part of the NNS 2013 additionally has revealed that salt iodine levels were higher in wealthier households, in urban areas, in salt purchased from supermarkets and grocery stores, and in pre-packaged and labeled salt. A regression analysis identified that market source was the most significant predictor of iodine levels in household salt. It also identified lower price as one of the reasons why non-iodized salt may be more popular than iodized. These results are concerning, as they suggest that poorer households in rural areas may be disproportionately at risk of IDD.

Voices of dissent from food processors

In the Philippines, an estimated 40% of salt is consumed through processed foods rather than directly as table/kitchen salt (4). The 2008 NNS reported that at least five food products consumed by the highest percentage of households were processed. These were bread, soy sauce, instant noodles, crackers, and canned sardines (2). The trend in the sales of packaged food (such as dried processed food, canned/preserved food, dairy, bakery, frozen processed food, noodles) is increasing. A recent survey of food processors showed that 11 large food producers, collectively responsible for the production of 13 brands of the targeted products, were aware of the ASIN law, and

used iodized salt in their production lines for at least some of the most consumed products (2, 5).

Key role of political commitment

National program management, coordination, and collaboration are reported by all stakeholders to be significantly improved as a result of the TWG. Through the Strategic Plan and regular meetings to review progress and discuss future activities, the TWG has served to support the implementation of the NSIP, improved program coordination, and has created a forum for multi-sectoral collaboration including between the private and public sectors. However, some key TWG stakeholders have not fulfilled their responsibility, notably the Food and Drug Administration, whose role is to enforce standards for iodized salt and monitor compliance. Overall, it seems that what is a comprehensive and well-considered national strategy is being constrained by poor implementation of one of its key components: regulatory monitoring and enforcement of industry compliance with the national salt standards.

Regional taskforces (Bantay Asin)

In recent years, greater attention has been given to sub-national implementation, in light of the implementation impasse at the national level. A primary activity has been the creation of the regional/provincial Bantay Asin Task Forces (BATF or salt watchdogs) to implement the NSIP. BATFs currently operate in 14 of the 17 regions, but the success of each task force relies largely on the motivation and commitment of key individuals, including regional FDA offices, as sector guidance and instruction is not available from the central level.

In view of constraints in implementation of the 'main strategy' of the NSIP, stakeholders of the TWG have identified innovative complementary initiatives such as working with a major supermarket chain to demand only adequately iodized salt and advocating with a group of municipal mayors to implement a 1,000-day package of interventions for child health and nutrition, including salt iodization. Goiter Awareness Week is observed in January each year and is an opportunity to run local awareness campaigns and promotional activities.

A workshop to review the NSIP Strategic Plan was held on 28-29 November, 2017 in Manila under the auspices of the National Nutrition Council of the Department of Health, with representatives from the salt industry, UNICEF, and the IGN.

Revising the Strategic Plan

A workshop to review the NSIP Strategic Plan before the 2018-2022 cycle is implemented was held on 28-29 November 2017 in Manila under the auspices of the National Nutrition Council of the Department of Health, with representatives from the salt industry, UNICEF, and the Iodine Global Network.

Based on the status quo, it was suggested that the goal of the Strategic Plan should be changed from "Elimination of IDD in the Philippines" to "Achieving universal salt iodization (USI)" to shift the focus toward enforcing and sustaining salt iodization and closing the gap between iodine intakes and access to adequately iodized salt. A new target was suggested: to increase the percentage of households using adequately iodized salt from 25.7% to 50% by 2022. At the same time, it was agreed that there may be a need to provide iodized oil capsules to pregnant and lactating women to mitigate their greater risk of IDD.

The workshop re-emphasized that more effort is necessary to support the ASIN law enforcement at the local and regional levels. Local government units (LGUs), which exist in all provinces, cities, and municipalities, are responsible for issuing local ordinances, monitoring the presence of iodine in all local salt, maintaining a list of salt producers, importers, and distributors, and allocating budget for implementation of the ASIN law. The review meeting proposed to focus on raising the awareness among the LGUs of their responsibilities and helping increase their enforcement capacity.

The workshop proposed to develop implementation tools which are lacking (e.g., guidelines, provision of WYD kits and reagents, monitoring checklist) to help local salt producers and food processors improve their compliance.

To support these activities, the workshop devised a communication plan targeting local implementers and producers to raise awareness of the benefits of iodized salt to population health, and help dispel myths about iodized salt (i.e., that it affects sensory or physical properties of foods or that iodization is not compatible with sodium reduction efforts), which together with strengthened enforcement may help lower the barriers to achieving adequate levels of salt iodization.

References

1. Oxford Business Group. 2018. The Philippines boasts a unique and diverse geography. https://oxfordbusinessgroup.com/overview/island-nation-unique-geography-has-bred-diverse-culture-and-history
2. Survey of Food Processors Utilizing Iodized Salt. 2015. Prepared by Nutrition Center of the Philippines for the Global Alliance for Improved Nutrition Philippines.
3. Perlas LA et al. 2015. 8th National Nutrition Survey, Philippines 2013: Iodine Deficiency Disorder (IDD) in the Philippines: UIE levels, Food and Nutrition Research Institute, Department of Science and Technology.
4. Food and Nutrition Research Institute-Department of Science and Technology (FNRI-DOST). 2010. Philippine Nutrition Facts and Figures, 2008.
5. Knowles J et al. Iodine Intake through Processed Food: Case Studies from Egypt, Indonesia, the Philippines, the Russian Federation and Ukraine, 2010–2015. Nutrients. 2017 Jul 26;9(8):797.

Mild to moderate iodine deficiency affects women's ability to become pregnant

Excerpted from: Mills JL et al. Delayed conception in women with low-urinary iodine concentrations: a population-based prospective cohort study. Human Reproduction 2018, Jan 11.

Insufficient iodine intakes among women who are pregnant or planning a pregnancy are a public health problem in many countries, even where school-age children are iodine sufficient. A study was conducted to determine whether a low urinary iodine concentration (UIC) in women attempting to become pregnant is associated with delayed conception.

Study design

A prospective cohort study enrolled 501 couples from 16 counties in Michigan and Texas, U.S., shortly after they discontinued using contraception and were planning a pregnancy (1). The subjects kept a daily record to track lifestyle, sexual activity, menstruation, and pregnancy test results. Women used the Clearblue Easy™ Fertility Monitor to help ensure that intercourse coincided with ovulation. Pregnancies were identified promptly by the Clearblue Easy™digital home pregnancy test (2). Pregnancy was defined as a positive hCG test on the day menstruation was expected. Spot urine samples used for iodine and creatinine determinations were collected at the time of enrollment.

Four hundred and sixty-seven women provided sufficient urine samples for analysis. Over the 12-month course of the study, 332 (71%) women became pregnant, 47 (10%) did not become pregnant, and 88 (19%) withdrew or were lost to follow-up. Women who became pregnant were younger, more likely to have college education or above, and a higher income than women who did not become pregnant. There was no difference in the UIC or risk factors for delayed conception between women who dropped out and those who completed the study.

Low urinary iodine levels delay time to pregnancy

The median urinary iodine concentration (IQR) was 112.8 μg/L (53.6, 216.9), in the sufficient range. UICs in the moderately (<50 μg/L) or severely (<20 μg/L) deficient range were more common in the women who did not become pregnant (29.8%) compared with the women who became pregnant (21.4%), but this difference did not reach statistical significance (p = 0.23).

Photo by: Madilyn Peiper via Flickr, CC BY NC ND 2.0

Women who were iodine deficient took significantly longer to become pregnant than iodine sufficient women.

Conversely, women who had urinary iodine concentrations in the moderately or severely deficient range took significantly longer to become pregnant, experiencing a 46% decrease in the probability of becoming pregnant over each menstrual cycle compared with the iodine sufficient group. This delay in time to pregnancy raises serious concerns.

Despite a lack of studies of iodine deficiency and its effect on the ability to conceive in humans, insufficient iodine is well known to cause hypothyroidism, and there is evidence for a number of mechanisms by which hypothyroidism could cause infertility. Low thyroid hormone concentrations are associated with thyrotropin-releasing hormone (TRH) elevation that stimulates prolactin, which in turn interferes with GnRH pulsatility, required for normal reproductive function (3, 4). They also cause decreased production of sex steroids by granulosa cells and alterations in androgen and estrogen concentrations (4, 5).

Conclusions

This study offers guidance for establishing target iodine concentrations in women of childbearing age. The demand for iodine increases substantially during pregnancy, which is reflected in a higher UIC threshold for iodine sufficiency (150 μg/L instead of 100 μg/L in non-pregnant populations). Therefore, it is reasonable to assume that a median UIC of at least 100 μg/L is desirable in women of childbearing age who may become pregnant. Further studies should determine whether iodine deficiency might be added to a list of considerations when evaluating women who are struggling to conceive. Countries where iodine deficiency is common should evaluate the need for programs to increase iodine intake for women of childbearing age and pregnant women.

References

1. Buck Louis GM et al. Designing prospective cohort studies for assessing reproductive and developmental toxicity during sensitive windows of human reproduction and development—the LIFE Study. Paediatr Perinat Epidemiol 2011;25: 413–424.
2. Behre HM et al. Prediction of ovulation by urinary hormone measurements with the home use ClearPlan Fertility Monitor: comparison with transvaginal ultrasound scans and serum hormone measurements. Hum Reprod 2000;15:2478–2482.
3. Poppe K et al. Thyroid disease and female reproduction. Clin Endocrinol (Oxf) 2007;66:309–321.
4. Chang A, Auchus R. Chapter 25: endocrine disturbances affecting reproduction. In: Strauss JF, Barbieri RL (eds). Yen and Jaffe's Reproductive Endocrinology, 7th edn. Philadelphia: Elsevier, 2014, 551–564.
5. Trokoudes KM et al. Infertility and thyroid disorders. Curr Opin Obstet Gynecol 2006;18:446–451.

Sustaining universal salt iodization in Egypt: program successes and challenges

Ibrahim M Ismail IGN National Coordinator for Egypt, **Izzeldin Hussein** IGN Regional Coordinator for Middle East & North Africa

The workshop was attended by all USI partners in Egypt, including representatives from MOHP, NNI, IDDSSE, Food Standards Organization/MOI, Ministry of Supply, as well as salt producers, and development partners (UNICEF, WHO, IGN).

The salt iodization program in Egypt began in 1996, and over the years has received support of a coalition of international and national stakeholders including WHO, UNICEF, IGN, and GAIN together with the IDD Scientific Secretariat of Egypt/ National Nutrition Institute (IDDSSE/ NNI) in collaboration with governmental bodies including Ministry of Health and Population (MOHP), MOI, and salt producers. National surveys show that Egypt has sustained adequate iodine nutrition in school-age children for over a decade, but as we are celebrating this achievement, there is a need for more political and technical support from all USI partners and stakeholders to overcome the inevitable challenges. Although momentum for nutrition is still strong among development partners and within the government, USI must remain center stage to ensure that the current coverage of adequately iodized salt is sustained and further improved.

USI sustainability workshop, 20–21 December 2017

To reinvigorate the USI program in Egypt, the Iodine Global Network held a two-day workshop on 20–21 December 2017 in Cairo, which brought together all key stakeholders (government, UN agencies, salt industry) with a goal to reaffirm their commitment, and develop a workplan that will strengthen and reposition IDD elimination as a top public health priority in Egypt. More than 100 attendees were invited to participate, including representatives from MOHP, NNI, IDDSSE, Food Standards Organization/MOI, Ministry of Supply, as well as salt producers, and development partners (UNICEF, WHO, IGN).

The main challenges facing the USI program in Egypt, identified in workshop discussions, were as follows:

- Egypt has a large number of salt producers and repackagers (more than 100), and many of these are informal (unlicensed) enterprises, which means they are not regulated and could threaten USI.
- QA/QC procedures are not implemented by small- and intermediate-size salt producers, which leads to inadequate iodine levels in salt. As a result, nationally about a quarter of household salt is inadequately iodized (i.e., at >5 but <30 ppm), as reported in a recent national survey of iodine nutrition 2014–15 and EDHS 2014.
- As new salt production areas continue to emerge in Egypt, new producers require strict regulation and monitoring by MOHP and MOI to ensure they are licensed and become a part of the national USI program. In addition to education and social marketing efforts, the government should conduct periodic inspections of the market to confiscate illegal salt.
- According to a recent national survey (2014-2015) less than 30% of the population was aware of the existence of the USI program and the importance of adequate iodine nutrition. This lack of awareness, especially in rural areas, is very dangerous to the sustainability of the program. Strong social marketing and education campaigns are needed to increase the population knowledge about how to use iodized salt, preferably combined with the new campaign to reduce salt in foods, as recommended by WHO.
- Education campaigns should also focus on primary health care units to make sure adequate information (and if needed, supplementation) is offered to pregnant women.
- More than 7.5% of households in Egypt (or around 10 million Egyptians, according to the 2017 population census) are using salt that is not iodized at all. Strong efforts are needed from all partners to

identify new channels to reach the entire Egyptian population with iodized salt, especially the rural areas and the poorest strata.

- Salt producing companies currently face strict legal consequences if they fail to meet the salt iodization standard of 30–70 ppm, including a prison sentence and a financial penalty of 10,000 £E. The representatives of the salt industry would welcome a modification of this regulation, so that falling just below the standard (>20 to 30 ppm) would be punishable by fine only.

Concluding the discussion, the participants agreed that to achieve the USI goals, there is an urgent need for a plan of action that will offer concrete solutions and steps to tackle these challenges.

All partners, including the IGN, agreed to continue their support of the USI program in Egypt and endorse the Plan of Action for 2018–19, which will be developed by IDDSSE, in collaboration with different stakeholders. The workshop identified the following key goals of the plan:

- Ensure the implementation of QA/QC procedures by all salt producers and repackagers.
- Maintain mandatory USI legislation and enforce the salt iodization standards.
- Continue the provision of free potassium iodate to salt producers.
- Conduct research to identify all areas with low household coverage of iodized salt and adequately iodized salt.
- Develop a training program to build capacity of the food inspectors and laboratory technicians.
- Implement a strong social awareness campaign targeting young people and families to improve their understanding of the benefits of using iodized salt whilst trying to reduce overall salt intake.

Dr Izzeldin Hussein, IGN Regional Coordinator for Middle East & North Africa, coordinated the efforts to bring together USI partners in Egypt to revitalize the program.

Dr Izzeldin Hussein with Dr. Ibrahim M Ismail, IGN National Coordinator for Egypt, at the workshop in Cairo on 21-22 December 2017.

Follow-up

Using the considerable momentum generated by the workshop, Dr. Izzeldin Hussein, IGN Regional Coordinator for MENA and Dr. Ibrahim Ismail, IGN National Coordinator for Egypt, will work closely with all USI stakeholders, including MOHP and NNI leaders, salt producers, WHO, and UNICEF, in coordination with IDDSSE, to discuss the next steps, and the role of the IGN as we continue to support Egypt's efforts toward optimal iodine nutrition and USI.

Sustaining IDD elimination in Bolivia through better monitoring of iodized salt

Ana Maria Higa Yamashiro IGN Regional Coordinator for South America and **Yecid Humacayo, MD** Head of Food and Nutrition Unit, MOH, Bolivia.

Bolivia is one of only two landlocked countries in South America with a population of 11 million. Tall mountains, highlands and hills predominate in its varied landscape, and the resulting lack of iodine in the soil puts the country's population at permanent risk of iodine deficiency disorders (IDD). Like Peru and Ecuador, Bolivia developed a successful salt iodization strategy and became one of the first countries to achieve the goal of optimal iodine nutrition before 2000. This success has been sustained until the present day.

On December 6, 2017, an advocacy meeting was convened in Cochabamba under the auspices of the Bolivian Ministry of Health. Supported by the Iodine Global Network, the meeting brought together the sectoral heads from regions with the lowest iodine intakes to review their achievements and renew engagement in IDD prevention efforts in their regions.

Sustaining optimal iodine intakes

The Food and Nutrition Unit of the Ministry of Health guides all activities related to achieving and sustaining optimal iodine intakes, and eliminating the risk of IDD. However, as in many countries in the Region and worldwide, the focus has drifted away from IDD toward other emerging public health concerns including nutritional anemia control, and the parallel threats of undernutrition and obesity. The reason is not so much a dwindling interest in IDD as a common perception that iodine deficiency is no longer a public health problem. In Bolivia's last nationally-representative survey of iodine status in school-age children, optimal iodine nutrition was confirmed, with a median urinary iodine concentration (MUIC) of 192 µg/L at the national level, and median UICs in the adequate range (≥100 µg/L) across all nine departments (1).

To assess the iodine status among pregnant women, a survey was conducted recently with support of UNICEF in partnership with Action Against Hunger. At the request of the MOH, the study included all nine departmental capitals and the city of El Alto. The national MUIC is in the optimal range for pregnant women (261 µg/L), but there are sub-national disparities reflected in a median UIC ranging from 130 µg/L to 360 µg/L (Figure 1). The highest consumption of poorly-iodized salt was reported in the city of Cobija, which also reported the lowest median UIC in pregnant women. This suggests that mild iodine deficiency may be present in some parts of the country, and to prevent it, salt iodization needs to be monitored more closely.

Modern technology to strengthen implementation

Bolivia has one of the longest-standing mandatory salt iodization laws, passed in 1968, but it did not come fully into effect until the 1980s, the same decade which saw the initiation of national IDD programs across the Region. The production of iodized salt remains concentrated in four departments: Oruro, Potosí, Cochabamba and La Paz in El Alto. However, traditionally the majority of salt producers were artisanal or small using low-grade iodization technology, which was a distinct disadvantage. According to a report presented at the Regional Meeting in Lima in 2004, of the 42 plants producing iodized salt 28 were artisanal, and the rest were using technology

FIGURE 1 Median urinary iodine concentration (MUIC) in pregnant women in 10 Bolivian cities reflects mostly optimal (MUIC ≥150 µg/L) iodine intakes.
Source: Bolivia MOH/UNICEF 2016

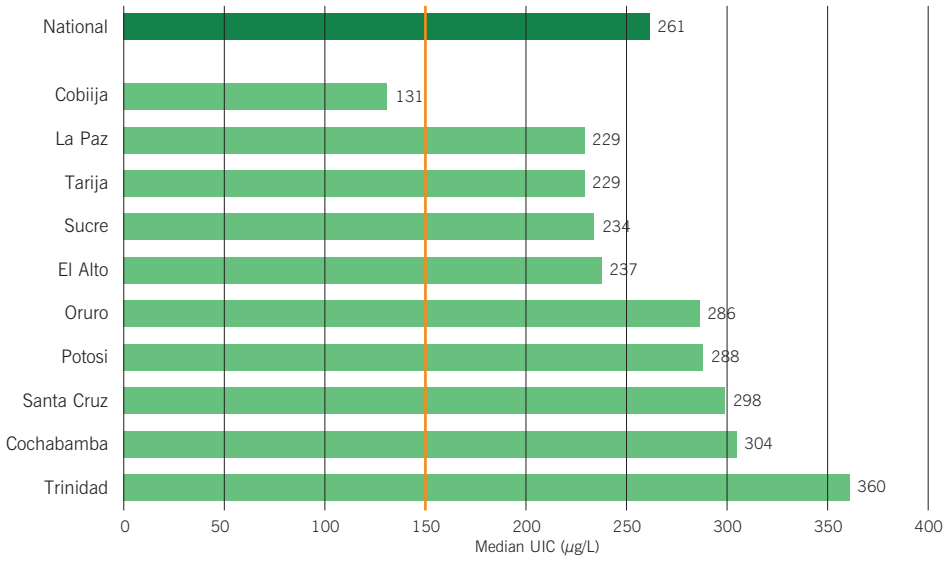
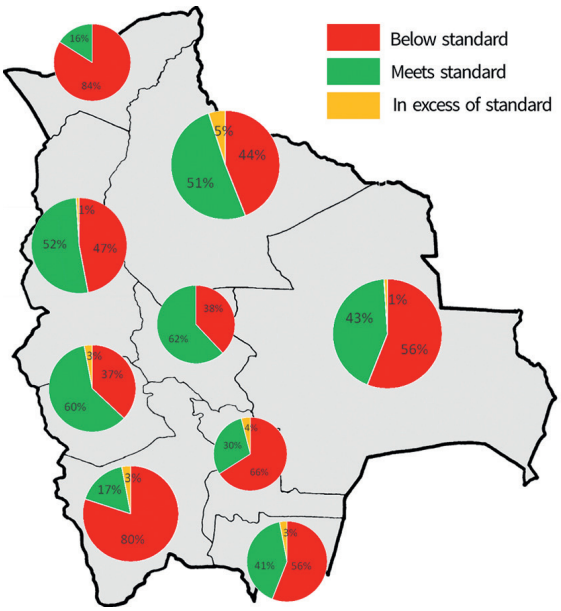


FIGURE 2 **Proportion of salt samples meeting the salt iodization standards in 2017 by department**



with low iodization capacity. Correcting this situation through consolidation efforts has been a challenge, but with continued technical assistance of UNICEF and the Global Network for Sustainable Elimination of Iodine Deficiency (later amalgamated into IGN together with ICCIDD), consolidation has been achieved and successfully maintained. However, given the inherent difficulties and the reported sub-national discrepancies in coverage of adequately iodized salt, it is important to strengthen monitoring of the iodization process.

A department within the Ministry of Health responsible for food control and monitoring has designed a computerized system for fortified foods SICCAF (sistema informático de control de calidad para alimentos fortificados), which connects analytical laboratories with the Department of Health and allows them to share and manage data in a systematic manner. This system is currently in the process of being implemented.

In addition, 2017 saw some improvement in levels of compliance with the salt iodization standards compared with previous years, based on an analysis of salt samples at production plants and at the market (Figures 2 and 3).

Workshop summary and recommendations

- Departmental and local nutrition coordinators agree that activities promoting and disseminating information about the importance of using iodized salt should be re-initiated at all administrative levels. Education, communication and information (ECI) activities were an integral component of the IDD elimination strategy in the past, and efforts were made over the recent years to bring them back. In particular it is important to reiterate the consequences of iodine deficiency on the developing brain rather than focus on the visible symptom that is goiter.
- It is increasingly important to collaborate with the non-communicable diseases control program to ensure that the messages promoting salt reduction and salt iodization are aligned and compatible, and reflect the complementarity of these two strategies in public health.
- Monitoring of the salt iodization process should be improved at production sites to raise the quality of iodized salt before it enters the market.
- International collaborations and partnerships should be established to conduct joint studies and generate better and broader evidence to reach policy decision-makers and keep the goal of sustaining optimal iodine nutrition high on the public health agenda.
- The National Director of the Nutrition Program offered to strengthen the support to the departments to maintain the promotion and surveillance activities at the local level.

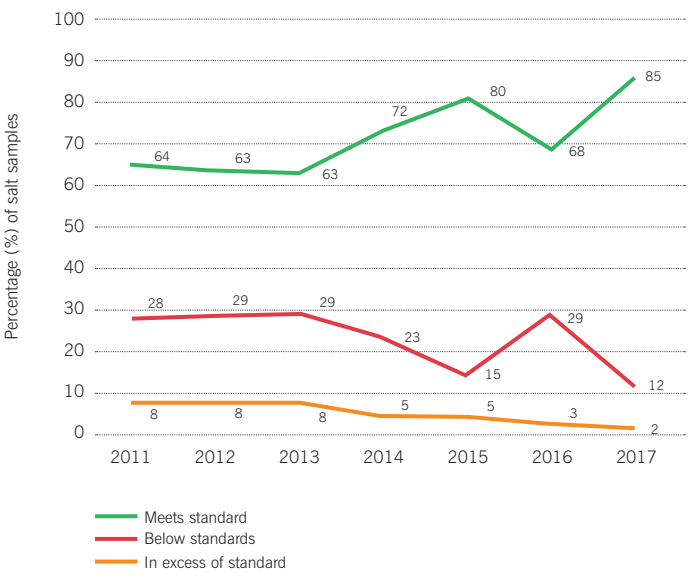
Conclusions

Although Bolivia, like other countries in South America, has reached the goal of optimal iodine intakes, ongoing advocacy must continue across the Region to periodically renew the political commitment to sustaining this achievement, and to make sure iodine does not disappear from the public health agenda. To support this, additional surveillance and monitoring in remote areas where IDD may persist would be particularly beneficial.

References

1. Pretell, EA. 2006. Assessment National IDD control program, Evaluacion del estado actual del programa de control de la deficiencia de yodo en Bolivia, Marzo 20-25, 2006, Informe de Consultoria EA Pretell, ICCIDD, UNICEF.
2. Ministerio de Salud. 2016. Estudio: Deficiencia en Yodo en Mujeres Gestantes - 10 ciudades de 9 departamentos de Bolivia. Serie: documentos de investigación. Ministerio de Salud: La Paz, Bolivia.

FIGURE 3 **Proportion of salt samples meeting the salt iodization standard in the years 2011–2017**



Production of Cambodian salty condiments with iodized salt

Karen Codling IGN Regional Coordinator for South-East Asia & The Pacific, **Un Roeurn** Consultant, Iodine Global Network and UNICEF Cambodia, **Samoeurn Un** Nutrition Specialist, UNICEF Cambodia

Universal salt iodization was defined as long ago as 1994 as iodization of "all salt for human and animal consumption, including salt for food processing" (1). The importance of iodizing salt used for food processing was reinforced by WHO guidelines on salt fortification issued in 2014 (2). Most countries with mandatory legislation for salt iodization do include salt for processed food in the scope of their legislation: 96 out of 109 (3). However, programs have tended to focus on ensuring only the iodization of household salt, and only household coverage is monitored in most national salt iodization programs. This is despite the fact that salt from processed foods contributes significantly and increasingly to salt intake in most countries.

Mr. Hong Tong, Manager of Thai Hong Keat factory, Phnom Penh

Use of iodized salt in processed foods appears to be particularly important in the South-East Asia region, where use of salty condiments, such as soya sauce, fish sauce, seasoning powder and fermented fish, in place of table or cooking salt, appears to be particularly prevalent. A small survey in Hanoi, Viet Nam in 2010, found that household salt contributed only 6% to total sodium intake; 75% of dietary sodium came from condiments such as seasoning powder, fish sauce, and monosodium glutamate (4).

Out of the 13 countries with mandatory salt iodization legislation in South-East Asia and the Pacific[1], all require the iodization of salt used in processed foods (3). Compliance with this requirement is mixed however, in particular with regards to the above-mentioned salty condiments:

A brand of Cambodian fish sauce, made with iodized salt

- **In China,** soya sauce producers report that they do not use iodized salt (5).
- **In Thailand,** legislation allows fish, soya sauce, and salty brine producers to either use iodized salt or iodize their products directly with potassium iodate. Reportedly all have chosen the latter option because of concerns about organoleptic changes to their products and to avoid the higher cost of iodized salt (6).
- **In Laos,** most fish sauce is imported from neighboring countries. Local producers reportedly don't use iodized salt (7).
- **In Viet Nam,** where the salt iodization program has recently re-started, fish sauce producers are objecting to the requirement to use iodized salt because of fears of organoleptic changes (8).

Cambodia seems to be an exception. In 2003, the Royal Government of Cambodia passed Sub-Decree No 69 on the Management of Iodized Salt Exploitation. *Prakas*[2] No 30 of the National Council for Nutrition, which provides guidelines for implementation of the Sub-Decree, indicates that "All people, Restaurants, Industries, Enterprises, Handicrafts, Hospitals and all places in the Royal of Cambodia shall use iodized salt for preparing foods for eating." Thus, all fish and soya sauce produced in Cambodia is required to be made with iodized salt.

Anecdotal reports indicate that "Before the sub-decree on the management of iodized salt, exploitation was in place, there were many complaints of changes in color when using iodized salt for fish sauce production, but there was no evidence. Since the sub-decree was issued and came into effect, there were no problems reported for fish sauce production using iodized salt." Following implementation of the Sub-Decree it was reported that all fish and soya sauce was made with iodized salt as non-iodized salt was not available (9). However, Cambodia's experience with the production of fish and soya sauce has never been officially documented. UNICEF Cambodia and IGN, therefore, collaborated to document Cambodia's experience in the production of fish and soya sauce with iodized salt in the period 2003-2010, when the salt iodization program was being fully implemented[3].

A survey of condiment producers

A national consultant visited the 30 largest fish and soya sauce producers in late 2017. He collected information on their production amounts and practices and the kind of salt used in the period 2003-2010. A key question was whether or not they had noticed any changes to their product when they switched to using iodized salt, and if so, what did they do about it. He also asked what they knew about the requirement to use iodized salt and whether government authorities ever came to monitor the type of salt they used. During the interviews it became clear that, while most fish sauce producers made their product by fermenting fish with salt, some used fish brine that is produced from the manufacture of *prahok*, a fermented fish paste which is also an important salty condiment in Cambodia. The consultant therefore also interviewed a selection of *prahok* producers, to collect the same information.

The information provided by the fish and soya sauce producers and *prahok* producers of Cambodia indicated that they **all used only iodized salt for all of their production for the whole period of 2003 to 2010.** Moreover, they all said they were still using iodized salt at the time of the interview. In order to try to double check this, we collected samples of salt used by the *prahok* producers; five of the six samples collected were iodized, although one had very low levels of iodine, and one had very high levels. Only one sample was not iodized at all. While the sample is small, it does support the information provided by the producers.

Wooden vats for production of fish sauce in a factory in Battambang province

The producers also advised that they had not experienced any changes to their products with the use of iodized salt, and the largest fish sauce producer said he felt that it is not possible to find fish or soya sauce made with non-iodized salt today in Cambodia. Their experience is supported by a study undertaken in Thailand. In the study, fish sauce was made by fermenting fish with salt for six months. One batch was made with iodized salt and another with non-iodized salt. The two fish sauces were subjected to blind taste tests by two panels of consumers. Fish sauce made with iodized salt received slightly higher acceptability scores for appearance, color, acceptability, and flavor. Iodine was also shown to be well retained, in particular if the fish sauce was made in the shade. The same study found similar, slightly higher acceptability scores and iodine retention for fermented fish (10). These results are in line with studies on use of iodized salt in other processed foods; no impacts to color or taste were found in a wide range of foods including processed meats, cheese, bread and cereals, potato products, canned goods, and several types of vegetable pickle (11).

Conclusions

Cambodia appears to be the only country in the region to have fully implemented the requirement to use iodized salt in the production of salty condiments, namely fish and soya sauce and fermented fish paste, to date. Their experience provides strong evidence that can support implementation of this important component of universal salt iodization programs in other countries in the region.

References

1. United Nations Children's Fund & World Health Organization. 1994. World Summit for Children-Mid-Decade Goal: Iodine Deficiency Disorders. Geneva: UNICEF-WHO Joint Committee on Health Policy.
2. World Health Organization. 2014. Guideline: fortification of food-grade salt with iodine for the prevention and control of iodine deficiency disorders. Geneva, Switzerland: WHO.
3. Global Fortification Data Exchange.2018. www.fortificationdata.org (Accessed 23 January 2018)
4. National Institute of Nutrition. Investigation of dietary sodium intake and sources in adults, aged 25-64 years. 2010.
5. China National Salt Industry Corporation, 2010
6. Dr. Sangsom Sinawat, IGN National Coordinator and Dr. Visith Chavasit, Food Technologist, Mahidol University
7. Intong Keomoungkhoune, ex UNICEF Nutrition Specialist, UNICEF Lao PDR
8. Do Hong Phuong, UNICEF Nutrition Specialist, UNICEF Viet Nam
9. Samoeurn, UNICEF Nutrition Specialist, UNICEF Cambodia
10. Chanthilath et al. Iodine stability and sensory quality of fermented fish and fish sauce produced with the use of iodated salt. Food and Nutrition Bulletin, vol. 30, no. 2; 2009
11. Blankenship et al. Effect of Iodized Salt on Organoleptic Properties of Processed Foods- A Systematic Review. (Submitted to Food Science and Technology)

[1] UNICEF's regional categorization; the South-East Asia and Pacific region includes 27 countries.
[2] A *prakas* is a ministerial or inter-ministerial decision signed by the relevant Minister(s).
[3] In 2010, UNICEF stopped funding potassium iodate for salt iodization. Data collectedin 2014-2016 demonstrated that the proportion of household salt iodized and adequately iodized had fallen significantly from the period prior to 2010. Therefore, the period for this study has been restricted to 2003-2010.

Preventing undernutrition must bring tangible results by 2022 in India

Dr. Chandrakant S Pandav IGN Regional Coordinator for South Asia

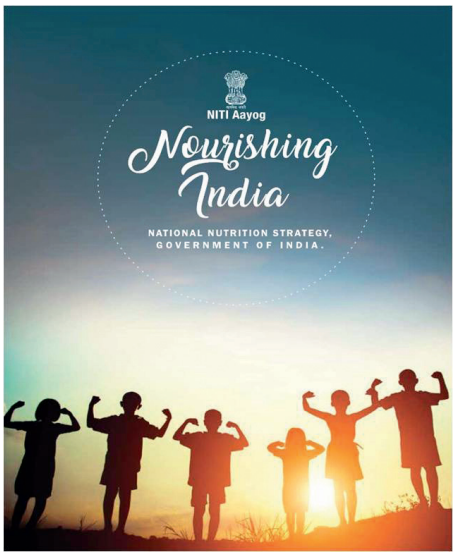
While reviewing the ongoing efforts to prevent and reduce undernutrition, India's Prime Minister Narendra Modi has told senior officials that visible and measurable results should be seen by 2022, the year of the 75th anniversary of India's independence.

The high level review meeting on November 24, 2017 was attended by officials from the Prime Minister's Office (PMO), National Institution for Transforming India (NITI) Aayog, and other Ministries. The PM stressed the need to work toward concrete objectives to reduce stunting, under-nutrition, low birthweight, and anemia.

One of the final items on the agenda was real-time monitoring of progress in nutrition outcomes, especially in the worst performing districts. A number of existing welfare and public health initiatives of the Union Government were found to be having a positive impact on nutrition in the country. In this context, the Prime Minister called for convergence among all schemes of Union and State Governments, which directly or indirectly affect nutrition outcomes, and he stressed the importance of raising social awareness through formal and informal channels.

Launch of the National Nutrition Strategy: Control of Micronutrient Deficiencies

On December 1, 2017 the Union Cabinet launched a three-year National Nutrition Mission (NNM). The NNM will provide a robust convergence mechanism to link health and welfare initiatives that affect nutrition in order to reduce the level of stunting, undernutrition, anemia, and low-birth weight. Its goals will be to:



In December, the Government of India launched a new national nutrition strategy, which puts nutrition center-stage on the national development agenda.

- Map and keep track of existing schemes that address or affect malnutrition
- Facilitate their convergence via a robust mechanism
- Provide an ICT-based Real Time Monitoring system
- Incentivize responsible Ministries/States/UTs to meet targets
- Incentivize Anganwadi Workers (AWWs) to use IT-based tools
- Conduct welfare checks
- Set up Nutrition Resource Centers to engage the public and create a mass social movement for nutrition.

The program will be phased in across all states over the initial three years and will benefit more than 100 million people.

National Nutrition Strategy: Control of micronutrient deficiencies

The Prime Minister's Office mandated NITI Aayog to examine the emerging data on undernutrition and prepare, in consultation with the Ministry of Women & Child Development and the MoH, a specific strategy to target poorly performing states/districts. This has brought nutrition center-stage on the national development agenda and provides the context within which the National Nutrition Strategy has been formulated.

Eliminating iodine deficiency with iodized salt

Interventions under the National Iodine Deficiency Disorders Control Program will be strengthened through the following activities:

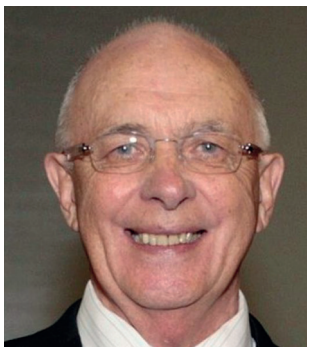
- Promotion of universal access to adequately iodized salt.
- Focus on reaching pregnant women, young children, and adolescent girls through food supplementation programs, such as Integrated Child Development Services (ICDS), Midday Meal (MDM), Rajiv Gandhi Scheme for Empowerment of Adolescent Girls–SABLA, and other vulnerable communities.
- Health and nutrition education.
- Community-based monitoring, especially through salt testing in schools, health centers, and Panchayats (village councils).

The program's aim will be to achieve the last mile to reach truly universal access to adequately iodized salt in 2018 and to reduce the prevalence of iodine deficiency disorders in the country to < 5% by 2022.

Sources: Press Trust of India (PTI), New Delhi, November 25, 2017

MEETINGS AND ANNOUNCEMENTS

Creswell Eastman named Officer of the Order of Australia



Professor Creswell Eastman, MD

Professor Creswell Eastman, a former long-serving member of the IGN Board of Directors and current National Coordinator for Australia, has been recognized in this year's **Australia Day Honors List as Officer of the Order of Australia (AO)** for his transformative work in iodine deficiency disorders in China.

This extremely well-deserved award recognizes a lifetime of leadership on iodine and efforts to help all children reach their full intellectual potential. Dubbed "the man who saved a million brains", Prof. Eastman is currently working with pregnant Indigenous women in Australia's Northern Territory who remain iodine deficient, which means that their unborn children may be at risk of lower I.Q. and poorer school performance.

"If we're ever going to close the gap we have to concentrate on the first 1,000 days of life," Prof. Eastman said. "Because that's when your brain develops, that's when most development occurs, and if you don't get it right, then you're not going to catch up later."

Prof. Eastman is the Clinical Professor of Medicine at Sydney University Medical School, Principal of the Sydney Thyroid Clinic and Consultant Emeritus to the Westmead Hospital.

A total of 895 Australians who have risen to the top of their fields in sports, science, performing arts and media have been recognized in 2018.

Burundi prepares for first national IDD survey

The Ministry of Health and the National Bureau of Statistics in Burundi are preparing to launch a new national IDD survey. Supported by the IGN and UNICEF Burundi, the survey will aim to determine the iodine status in women of reproductive age, and the household coverage of adequately iodized salt. The data will help to inform a review of Burundi's salt iodization program.

Field workers who will conduct the national survey in Burundi received training on data collection on February 9.

IGN Board meets in Geneva

The IGN Board of Directors held its annual meeting on 11–12 December 2017 in Geneva, Switzerland. The meeting was hosted with support from Global Alliance for Improved Nutrition (GAIN). Mr. Daniel Levac retired from the Board after serving as Treasurer, and recently as Secretary, for many successful years. Dr. Rafael Flores-Ayala was elected as the new Secretary.

IGN Board of Directors paid a visit to GAIN headquarters for a lunch & learn session on iodine deficiency and salt iodization.

Obituary: Gabriella Morreale de Escobar

Gabriella Morreale died on December 4, 2017. Born in Milan in 1930, she was one of the founders of modern Endocrinology in Spain and dedicated her effort to the study of the role of iodine and thyroid hormones in brain development.

In the 1970s she began the routine measurement of TSH and thyroid hormones in blood from the heel prick sample of newborns to prevent hypothyroidism and congenital cretinism. Later, she demonstrated the importance of maternal thyroid hormones in the development of the fetal brain, thus helping to define the iodine nutritional requirements of pregnant women. Her work has had a great impact on public health strategy in Spain and in other countries.

Dr Morreale trained many Spanish scientists in the field of thyroid gland physiology. She was a founding member of the European Thyroid Association, becoming its president in 1977–1978 and also president of the annual meeting in Madrid 1983. She received numerous awards from the ETA including the Lissitzky career award in 2009.

Gabriella Morreale was a great person and leader; she knew how to combine scientific rigor with her kindness and was very helpful to younger colleagues. Her scientific and personal legacy will always remain among us and will help the next generations of scientists.

JH Lazarus, UK, L Villa, Spain

Gabriella Morreale de Escobar (1930–2017)

ABSTRACTS

Endemic goiter and iodine deficiency status among Guinea-Bissau school-age children

The objective of this cross-sectional survey was to evaluate the current status of iodine nutrition in Guinea-Bissau (West Africa). Total goiter rate and median urinary iodine concentration (UIC) was determined in 6–14 year-old children (n=299) from four regions of Guinea-Bissau, across a coast–hinterland gradient: Bolama, Bissau, Cambaju-Bafatá, and Gabú. Goiter was found in 73.5% (CI 95%, 68.5–78.2%) of the school-age children, and the median UIC was 110 µg/L, with 7.3% of the population presenting UIC < 50 µg/L. Only 12.5% of household salt samples were iodized at ≥ 15 mg/kg. The median iodine concentration in well water was 11.7 µg/L. The discrepancy between the high goiter rates and a satisfactory median UIC warrants further studies, e.g. to identify potential goitrogens in the diet.

Carvalho AC et al. Eur J Clin Nutr. 2017 Dec 28 [Epub ahead of print]

Supplementation during pregnancy with small-quantity lipid-based nutrient supplements or multiple micronutrients, compared with iron and folic acid, increases women's urinary iodine concentration in semi-urban Ghana: A randomized controlled trial.

There is little information on whether prenatal multiple micronutrient (MMN) supplements containing iodine affect women's iodine status. The International Lipid-based Nutrient Supplements DYAD-Ghana trial aimed to assess urinary iodine concentration (UIC) during pregnancy. Women (n = 1,320) <20 weeks of gestation were randomized to consume 60 mg iron/400 µg folic acid per day (IFA); 18 vitamins and minerals including 250 µg iodine per day (MMN); or 20 g/day of small-quantity lipid-based nutrient supplements (LNS) with the same and additional 4 vitamins and minerals as the MMN. At 36 weeks of gestation, the geometric mean (95% CI) UIC of the MMN (161 [133, 184]) and LNS (158 [132, 185]) groups did not differ; both values were significantly greater (P = 0.004) than that of the IFA group (116 [101, 135]). The median UICs of the MMN and LNS groups were adequate, but insufficient in the IFA group. Only ca. a third of the women reportedly used iodized salt despite a national salt iodization program. Regular monitoring of the iodine status of pregnant women is needed to ensure the elimination of iodine deficiency in Ghana.

Adu-Afarwuah S et al. Matern Child Nutr. 2017 Dec 6 [Epub ahead of print]

Iodine-containing supplement use by pregnant women attending antenatal clinics in Western Australia

Iodine requirements increase during pregnancy and there is no research related to the uptake of these recommendations by pregnant women in Western Australia. In a cross-sectional study, the authors investigated the use of iodine-containing supplements in a sample of Western Australian pregnant women (n = 425) recruited at antenatal clinics in Perth during 2012–2013. In a questionnaire, 24% of pregnant women reported using iodine-containing supplements prior to pregnancy, and 66% during the previous two months. Age and maternal income were associated with supplement use prior to pregnancy only (respectively, P = 0.004 and P = 0.031) and first pregnancy was associated with use during pregnancy only (P = 0.006). Ethnicity was associated with the use of iodine supplements both in the year prior to pregnancy (P = 0.002) and during pregnancy (P < 0.001). Public health strategies are required to promote awareness of the importance of iodine and supplementation both before and during pregnancy.

Hine T et al. Aust N Z J Obstet Gynaecol. 2018 Feb 7 [Epub ahead of print]

Breast milk iodine concentration rather than maternal urinary iodine is a reliable indicator for monitoring iodine status of breastfed neonates

There is no scientific consensus on whether breast milk iodine concentration (BMIC) accurately reflects iodine status in lactating mothers and breastfed infants. This cross-sectional study aimed to compare BMIC and maternal urinary iodine concentration (UIC) as indicators of iodine status in breastfed neonates. 147 lactating mothers and their neonates (3–5 days postpartum) were randomly selected from health care centers. Breast milk and urine samples were collected from each pair. Overall, 129 (89.0%) and 16 (11.0%) mothers had BMICs ≥ 100 and <100 µg/L, respectively. Median (IQR) maternal UIC was 70 (42, 144) µg/L in mothers with BMIC ≥ 100, and 37 (25, 100) µg/L when BMIC was <100 µg/L (P = 0.047). Median UIC (IQR) of neonates born to mothers with BMICs ≥ 100 and <100 µg/L were 230 (114, 310) µg/L and 76 (41, 140) µg/L, respectively (P < 0.001). In linear regression, neonate UIC was positively associated with BMIC. These findings indicate that BMIC is a more sensitive indicator than maternal UIC for assessment of iodine status in breastfed neonates.

Nazeri P et al. Biol Trace Elem Res. 2018 Jan 25 [Epub ahead of print]

Iodine intake from supplements and diet during pregnancy and child cognitive and motor development: the INMA Mother and Child Cohort Study

The effect of mild-to-moderate maternal iodine deficiency on the neuropsychological development of their offspring is uncertain. Authors of this prospective cohort study aimed to assess the association between iodine status during pregnancy and the cognitive and motor development of children at 4–5 years. Pregnant women were recruited in 2003–2008, and their children (n = 1803) were followed-up for a mean (SD) 4.8 (0.6) years. Cognitive and motor function was assessed using the McCarthy Scales of Children's Abilities. Neither iodine supplements nor iodized salt consumption or maternal UIC were associated with cognitive or motor function. After adjusting for creatinine, children of women with UIC~Cr <100 µg/L had 3.93 (95% CI -6.18 to -1.69) general cognitive scores lower than the reference (150–249 µg/L). Dietary iodine was inversely associated with motor scores. Milk but not other dairy products or seafood intake accounted for this association. Iodine supplementation does not appear to improve child's neurodevelopment at 4–5 years.

Murcia M et al. J Epidemiol Community Health. 2017 Dec 26 [Epub ahead of print]

Development of databases on iodine in foods and dietary supplements

Low levels of iodine in the soil and groundwater are common in many parts of the world, leading to diets that are low in iodine. Mild-to-moderate deficiency is still prevalent, even in many developed countries. To understand patterns of iodine intake and to develop strategies for improving intake, it is important to characterize all sources of dietary iodine, and national databases on the iodine content of major dietary contributors (including foods, beverages, water, salts, and supplements) provide a key information resource. This paper discusses the importance of well-constructed databases on the iodine content of foods, beverages, and dietary supplements; the availability of iodine databases worldwide; and factors related to variability in iodine content that should be considered when developing such databases. Current efforts in database development and the use of iodine composition data to develop food fortification policies are also discussed.

Ershow AG et al. Nutrients. 2018 Jan 17;10(1)

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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, newsletter@ign.org.

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