



IDD NEWSLETTER

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IDD reappears in Vietnam as vigilance slips

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HANOI, 9 November 2012. Your LCD TV screen is made with it; your brain does not function well without it. Meet iodine, a multi-functional chemical element found in soil and seawater that when mixed with table salt, is the most effective way to thwart preventable brain damage. Consumed in inadequate quantities by millions of children globally, iodine deficiency disorders (IDD) are one of the leading causes of mental retardation, say health experts. But with few physical signs – save a swollen thyroid gland, or goiter – to herald its presence, IDD often debilitates quietly.

“With an infection, you have fever. But for micronutrient [deficiencies], the impact is hidden,” said Le Phong, coordinator of IDD activities at the government Hospital of Endocrinology in Vietnam’s capital, Hanoi.

Where nature does not contain adequate iodine, iodine-fortified table salt has been used widely – and successfully – in the past two decades to boost iodine intake in dozens of countries. In 1993, 110 countries were classified as “iodine-deficient”. Salt iodization brought that figure down to 32 in 2012, according to ICCIDD and UNICEF.

A number of countries, like Vietnam, eliminated IDD by outlawing non-iodized salt, regulating the salt industry, investing in health education to inform people about the link between salt and brain development, equipping laboratories and training technicians to measure iodine content in people and foods – only to see a resurgence in IDD when vigilance slipped. Since declaring IDD under control in 2005, the country is once again facing falling iodine levels and rising complications, say health workers.

“We are losing a generation,” said Le from the Hospital of Endocrinology, referring to studies that link insufficient iodine intake during pregnancy to stillbirths, miscarriage, low birth weight, shortened child survival and mental retardation (irreversible even if the child is later exposed to sufficient quantities of iodine).

In 1993 two out of 10 schoolchildren surveyed in Vietnam had goiter and the median concentration of iodine in their urine (UIC) was far below criteria for adequate iodine nutrition levels, which start at a UIC of 100 µg/L daily for the general population, and go up to 250 µg/L for pregnant and lactating women. The median UIC of the surveyed schoolchildren was 32 µg/L. The following year the prime minister passed a decree calling for iodized salt in all food preparation; gave US\$3.1 million to the Hospital of Endocrinology to manage the country’s battle against IDD; and set 2005 as the deadline to control IDD.

Goal reached

By 2005, the goiter rate fell to less than 4 percent, from 22 percent in 1993. Median UIC in schoolchildren 8–12 years old had almost tripled to 113 µg/L in that period. Slightly more than nine out of 10 people



Not only table salt, but also many condiments and special seasonings in Vietnam contain iodine
Photo: Phuong Tran/IRIN

surveyed nationwide reported getting enough iodized salt in their diet, a milestone known as universal salt iodization (USI). Mission accomplished.

But since then, funding to control IDD shrank to some \$300,000 annually; a new

decree was passed in 2006 that no longer made salt iodization mandatory; and the number of households using salt with sufficient iodine content has halved, according to a 2011 government survey that tested salt’s iodine content in more than 11,000 households nationwide.



Mountain communities are hit hardest by deficiency
Photo: Contributor/IRIN

Median UIC among women of reproductive age (15-44) fell from 122 µg/L in 2006 to 83 µg/L in 2009. While pregnant women require higher levels of iodine than the general population, only 18 percent of them in Dong Thap, a southern province in Vietnam's Mekong Delta region, had the iodine levels needed to give birth to healthy newborns, according to a 2008 government survey.



Its important that iodized salt is used in processed foods in Vietnam
Photo: Phuong Tran/ IRIN

What went wrong?

Downgrading IDD control from a national health priority to routine activities in the public health sector, with provincial authorities making decisions, “seriously affected” IDD control. Rather than giving iodized salt subsidies to communities most at risk of IDD living in mountainous areas, provincial officials gave cash (no conditions) to poor families to buy the salt for themselves. But rarely did that happen. With no adequate IEC [information, education and communication], it appears that most people used the money for other things instead of buying iodized salt.

Starting in 2006, the central committee in control of IDD was dismantled with all responsibility given to the Hospital of Endocrinology, which Le, the director of the hospital's IDD control activities, said is too overstretched to do much health promotion or education. In a 2008-09 survey by his unit, 43 percent of mothers linked goiter to iodine deficiency, while only 19 percent knew lack of iodine could lead to mental retardation. Le said since 2006 when the national government stopped supporting the

country's 64 provincial labs set up to monitor salt iodine content, most are no longer operational. The only lab to receive government funding is Le's.

Meanwhile, the global price of potassium iodate (KIO₃), the form of iodine used to fortify salt, increased. A 2010 study of the global iodine market noted how a current global shortage of iodine, exacerbated by the 2010 twin disasters in Japan (a KIO₃ producer), will keep prices unstable until up to late 2012. KIO₃ prices nearly doubled between 2003 and 2011, reaching \$60 per kilogram.

“We get less money for it and are getting less for our money,” said Le. Based on WHO's recommendation of six grams of salt daily, Vietnam

needs 187,000 tons of iodized salt annually. The Hospital of Endocrinology – currently the country's sole purchaser of KIO₃ – met 16 percent of that demand in 2011.

Building back

Boosting iodine levels can “theoretically be fairly fast, within months,” – as soon as iodized salt is sold – said Maria Andersson, of ICCIDD, a scientist with the Human Nutrition Laboratory at the Swiss Federal Institute of Technology and co-author of analyses about IDD trends over the past decade.

But the reality of how long it takes to reach the entire population with iodized salt depends on the effectiveness, knowledge and commitment of salt producers to iodize salt; whether laws require it; monitoring and control measures for iodine content; and the support the food industry has to include iodized salt in its products, she told IRIN.

For iodine nutrition to improve, the iodized salt needs to make it into households, and into their food – and most importantly – be consumed, said Andersson. It also needs to

be well-packed so iodine is not lost during storage and transit. It is also a question of how much time it takes to clear the shelves of non-iodized salt, which “won't happen overnight”, said Roger Mathisen, a nutrition specialist at UNICEF's office in Vietnam.

Along with salt, what else to fortify?

In Vietnam, agencies and NGOs have looked into fortifying widely consumed fish sauce (made by fermenting fish with salt) with nutrients missing in diets. Also popular is ‘bot canh’, a powder that includes salt, pepper and monosodium glutamate. In a 2010 survey of some 400 pregnant women in rural northern Vietnam (Ha Nam Province, 50km south of the capital), a quarter of the women reported not using iodized salt or cooking powders. Women said they felt iodized salt made food taste bitter and that monosodium glutamate or ‘bot canh’ made it taste “smoother”.

Salt iodization and fortification levels need to take account of the population's iodine needs and how – and how much – people consume salt, Andersson added. It is better to target salt, as most condiments already include it, said UNICEF's Mathisen, who noted regulating the salt industry is easier than setting up parallel monitoring and enforcement systems.

With funding from the US Agency for International Development, UNICEF is advocating that the government revive salt iodization by making it mandatory once again, re-establishing national oversight, and shifting KIO₃ procurement from the government's budget to the salt industry's so the consumer bears the cost, which is minimal, said Le with the Hospital of Endocrinology. “We are talking about a price difference [between iodized and non-iodized salt] of 250 VND [one US cent] – less than the cost of a cigarette.”

Parliamentarians have agreed on the need to control IDD, but are reticent to tackle it again, he added. “It can be harder rebuilding something than it was to build it in the first place.” But it is not just a question of building back, said Mathisen. “The issue is how to build back better. What existed was obviously not sustainable.”

Status of the National IDD Program in Vietnam in 2012: a ICCIDD/UNICEF/WHO report

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A joint mission of ICCIDD, UNICEF and WHO visited Vietnam on 7-11 May, 2012 to evaluate the IDD control program. The following is the executive summary and recommendations from that report.

Executive Summary

Vietnam had a very successful Iodine Deficiency Disorders control Program between 1993-2005. The Government of Vietnam set three targeted goals to eliminate IDD: Goiter Rate <5%, Median Urinary Iodine Concentration >100mcg/L and Household iodized Salt Coverage >90%; these were achieved in 2005.

The Ministry of Health in Vietnam deemed that the goals had been reached and IDD activities would simply become part of the routine activities of local public health sector. The Government Decree 163 issued in 2005 no longer called for mandatory salt iodization for human consumption and food processing. There was no specific annual budget allocation for IDD activities. The effective IDD Management Team under the Hospital of Endocrinology in Hanoi was dissolved. Monitoring and communication activities to promote IDD have clearly been inadequate since 2005.

Recent survey data (2008) revealed, from some provincial areas, that IDD are again a public health problem in the country. In the Mekong Delta provinces, IDD is worsening. Household usage of adequately iodized salt went from more than 90% in 2005 to less than 50% in 2011. Ethnic minorities living in the mountainous areas suffer a similar fate as those living in the South West and South East areas of the country.

The joint ICCIDD/UNICEF/WHO mission identified a number of achievements and constraints in Viet Nam. These have been discussed with appropriate health authorities. At the end of the mission, the team provided a summary of its conclusions and recommendations to the MOH.

Recommendations

1. Revise current Decree 163 by including mandatory iodization of all edible salt for human consumption and food processing, including various types of salt-based season-



Salt producers in Vietnam need to renew iodization efforts

ings. According to a recent study conducted by the National Institute of Nutrition, sodium is consumed mostly through various seasoning products, not as pure salt. Appropriate stakeholders, including salt industry representatives should be identified and included in this revision process; with clear coordination mechanisms.

2. Re-establish a National Committee for IDD Control, involving health and other sectors, with clear goals, targets and a time frame.

3. Re-establish the Hospital of Endocrinology in Hanoi as the national monitoring laboratory to oversee all laboratories carrying out IDD monitoring functions (at national and sub-national levels), including laboratories in the salt factories. Immediate next steps are highlighted in the report.

4. The management structure and governance of the National Hospital of Endocrinology, 7 regional Laboratories, 64 provincial laboratories and 72 salt laboratories, must be defined with clear roles and responsibilities outlined and documented.

5. Purchase of KIO₃ should not be the function of the National Hospital of Endocrinology or the MOH and it should be industry based. In the longer term, the cost of KIO₃ should be incorporated into the price of iodized salt and this should be paid for by consumers. This pricing structure must be transparent, reasonable and affordable by consumers, after broad consultation with appropriate authorities. In the meantime, it is essential to continue providing subsidized

iodized salt, in-kind (as opposed to providing cash to households) in areas where subsidies are considered necessary. Incentives for companies should also be put in place such as tax reductions/ exemptions on purchase of equipment, supplies, premix, etc.

6. Information, Education and Communication activities have been minimal and messages have mostly focused on the elimination of endemic goiter rather than prevention of brain development from iodine deficiency and its impact on productivity and economic development. It is time to consider turning the table around to concentrate on prevention of brain damage as a result of IDD, develop messages promoting iodized salt to improve IQ scores and contribute to the development of the whole nation.

7. The government must mobilize sufficient resources to support the revitalization of the national IDD control and prevention program and allow some flexibility for provinces to use resources to support IDD.

8. In view of the growing awareness of the rising tide of non-communicable diseases in Viet Nam and the beginning of a campaign to reduce salt consumption to decrease hypertension in the population, it is both necessary and advantageous to link the IDD program with the sodium reduction program. This should be done at 3 levels: a) by advocating for a reduction in sodium intake through all sodium containing seasonings; b) by monitoring jointly sodium and iodine intake; c) by ensuring that achievements in reducing sodium intake will be matched by progressive increases in iodine concentration of salt and other sodium containing products, as required to maintain good iodine status.

9. It is proposed that a review meeting be scheduled about 2 years after the submission of these recommendations to the appropriate authority, to monitor progress in achieving the recommended targets and to provide any further support required.

Iodine nutrition and universal salt iodization: a landscape analysis in 2012

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(Disclaimer: the content of this publication reflects the opinion of the author and not necessarily the policy of UNICEF)

Universal salt iodization (USI) is the main strategy to eliminate iodine deficiency. Over the past two decades, national salt iodization programs have been introduced and scaled up in many countries. The basic concept of USI implies that all edible salt (household, processed food and animal salt) should be iodized. The programming and monitoring reality, though, have focused mainly on iodized salt purchased and consumed within households and iodine status has been measured through urinary iodine concentration (UIC) in school age children.

However, the program context has changed significantly with an increasing percentage of salt consumed which is obtained from processed foods, a greater emphasis is placed on assuring adequate iodine status of pregnant women, more countries reaching program maturation and needing to make adjustments in salt iodization standards, and recognition of the need to reduce both deficiency as well as excess. These changes have implications for program design, implementation and monitoring. To inform global partners on their strategic direction, an analysis was carried out of the current challenges and needs with the aim to guide national programs and help direct global support. This analysis assumes that USI is the main strategy to be pursued and is central to achieving and sustaining optimal iodine nutrition for populations.

1. Assessment of program progress: global status of iodine nutrition and USI

Two indicators are currently recommended to track population level progress towards the achievement of USI (USI criteria > 90%

households using adequately iodized salt, with iodine content according to national standards) and optimal iodine nutrition: proportion of households using adequately iodized salt (HHIS) and iodine status (urinary iodine concentration-UIC). These are collected nationally through surveys and tracked globally on a periodic basis by WHO (UIC) and UNICEF (HHIS). The assumption has been that the availability of iodized salt in households would capture the total iodine intake, and in turn, the iodine status measured among school aged children, would represent the iodine status of the population. As such, assessment of these two indicators has long deemed sufficient to track progress in national iodine program efforts. This original paradigm is presented graphically in Figure 1.

The global *iodine status* was recently updated (1) and estimates are now available for 96% of the world's population. There has been major progress between 2003 and 2011 in most regions of the world. The number of countries classified as iodine deficient has declined from 54 to 32, while the proportion of all countries which have an adequate iodine status has increased from 34% to 47%. At the same time, there has been an increase in the number of countries with more than



adequate or excessive iodine from 29 to 47 (Table 1). These data suggest that iodine nutrition has been improving since 2003, but progress has also been slowing. As programs continue to mature, special attention should be paid to supporting those countries and populations who continue to struggle to achieve optimal iodine status.

Figure 1: Evolving iodine nutrition and program landscape: original paradigm

(Adapted from GAIN/UNICEF Partnership, Jacky Knowles)

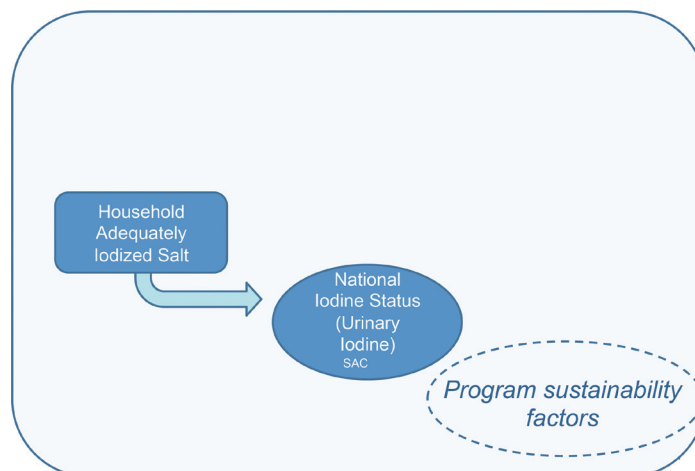


Table 1: Status of Iodine Nutrition – Number of countries in terms of iodine status and the total number of country estimates

Iodine intake	2003	%	2007	%	2011	%
Insufficient: severe iodine deficiency	1	1%	0	0%	0	0%
Insufficient: moderate iodine deficiency	13	10%	10	8%	9	6%
Insufficient: mild iodine deficiency	40	32%	37	28%	23	16%
Adequate	43	34%	49	38%	69	47%
More than Adequate	24	19%	27	21%	36	24%
Excessive	5	4%	7	5%	11	7%
Countries with data	126		130		148	
Total Number of Countries	192		192		193	
Countries with no data	66		62		45	

To complement measures of iodine status, progress towards the achievement of USI has been assessed based on the HHIS. The current average HHIS for developing countries is 71% (Ref: UNICEF SOWC 2011, 2012) (Figure 2). The global estimate reached 70% around 1990 and then has stagnated at this level for the past decade. A closer look shows, however, that the number of countries reporting on HHIS has increased from 90 in 2002 to 128 in 2012 indicating that more countries are monitoring and reporting. While there is an increase in the number of countries that have attained USI (HHIS>90%), some countries have also been sliding back with declines in coverage (Table 2). National aggregate estimates mask disparities within countries, and HHIS coverage is higher among the richest households than

poorer households in countries with available data (Figure 3) (Source: MICS, DHS and national nutrition surveys 2003–2009, with additional analysis by UNICEF; 2010).

2. Status of countries

As USI programs mature and additional insight into implementation is gained, it has become important to distinguish countries with different characteristics and needs. For this analysis, countries have been divided into four groups, each with specific issues and challenges.

A. Countries with scaled up programs

• These countries have already achieved an optimal iodine nutrition status with scaled-up USI programs. The current focus is on consolidation, program adjustments and on

sustaining the achievements.

- The key challenge for these countries is to *sustain* the current success i.e. avoid sliding back, maintain periodic oversight, renew commitment and mainstream iodine nutrition, ensure a functional coalition, and adjust the program to the changing national context. Inadequate program reach for the disadvantaged and marginalized population could be a challenge for these countries. Possibly, there could also be external threats to the program, such as objections voiced by opponent groups, complacency among policy and program staff, or changes in the enabling environment.

B. Countries in scale up phase

- This group of countries is in the process of scaling up USI, but have yet to achieve either high coverage of HHIS and/or optimal iodine status. The program focus is on *improving* the proportion of poorly iodized salt (quality of iodized salt in key areas & market segments, typically amongst medium-size producers), and *expanding* capacity to suppliers with no iodization, typically small producers, and expanding the use of iodized salt by the processed food industry
- The key issues and challenges are to address capacity problems along the supply value chain; quality control and quality assurance, ensure iodization by small producers, as well as advocacy & communication. These countries often need to improve commitment (reflected by poor regulatory monitoring and enforcement, unobstructed flow of illegal non-iodized salt, lack of control over imported salt, or presence of disincentives

Figure 2: Household use of adequately iodized salt

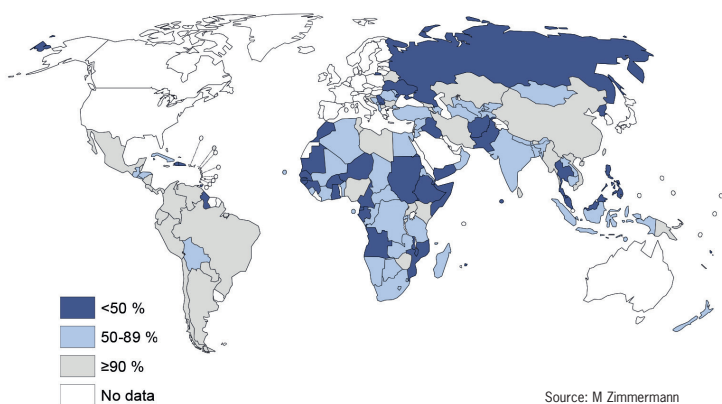


Figure 3: Use of iodized salt by households is often not equitable

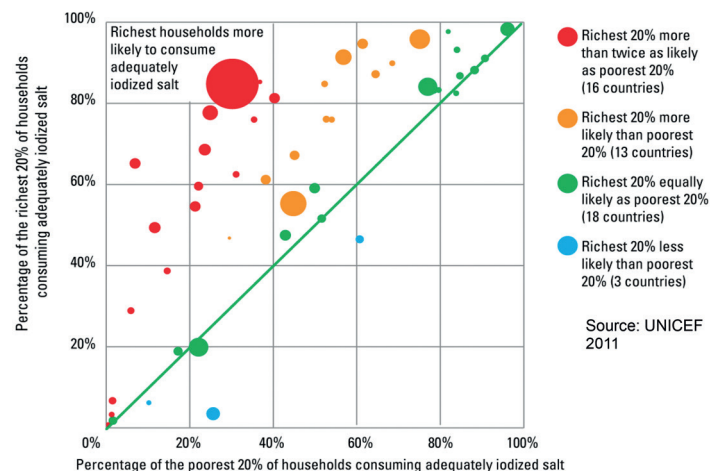


Table 2: National Estimates of Household Coverage of Iodized Salt

HHIS (% adequate)	SOWC 2002		SOWC 2012	
		%		%
>90%	21	23%	37	29%
70-90	17	19%	27	21%
50-69	17	19%	25	20%
20-49	22	24%	27	21%
<20	13	14%	12	9%
Countries with data	90		128	
Total number of countries	156		157	
Countries with no data	66		29	

to iodize salt (e.g. taxation)), and a need to assure strong collaboration amongst all stakeholders. A particular challenge includes how best to reach disadvantaged population groups through market channels or alternative strategies (subsidized IS, other iodine interventions).

C. Countries without policy/plan to scale up and achieve USI/optimal iodine nutrition

- These are countries where salt iodization may have been initiated, but is not being scaled up and where the iodine status population is not in an optimal range. Typically, one would observe several issues in these countries, including a lack of understanding and awareness of the iodine nutrition problems and commitment for USI among key gatekeepers (public, private, civic, academic sectors), as well as an inadequate capacity to implement USI.
- A critical issue is to *improve* recognition of the importance of iodine nutrition and/or USI by policy makers or public health advisers, as well as *expanding* the production and supply of iodized salt. This often leads to confusion about the need for USI, either alone or in combination with other strategies to improve iodine intake. In these settings, alternative strategies are often promoted and compete with USI strategy, which could negatively influence the commitment for USI.

D. Fragile states

- The last group includes countries in which USI may or may not have been (fully)

implemented and where iodine status may or may not be optimal. The countries are characterized by a fragile enabling environment (political, economic, sudden shocks due to natural or man-made disasters) which undermines USI and therefore the iodine status as well. Strategies are not in place or are weakening; there is a lack of attention and low priority for iodine nutrition.

- The aim in these settings is to *expand* commitment and capacity to implement salt iodization, or consider alternative temporary interventions until long term USI strategy can be accelerated. There is a need to target the right population groups, prioritize efforts, and make optimal use of resources.

3. Global and national challenges in the iodine nutrition program regarding advocacy, enabling environment, supply, communication and monitoring

There are a number of rapidly changing factors which affect global and national level planning for USI programs which require attention. The following considerations affect the design and support of iodine programming and in building the capacity to assure that programs are viable and sustainable.



of urgency, opportunity and vigour around iodine nutrition needs to be created. This can be facilitated by continuously updating and reinforcing the evidence base, generate support for programming, and position USI and iodine nutrition in the changing environment.

Enabling environment at the national level

At the national level, iodine nutrition often disappears from the agenda after USI has been achieved. Low awareness of iodine deficiency and implications are often not understood by one or more of the public, private, civic and academic stakeholders, or the supporting organizations. Renewed commitment is needed to support program implementation and oversight. For program sustainability, it is essential to have strong coordination amongst all key stakeholders, and ensure that there is mutual trust between the public and private sectors but also with the academia and consumer groups. Such coordination can be enhanced where information resources are used to create an enabling environment for program success.



Iodine intake from processed foods is becoming more important in many countries

Global advocacy

Nations all face multiple competing priorities in health and nutrition. As such, countries but also donors are less interested in vertical programs and emphasize nowadays integrated programs. There is a need to embed iodine programs in micronutrient and nutrition strategies and plans, and in the Scaling Up Nutrition (SUN) and other relevant movements. While there has been progress in USI over the past decade, it is important not to become complacent and a new sense

In some cases, disincentives have halted salt iodization progress because the salt industry's point of view was poorly understood and/or solutions have not been embraced to incentivize salt iodization. On the other hand, since salt iodization is often mandated by law, legislation is often not implemented and enforcement is poor, giving the salt producers opportunity not to meet standards. Increasingly, salt is consumed through processed foods. It is important to incorporate food grade salt into the national strategy,

and provide guidance on how to program and monitor this.

Supply

There are a number of critical production and supply-related issues that currently halt progress. Internal quality assurance procedures as well as external enforcement are poorly implemented or not in place at all. Existing effective systems and good practices often remain undocumented or not available to those who need them. One of the most important challenges is the frequent absence of functional cost recovery systems for iodine premix. The legacy of external dependence and rising and variable prices of iodine premix have often led to an unsustainable and unpredictable procurement situation. Ensuring iodization of salt by small producers remains a challenge in several countries and, to date, very few sustainable business solutions have been developed to organize producers to produce quality assured iodized salt.

National advocacy and communication

The focus of most national communication strategies has been on advocacy for national legislation, commitment building of stakeholders and creating awareness on iodine and iodized salt among the population. It is also not strategic to change behaviour of consumers to increase retention of iodine in salt by better storage and delayed addition of iodized salt during cooking. What has been lacking in this approach is a direct link how these communication efforts address program challenges and deliver quantifiable results in terms of iodized salt supply and HHIS. For example, efforts should focus on building commitment among salt producers leading to salt iodization; on wholesalers, retailers and consumers in low coverage districts to demand iodized salt.

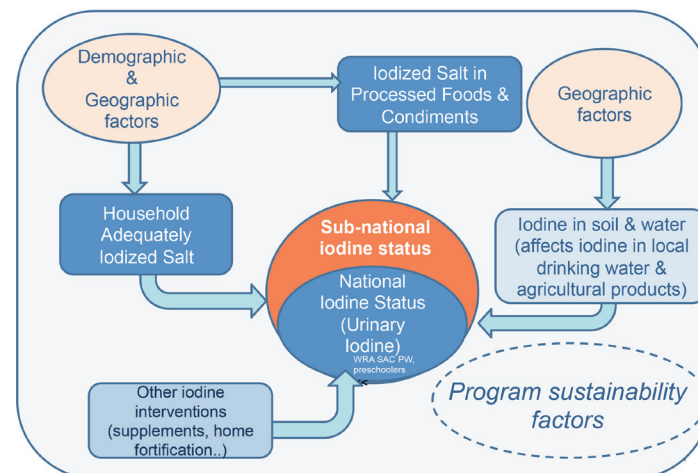
On the other hand, more emphasis is needed to capitalize on sustainable communication through inclusion of iodine and iodized salt in school curricula, training of professionals and salt packaging, logos and labelling.

Monitoring

The changing program realities urge us to revisit the indicators used in monitoring performance and impact. It is common that a conflict between HHIS and UIC exists (e.g. HHIS < 90% and UIC > 100 mcg/dl),

which has led to incorrect conclusions and/or changes to the program. Accounting for iodized salt intake obtained from processed foods is increasingly important, but also iodine containing products are increasingly used such as iodine supplements, multi micronutrient supplements, home fortification products such as micronutrient powders, ready to use supplementary foods, and, in some specific cases, iodine in the natural environment. A better understanding of the iodine sources, planned and un-planned, are crucial for the design and monitoring of national iodine nutrition programs. This changing paradigm is illustrated in *Figure 4*.

Figure 4: Evolving iodine nutrition and program landscape: revised paradigm



Although pregnancy is the period during which iodine is crucial in brain development, iodine status is primarily assessed in SAC, because it is easier to assess. The question remains how UIC can be obtained more systematically from pregnant women and women of reproductive age. Furthermore, hardly any information is available about the iodine status of pre-school children, identified as a research need. Cut off values for adequacy and excess UIC, driven by thyroid function, require further research and clarification for different population groups.

Typically, nationally representative UIC and HHIS is collected on a periodic but infrequent basis. Lack of (recent) (sub)nationally representative data for UIC and HHIS is a concern. The US Centers for Disease Control and Prevention maintains external quality control of laboratories worldwide performing

UIC analysis (EQUIP). Not all laboratories are 'members' and therefore UIC data quality often cannot be guaranteed. An initiative for regional resource laboratories carrying out external quality control (IRLI) was initiated in the 1990's but was never fully pursued as well as field friendly devices to measure UIC and HHIS.

UIC and HHIS are often collected and/or analysed independently from one another thereby losing the ability to provide insight in median UIC by HHIS (with different iodine levels) which can indicate the optimal iodization level, the presence of iodine intake sources other than household salt, and sub-

national variations. It is important to understand this relationship between UIC and HHIS to guide corrective action. Clarification is also needed about the UIC interpretation (by median and by proportions), the presentation of UIC results, and the use of UIC for estimating dietary intake (EAR/RDA values). Program sustainability is seldom assessed and

tracked globally, while indicators for sustainability exist. The latter require a thorough review, however.

As mentioned before, current measures of HHIS do not reflect iodized salt intake from processed food nor from other iodine interventions, if these are present. Guidance is required on the use of testing equipment (e.g. WYD, iCheck, titration, test kits). Rapid salt test kits can only determine the presence or absence of iodine but still are incorrectly used to categorize adequately from inadequately iodized salt, which often leads to incorrect conclusions and misinforms national decision making. In addition, fixed international cut off values for adequacy at 15 ppm are often in not in line with national program standards that have different cut off values. This makes setting national program targets and assessing their progress confusing. Views also differ about the need to measure exact iodine

content in salt at household level if contribution of iodized salt from processed foods cannot be quantified at all and if quality assurance at production level is well functioning. The issues above have implications for the way global databases are maintained and global progress is presented.

4. Iodine nutrition and USI strategy, applied research, program management and support

USI has been successfully scaled up to current levels partly because of its focus and vertical approach, which is not sustainable in the current landscape where nutrition interventions are delivered in integrated manner and where nutrition is mainstreamed as a national development priority through Scaling Up Nutrition (SUN), REACH and the 1,000 days movement. Iodine nutrition and USI also need to be part of global and national micronutrient and nutrition policies and strategies and should not stand alone. With sodium intake reduction strategies being pursued globally it is important to align these with USI to synergize implementation and monitoring so as to maximize impact as well as to avoid confusion and competition.

With a rapid development and scale up of specialized nutritional products for the treatment and prevention of various manifestations of undernutrition in different population groups in different contexts, it is important to define the need for and content of iodine in these products. Above all it should remain clear to national policy makers that USI is

the main strategy and other interventions are to be seen as temporary or complementary. Within this context it is important to show that USI can achieve optimal iodine status for all population groups. Guidance on the feasibility of these complementary interventions also needs to be provided.

What emerges from the current landscape is the need for clear guidance on how to set salt iodization levels in presence or absence of processed foods and how to deal with the wide variation that may exist within a country. A discussion is also required on the use of HHIS data for program corrective action such as setting iodization levels. When is information needed on iodine intake from natural sources (e.g. water) and how to monitor this? Similarly, guidance is needed how to identify the processed foods to target for iodization, and how to assess its attribution to the iodine status.

Structured coordination between public-private and civic sectors is required for effective implementation, information exchange, program oversight and corrective action. Countries have expressed a need for better guidance to establish these and how to strengthen public-private trust. A wealth of experience, materials and lessons learned exist but are often not accessible to peers in other countries. A community of practice and more systematic documentation of lessons and experiences can provide a solution to this.

Global coordination on iodine nutrition and USI among partners is important but is cur-

rently not strongly linked with other micronutrient and nutrition platforms such as the Micronutrient Forum, the Flour Fortification Initiative, and the Home Fortification Technical Advisory Group. Among program support providers – even while there is agreement on USI – true USI is often not fully understood and guidance and support differs in scope and results that can be anticipated. This leads to confusion, conflicting advice, and as a result different program practices, for example the criteria to start iodine supplementation and the omission of processed food as an important strategy component. In the past, there has been some difficulty in maintaining consistency in approaches that have been taken by different organizations that provide support. It is critical to “speak with one voice” and develop, agree and promote a common approach and guidance to countries. This is enhanced by ensuring that policy, information and tools are managed by true collaboration among support providers. A forum at the global level for planning and discussion of programming approaches and implementation issues will go a long way to guarantee such harmonization.

What is also required is a strong global voice and stewardship for iodine nutrition and USI. Tracking progress and a solid analysis should help define the advocacy, communication and support functions. This could, for example, highlight the “forgotten” problem of sub-optimal iodine nutrition in industrialized countries, advocate for sustainability, and highlight needs and opportunities.

Iodine deficiency in the Democratic People's Republic of Korea

Dr. Kapil Yadav ICCIDD Deputy Regional Coordinator for South Asia



Background

The Democratic People's Republic of Korea (DPRK), a country on the northern half of the Korean peninsula with a population of over 24 million, is geologically prone to iodine deficiency owing to its predominantly mountainous terrain. In 1989, on behalf of Unicef-EAPRO, a team comprising of Dr. Chandrakant Pandav and Mr. Venkatesh Mannar undertook a visit to DPRK and conducted a detailed situation analysis of IDD in the country. The mission recommended conduction of an IDD survey and capacity building and training of scientists for epidemiological and laboratory methods for IDD control.

Two decades later, in May 2009, a joint mission of ICCIDD-WHO SEARO visited DPRK including Prof. Chandrakant Pandav, ICCIDD Regional Coordinator for South Asia, and Dr. Kunal Bagchi, Regional Advisor (Nutrition), WHO SEARO. Their aim was to strengthen the national IDD program and to build country capacity. They also assisted in the development of a plan for a nationwide IDD assessment, including sam-

pling, questionnaires, as well as equipment and training for a field survey. They also assessed the laboratory capacity for undertaking measurement of urinary iodine and assessed ways to further strengthen capacity.

In November 2009, an ICCIDD team comprised of Prof. M. Karmarkar and Dr. K. Yadav from the South Asia Regional Office undertook a mission to set up a urinary iodine laboratory in Pyongyang, DPRK. They also trained the survey teams for conducting the national level IDD survey.

The national IDD survey

The national IDD survey was carried out from November 2009 to March 2010. The results of the survey provide the first comprehensive description of the IDD situation in the DPRK. The Institute of Child Nutrition of the DPRK surveyed iodine nutrition among 6-12 y-old children across the country. The general objective was to further strengthen the national IDD control policies and programs. The specific objectives were:

- To determine goiter prevalence in school children
- To determine the urinary iodine concentration in schoolchildren
- To determine the availability of iodized salt in households
- To assess the knowledge of the population regarding IDD and iodized salt

Methodology

The study design was a cross sectional, community based field survey. The probability-proportionate-to-size (PPS) cluster method was used for sample selection. The study population was children in the age group of 6-12 years. The total sample size was 1200 children, with 30 clusters and 40 children per

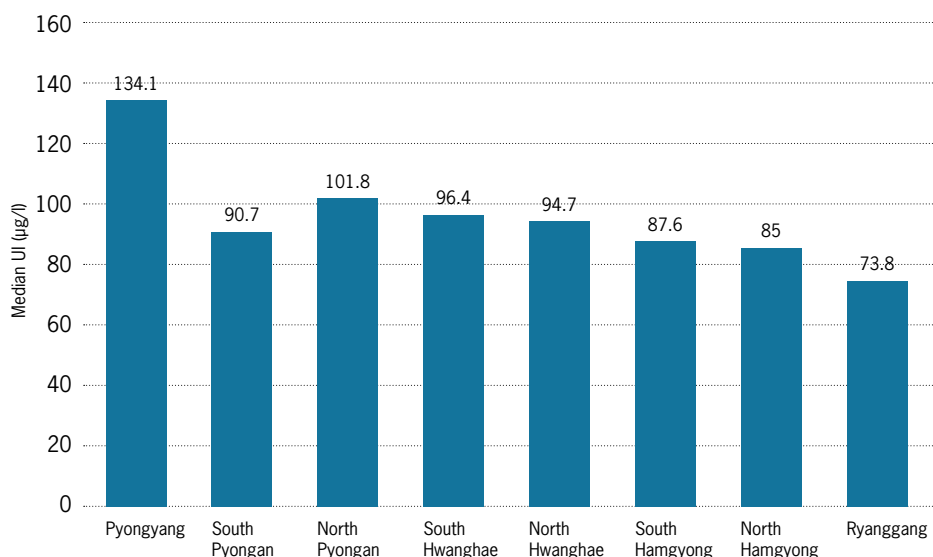
cluster. Using standard methods, a household was selected randomly in the selected clusters. Only one child per household was examined so as to cover the maximum number of households in the village.

Trained and experienced physicians clinically examined all children for thyroid enlargement. Goiter was graded as per the recommendation of the Joint WHO/UNICEF/ICCIDD Technical Consultation Group (May, 1999). From the children examined, urine samples was collected and analyzed for urinary iodine concentration. Salt samples were collected from all the households visited, for estimation of iodine content. This was done by iodometric titration.

Table 1: Goiter prevalence in provinces (%)

Province	Number	TGR	Visible goiter (Grade 2)
Pyongyang	160	11.8	0.6
South Pyongan	160	18.1	1.8
North Pyongan	160	17.5	1.6
South Hwanghae	120	20.0	2.5
North Hwanghae	160	20.6	2.5
South Hamgyong	160	21.2	2.5
North Hamgyong	160	18.1	2.5
Ryanggang	120	30.8	3.3
Total	1200	19.5	2.2

Figure 1: Distribution of urinary iodine concentrations in schoolchildren in DPR Korea in 2009.



Information related to the availability, affordability and accessibility of iodized salt was collected through structured questionnaire by personal interview with the mothers of the children.

Results

Goiter Prevalence

Goiter prevalence by province is shown in Table 1. The total goiter rate (TGR) and the prevalence of visible goiter was the highest in Ryanggang province, at 30.8% and 3.3%, respectively. The total goiter rate at the national level was 19.5%, of which 2.2% was visible goiter.

Urinary iodine concentration

The median urinary iodine concentration (UIC) was highest in Pyongyang city at 134 µg/L and the lowest in Ryanggang province at 74 µg/L (Figure 1). The overall median UIC was 97 µg/L and the proportion of UIC values below 100 µg/L was 51% in the 8 provinces.

Proportion of iodized household salt

Of all provinces, the proportion of iodized household salt was the lowest in Ryanggang province at 15.8%. The national percentage of household salt that was iodized was 42%, and the proportion of adequately iodized household salt (iodine content >15 ppm) was 23.0%.

Knowledge of the population regarding IDD and iodine salt

The proportion of the population that recognized the necessity of consuming iodized salt was 73.4%. The proportion of the population that regards iodized salt as the means of goiter prevention and health promotion was 53.8% and 38.1%, respectively. About 95% of the population knew about iodine deficiency and iodized salt. Nearly 50% of the population had heard about iodine deficiency and iodized salt through television and health care workers.

Recommendations for strengthening the IDD Control Program in DPRK

Immediate

Inclusion of pregnant women in the national level IDD survey: Measuring median urinary iodine excretion in pregnant women is one of the indicators used for tracking progress towards sustained IDD elimination as per WHO/UNICEF/ICCIDD.

Increasing iodised salt production capacity in the country: There is urgent need to augment the capacity to produce adequately iodized salt in DPRK. The government with support of international agencies should make the existing production facilities functional to meet the existing shortfall in the estimated requirements of adequately iodised salt in DPRK.

Short term

Dissemination workshop/meeting after completion of national IDD survey: The government of DPRK in collaboration with WHO should organize a dissemination workshop/meetings of the different stakeholders involved in USI and IDD elimination in DPRK. The dissemination workshops would enable advocacy with policy makers and stakeholders for the efforts and resources required to achieve sustainable IDD elimination in DPRK.



Dr. Kang Ha Guk, Deputy Minister, Ministry of Public Health, DPR Korea (3rd from right) during his visit to the All India Institute of Medical Sciences (AIIMS), New Delhi with Prof. Chandrakant S Pandav, Regional Coordinator, ICCIDD (1st from right)

Table 1: Current status of indicators for tracking progress towards sustainable elimination of IDD in DPRK

Indicators	Goals recommended	Goals achieved
Salt iodization Proportion of households using adequately iodized salt	>90%	23%
Urinary iodine Median in the general population	100 – 199 µg/l	96.8 µg/l
Median in the pregnant women	150 – 249 µg/l	Not available
Programmatic indicators (Table 2)	Attainment of 8/10 indicators	Attainment of 1/10 indicators, with 3 indicators partially attained

Table 2: Programmatic indicators for tracking progress towards sustainable elimination of IDD in DPRK

S No	Indicator	Current Status
1	An effective, functional national body responsible to the government for the national program for the elimination of IDD. This council should be multi disciplinary involving the relevant fields of nutrition, medicine, salt industry, education, the media and consumers.	Not attained
2	Evidence of political commitment to Universal Salt Iodization and the elimination of IDD.	Not attained
3	Appointment of a responsible executive officer for the IDD elimination programme.	Not attained
4	Legislation or regulations on Universal Salt Iodization.	Not attained
5	Commitment to assessment and reassessment of progress in the elimination of IDD, with access to laboratories able to provide accurate data on salt and urine iodine.	Partially attend
6	A programme of public education and social mobilization and the importance of IDD and the consumption of iodised salt.	Attained
7	Regular data on salt iodine at factory, retail and household level	Partially attend
8	Regular laboratory data on urine iodine in school aged children with appropriate sampling for higher risk areas.	Partially attained
9	Cooperation from the salt industry in maintenance of quality control.	Not attained
10	Database with recording of results or regular monitoring procedures, particularly for salt iodine, urine iodine and if available, neonatal TSH with mandatory public reporting.	Not attained

Production level laboratory salt iodine estimation using iodometric titration:

Setting up laboratories: Make an inventory of existing laboratories, identify the gap supply and provide necessary equipments/reagents and training.

Quality assurance: To set up quality assurance laboratories that monitor iodine content of salt at the production end and to conduct training to achieve the same.

Providing 24 hour uninterrupted electricity supply to the ICN laboratory: Since uninterrupted power supply is essential for a urinary iodine laboratory, the government with the support of international agencies should ensure uninterrupted power supply to the ICN.

Increasing iodized salt production capacity in the country: Including infrastructure improvements to the salt iodization plants to ensure production of iodized salt to meet the shortfall in national requirements.



Korean children will reap benefits at school if their iodine nutrition is optimal



Dr M G Karmarkar and Dr Kapil Yadav with laboratory personnel during the training workshop held in November 2009 at Pyongyang, DPR Korea.



identified laboratories and for which the help from donor agencies can be sought. It is essential to ensure continuous supply of reagents and other consumables considering the past experience with production end laboratories. Internal and external quality assurance protocols with regular exchange of samples should be established between all the laboratories with ICN as the reference laboratory.

Establish a national network for USI and IDD elimination in DPRK: Greater coordination between the State Planning Commission (SPC) and the Ministry of Public Health to ensure adequately iodized salt from production to household level is needed. A national network of all stakeholders working towards USI and IDD elimination in DPRK should be established, to promote intersectoral coordination and synchronize efforts of all government and non-governmental organizations. As a follow up of recommendations outlined above, the network should track progress towards sustainable elimination of IDD in DPRK.

Increasing iodized salt production capacity in the country: There is urgent need to augment the current capacity of production of adequately iodized salt in the country. Necessary support both from government of DPRK and international partner agencies is imperative for achieving USI in DPRK.



Iodized salt increases the nutritional value of DPR Korean meals

Long term

Subnational/regional survey: After the national survey, plan and carry out a regional level survey, using the same teams. Based on the results of the national IDD survey and on geographical and administrative aggregation, divide the whole county into four regions. The IDD survey with 30 x 40 clusters should be carried out in each region over a one-year period. This regional survey would generate data at sub-national/regional level and make intervention at sub-national level more specific and targeted. In subsequent years, a cyclic monitoring with one region being surveyed every year so that at end of four years each region has been surveyed at least

once. This would ensure continuous ongoing monitoring of IDD status in the country and institution of timely action linked to these surveys. Pregnant women should be included in all the above-proposed surveys.

Regional level salt iodine iodometric titration laboratories: The Ministry of Public Health should identify and establish regional/ province level salt iodometric titration laboratories to monitor household level consumption of adequately iodized salt. Four such regional laboratories should be established with the ICN laboratory as a reference laboratory. The necessary equipment/reagents including logistic support should be provided to these

Team from DPR Korea visits China to discuss the fight against IDD

Qian Ming ICCIDD Regional Coordinator for China and East Asia, Tianjin, China.

On September 19 to 22, 2012, a team from the Democratic Peoples' Republic of Korea, (DPRK) visited China, arranged by the UNICEF office in DPRK. Mr. Jon In Chan, leader of this group and deputy secretary general of DPRK National Coordinating Committee for UNICEF, met Mr. Xiao Donglou, Deputy Director of the Control Diseases Bureau of the MOH in China (see Photo). After the meeting, the DPRK team visited the Chinese National IDD Reference Laboratory, the Tianjin Changlu Hangu Salt

Cooperation Limited Company (see Photo), and Chinese Prevention and Research Center of Endemic Diseases. During the meeting in Beijing, officials exchanged information on the control of IDD, including a discussion of USI-related legislation, organization across multiple sectors, IDD education, purchase of iodine, production of iodized salt and monitoring at the national level. According to DPRK monitoring results from 2010, household coverage of adequately iodized salt was only 23%.



A high-level team from the DPRK visited Beijing and met Chinese officials on September 19, 2012 to discuss IDD and USI.



Jon In Chan (left) and his DPRK colleagues visited the Tianjin Changlu Hangu Salt Cooperation Limited Company in China on September 20, 2012 and accepted a bag of iodized salt as a gift.

Although salt iodization work in the DPRK has been supported by UNICEF for more than 10 years, the amount of iodized salt remains limited because of issues related to the purchase of potassium iodate and the production capacity of the salt factories. DPRK is considering emergency measures, including iodized oil supplementation of pregnant women, lactating women and children aged <2ys. In the future, it will be necessary to set up a national coalition led by a high ranking politician, draft a law related to iodized salt, strengthen IDD education, and build a system of national monitoring in order to achieve USI to control IDD in the DPRK.

Iodine content in imported table salt in Haiti on the eve of a mandatory salt iodization bill

Ismael Ngnie-Teta, Mohamed Ag Ayoya, Raphy Favre, Aissa Mamadoulaibou, Jean Ernst Saint-Fleur, Joseline Marhone Pierre, Paola Dos-Santos Nutrition Section, UNICEF Haiti; Office of the First Lady, Haiti; Ministry of Public Health and Population; World Food Programme, Haiti.

In Port-au-Prince, only about 10% of table salt is iodized but most is labeled as iodized



A national iodine deficiency disorders (IDD) survey conducted in 2006 showed that the median urinary iodine concentration in school age children was 84 µg/L; 60% of urine samples had an iodine concentration below the minimal normal value of 100 µg/L and 25% of samples were below 50 µg/L. The prevalence of iodine deficiency was 72% in rural areas (1). Unfortunately, the proportion of households consuming salt with adequate levels of iodine in Haiti, 2% to 3%, is among the lowest in the world (IHE/MACRO, 2005; MSPP/UNICEF, 2006). Iodine deficiency disrupts mental and intelligence development and therefore affects national development performance.

Haiti salt production and importation

Haiti currently produces salt using archaic ancestral solar evaporation production technology. Salt producers dig ponds in the soil and fill the basins by gravity with sea brine. After evaporation, the crystallized salt is deposited on the sides of the basins or stored in thatched sheds. The national annual salt output is estimated to be 30,000–40,000 MT (2) mostly in the region of Artibonite (about

90%). The national capacity is however estimated at 250,000 MT/year, if the production methods were modernized. Salt importation is estimated to be about 6,000 metric tons per annum (Technoserve, 2011) mainly in the form of crude non iodized salt; only about 10% comes as table salt. Haiti's government has little oversight on the salt industry, as the sector is still weakly organized.



Various brands of table salt sold in Port-au-Prince, Haiti

Salt iodization in Haiti and legal environment

Salt iodization is considered the most effective intervention for prevention of IDD. Because of the antiquated method of salt production, Haitian salt is of very poor quality, consisting of large individual impure grey-colored crystals and containing a lot of dirt and debris. The salt is therefore not suitable for iodization without further pro-

cessing. The Ministry of Public Health and Population (MOPHP) owns the only salt iodization plant in the country. The plant has a very limited production capacity. At the same time, Haiti remains the only country in the western hemisphere without legislation on, or government enforcement for, salt iodization. Although there have been several national and international efforts to eliminate IDD in Haiti, salt iodization has never been successfully established in the country.



Haitian children need better iodine nutrition for healthy growth and development

Even though salt iodization is not yet mandatory, table salt iodization and labeling are mandatory in most of the countries from which Haiti's table salt is imported. Cognizant of the problem, the MOPHP and the Office of the First Lady have recently pushed a bill on mandatory fortification of salt with iodine. This is yet to be presented to the parliament. In prelude to the preparation of the bill, a rapid market survey was

Table 1: Results of the qualitative and quantitative test of iodine content in table salt

Country of origin as mentioned on the package	Labeled as iodized	Colorimetric test	Titration results (ppm of iodine in salt)
Colombia	YES	Positive	70
Dominican Republic	YES	Positive	55
Dominican Republic	YES	Positive	49
Haiti	NO	Unclear	9
Colombia	YES	Positive	5
USA	YES	Negative	4
Dominican Republic	YES	Negative	4
USA	YES	Negative	2
USA	YES	Negative	0
USA	YES	Negative	0
Haiti	NO	Negative	0
USA	YES	Negative	
USA	YES	Negative	
USA	YES	Negative	
USA	YES	Negative	
Colombia	YES	Negative	
USA	YES	Negative	
USA	YES	Negative	
Haiti	YES	Negative	
France	NO	Negative	
USA	NO	Negative	
USA	NO	Negative	
USA	NO	Negative	
USA	NO	Negative	
Spain	NO	Negative	
Haiti	NO	Negative	

conducted to assess the iodine content in table salt sold in major supermarkets of Port-au-Prince.

The iodine content in table imported salt

Twenty seven salt samples (Table 1) of different brands were collected from freshly opened containers from various supermarkets in Port-au-Prince and from volunteer UNICEF staff. The presence of iodine was assessed using colorimetric field test kits. The iodine content of eleven samples, including four that passed the colorimetric test, was further measured using iodometric titration.

Of the 28 salt samples collected, 18 were labeled as iodized salt and 10 were labeled non-iodized salt or have no mention. On each of the samples there was mention of a country of origin that we cannot confirm.

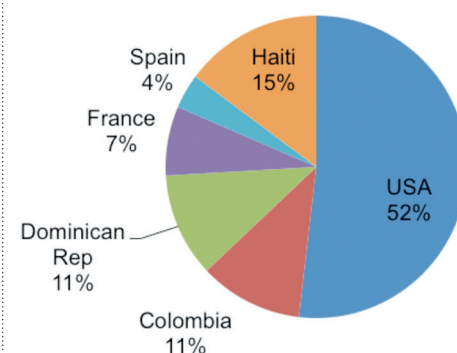
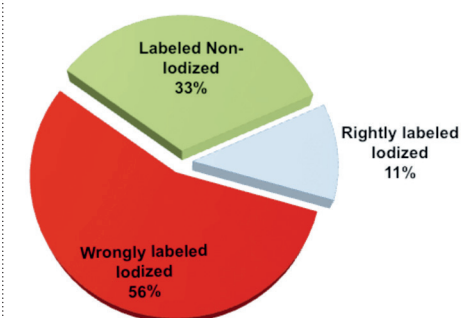
The colorimetric test revealed presence of iodine in only 4 samples (14%). Among the eleven samples tested by titration, adequate levels of iodine (≥ 15 ppm) were found in 3 samples (11%) and the iodine level was nil or less than 10 ppm in all the remaining samples (89%).

Overall, 86% (15 out of 18) of the table salts labeled iodized were not iodized. More than half (56%) of the table salt had a label mentioning USA as the country of origin (Figures 1 and 2); 100% of that salt did not contain iodine despite the fact that 80% had a label claiming otherwise.

Conclusion

Only 11% of table salt sold in Port-au-Prince's major supermarkets is adequately iodized. The iodine content in table salt did not match its label in 86% of cases.

Legislation on salt importation is warranted to ensure that all the salt imported in Haiti is adequately iodized. Haiti needs now to develop a regulated IDD control program that bans importation of non-iodized table salt. If passed by the Haitian Parliament, the bill on mandatory fortification of salt with iodine would provide the legal basis and the resources necessary for an operative control on salt imported. The bill would also have a positive impact on investment in salt processing in country. Indeed, by clarifying salt specifications for the Haitian market, the bill would assist the expansion of salt fortification plans by the private sector.

Figure 1: Country of origin of the table salt sold in Port-au-Prince, Haiti, as mentioned on the package**Figure 2: Labeling of the table salt sold in Port-au-Prince, Haiti**

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Bread with iodized salt boosts iodine nutrition in Belgian children, but nonpregnant and pregnant women remain mildly deficient

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Background

Despite worldwide success in the implementation of iodine supplementation programs over the last decades, iodine deficiency still remains a public health problem in Europe and other regions of the world. In 2003, only 9 out of 40 countries in Europe had iodized salt coverage of at least 90% in their households (1). Although the number of European countries in which iodine deficiency is a public health problem decreased from 23 in 2003 to 14 at the present time (2), it is a matter of concern that iodine deficiency reappeared in countries whose previous iodine intake was sufficient, such as the UK (3).

Several surveys in the past among neonates and school-aged children indicated that Belgium is affected by MID, and that this represented a substantial economic burden to the health care system (4,5). The previous most recent national survey performed in 1998 among school-aged children found a median urinary iodine concentration (UIC) of 80 µg/L and a goiter prevalence of 5.7% (4).

Consequently, optimizing iodine intake was one of the priorities in the first national nutrition and health plan (2005–2010) of the Belgian Ministry of Health. An agreement was signed between the bakery sector and the Ministry of Health in 2009, to encourage the fortification of bread with iodized salt (10–15 ppm) (6).

The aim of the present study was to evaluate iodine status of Belgian school-aged children. We also investigated whether the median UIC in school-aged children was an adequate surrogate of iodine status of their mothers. In addition, iodine status among a nation-wide representative sample of Belgian pregnant women in the first and third trimester of pregnancy was determined, and determinants of iodine status were assessed 1 year after the introduction of bread fortified with iodized salt.

Methods

The study was cross-sectional. In a van, equipped with an ultrasound device, the thyroid volumes of children were measured and household salt samples and urine samples were collected from the children and their mothers. From across Belgium, 60 schools (see Figure 1) were selected and 1541 children participated in the study. The pregnant women were selected according to a multistage proportionate-to-size sampling design. Urine samples were collected and a general questionnaire was completed face to face with the study nurse.

Results

The overall median UIC in Belgian school-aged children was 113 µg/L (IQR=80–162 µg/L), which is within the optimal level of 100–199 µg/L (7). In a pair of 624 children and mothers, the median UIC was 115 µg/L in school-aged children, and 84 µg/L

in their mothers; these medians were significantly different (Figure 2). Additionally, the frequency of school-aged children with UIC < 100 µg/L was only 39 % but 64 % of the mothers had UIC < 100 µg/L. The correlation between UIC from children and mothers was 0.17 ($p < 0.001$). The percentage of school-aged children with goiter was 7.2% when using the European reference values by sex and age, while it was 4.3% as a function of sex and BSA.

Frequency of consumption of milk and dairy drinks was significantly higher among children than their mothers. The percentage of children consuming milk and dairy drinks at least once a day was 32%, while for mothers this was only 13%. Approximately 44% of the children consumed more than one glass of milk per day, among the mothers only 25%.



A brighter future for Belgian children through iodized baker's salt

Among the 904 samples of household salt obtained, 63% did not contain iodine. Of the 333 iodine-containing samples, 44% was in the form of KI and 57% was in the form of KIO₃. 3% of the samples contained an iodine content of 7 ppm, 9% of the samples contained an iodine content of 15 ppm and 25% of the samples contained an iodine content of 30 ppm.

Among pregnant women, the median urinary iodine concentration (UIC) among pregnant women ($n=1311$) was $124 \mu\text{g/l}$ and $123 \mu\text{g/g}$ creatinine when corrected for urinary creatinine (8). The median UIC in the first trimester ($118 \mu\text{g/l}$) was significantly lower than that in the third trimester ($131 \mu\text{g/l}$) but significantly higher than among non-pregnant women ($85 \mu\text{g/l}$). Iodine-containing supplement intake was reported by 61% of the pregnant women and 57% of the women took this supplement daily.

Figure 1. Geographical distribution of the 60 schools investigated in Belgium and the number of school-aged children ($n=1541$) investigated by site.

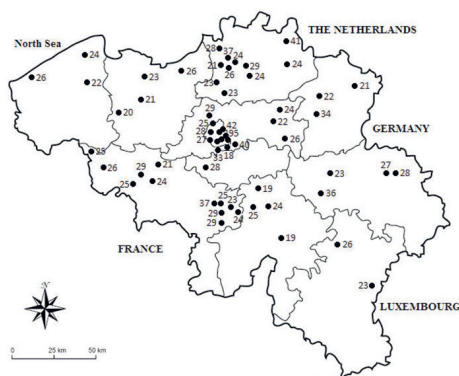
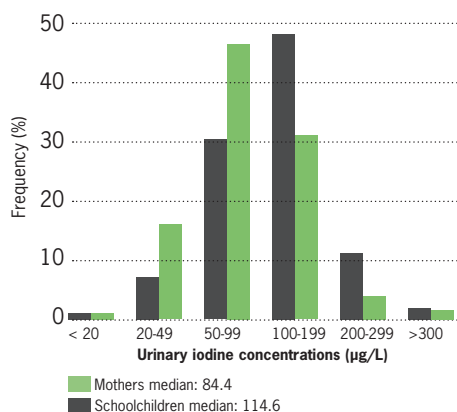


Figure 2. Frequency distribution of urinary iodine concentration in matched pairs of school-aged children and their mothers in Belgium ($n=624$).



Discussion

Compared to 12 years ago iodine status in school-aged children in Belgium improved (4); median urinary iodine concentration increased from $80 \mu\text{g/L}$ to $113 \mu\text{g/L}$. Interestingly, despite sharing a similar household food basket, the median UIC in the school-aged children was significantly higher than the median UIC of their mothers.

The median UIC during pregnancy indicates iodine deficiency in Belgium and some women are at a higher risk of deficiency. The current low dietary iodine intake in women of childbearing age appears to prevent the correction of iodine deficiency in pregnant women supplemented with multivitamins containing $150 \mu\text{g}$ iodine as recommended.

The implementation of bread fortification with iodised salt since 2009 may have contributed to the substantial increase in iodine status and explain why Belgian school-aged children are currently iodine sufficient. According to data from ESCOSALT, one of the main suppliers of iodized salt to the bakers in Belgium, the utilization of iodized salt by the bakers increased over the years from 11% in 2001 to 41% in 2010, the year of the survey. According to ESCOSALT the total volume of salt remained remarkably constant over these 10 years. Because of this, it can be derived that there was indeed a substitution of non-iodized salt with iodised salt over the last 10 years.

Presently there is no need to increase the concentration of iodine in salt used for bread fortification (10-15 ppm) but there is a need to increase the number of bakers using iodized salt, as according to ESCOSALT data, still less than 50% of the bakers use iodized salt.

The main drawback of the current situation in Belgium is the absence of a legal framework. The bakery industry and the ministry

of health endorsed the utilization of iodized salt in bread – on voluntary basis – in 2009. Other sectors in the food industry have also expressed their willingness to use iodized salt for food fortification. Therefore, to maintain an optimal iodine intake, a regulatory framework would be preferable where a law determines the concentration of iodine in salt for the production of bread and in household salt.

In conclusion, the fortification of bread with iodized salt has corrected iodine deficiency in Belgian school-aged children but not in their mothers, or in pregnant women. To provide adequate iodine intake to women of child-bearing age the current Belgian program needs to increase the use of iodized salt in bread and the consumption of household iodized salt.

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Meetings and Announcements

In Memory of Prof. Aldo Pinchera

Prof. Aldo Pinchera, of Pisa, Italy, died on 10th October 2012, aged 78. Prof. Pinchera was the Regional Coordinator of ICCIDD for Western and Central Europe, and an internationally renowned expert in thyroid disease and iodine deficiency. He was one of the 'founding fathers' of the European Thyroid Association. He most recently received the Lissitzky Career Award at the 36th Annual Meeting of the European Thyroid Association in Pisa, of which he was Honorary Chairman. He will be sadly missed by all.



Prof. Aldo Pinchera (left) receiving the Lissitzky Award at the ETA meeting in Pisa in September 2012.

Iodized salt safe for preventing iodine deficiency: Chinese health officials statement

BEIJING, Nov. 2 2012. Tang Danlu, xinhuanet.com

Iodized salt is efficient in preventing iodine deficiencies and will not induce thyroid cancer, experts and officials from the Ministry of Health said. A report by China Central Television (CCTV) stated that the increasing incidence of thyroid cancer is not linked to the consumption of iodized salt.

Ministry of Health official Li Xun said there has been no proof to indicate that consuming iodized salt leads to thyroid cancer. The International Council for the Control of Iodine Deficiency Disorders has also issued a statement saying that iodized salt is not related to the induction of thyroid cancer, Li added.

Rumors have recently spread online stating that increasing cases of thyroid cancer have been caused by the consumption of iodized salt. Health experts said unhealthy lifestyles and improved medical techniques that diagnose thyroid cancer at an earlier stage have led to increasing numbers of thyroid cancer cases in China.

'10% in Tamil Nadu hit by iodine deficiency'

VELLORE 23rd October 2012 Indian Express News Service.

About 10 per cent of people of the Indian state of Tamil Nadu suffer from iodine deficiency, said Health Minister Dr. VS Vijay. Addressing a function organized to observe World Iodine Day, at the Government Muslim Boys Higher Secondary School in Vellore, India, he appealed to the younger generation to add iodized salt to their diet to improve their health and intelligence quotient.

World Iodine Day was observed to create awareness on the importance of iodine and how its deficiency adversely affected health, he said. Deficiency of iodine leads to a drop in concentration levels in children.

The State government had issued an order that iodized salt must be sold compulsorily, Dr. Vijay said. District Revenue Officer A Sundaravalli presided over the function while the Director of Public Health and Disease Prevention, Dr Porkaipandian, explained about the benefits of iodine. Vellore corporation mayor, P Karthiyayini, and doctors, nurses and paramedics, as well as students from schools took part in the event.

Ghana can save millions if it implements the right malnutrition objectives, including iodized salt

Tamale, Ghana, Oct. 11, 2012. Ghana News Agency

The Ghana Health Service (GHS) has projected that the country could save about GHc 1,685 million if the country implemented the right malnutrition objectives with sustained financial commitment. The GHS said GHc 433 million can be saved through the proper management of iodine deficiency, GHc 505 million from anemia control and a colossal GHc 720 million from correction of stunting. In the same vein, however, the nation could lose a total of GHc 7,874 million from 2011 to 2020, if it failed to implement pragmatic measures in reducing the increasing iodine, anemia and stunting, resulting from poor nutrition in children and pregnant women. The service indicated that more than 30,000 children's lives could be saved by reducing underweight, 25,000 by reducing vitamin A deficiency and more than 4,500 lives of mothers would be saved by decreasing maternal anemia.

Madam Esi Amoafu, Deputy Chief Nutrition Officer of the GHS disclosed this in Tamale during a day's media workshop to sensitize media practitioners from the Northern, Upper East and Upper West regions on the consequences of malnutrition in the country. The workshop, which is under the theme; "Build the future, invest in nutrition now," was the third in a series after the southern and

middle belts. Madam Amoafu said 12,000 children die annually in Ghana because they were underweight due to poor nutrition. She said malnutrition was the major cause of death for children under five and pregnant and lactating mothers, stressing that, 1.5 million children could be affected by mild to severe irreversible brain damage due to iodine deficiencies.

Dr. Akwasi Twumasi, Northern Regional Director of the Ghana Health Services said good nutrition was the foundation of good health, and that there was the need to build a better future for the nation through quality, balanced and nutritious meals for children to ensure that they grow well. "The media must join the campaign for good nutrition for a better nation", he said. Mrs. Naana Osae Omaboe, Media Events Consultant, noted that because of the general impact of nutrition on the overall health needs of the country, there was an urgent need for the media to devote exclusive attention to it.

Annual Board Meeting of ICCIDD, September 6-7, 2012, Pisa, Italy

VELLORE 23rd October 2012 Indian Express News Service.

The 2012 Board Meeting of ICCIDD was held on September 6, 2012, in Pisa, Italy, in conjunction with the Annual Meeting of the European Thyroid Association.

Regional reports were received, and the Basal Hetzel Award was given to Mr. Khun Srethta Thavisin, President, Sansiri Corporation, Bangkok, Thailand. The 2012 budget was approved. The Board approved new revised Bylaws as well as the consolidation of ICCIDD with the Network for the Sustained Elimination of Iodine Deficiency.



Participants at the ICCIDD Board Meeting in sunny Pisa, Italy

The following persons were approved as new Regional Coordinators (RC) and Deputy Regional Coordinators: Pieter Jooste (RC for Southern Africa), Ming Qian (RC for China and Mongolia), Elizabeth Pearce (DRC for America), Maria Andersson (DRC for West and Central Europe), Gary Ma (DRC for Asia Pacific) and Ekaterina Troshina (DRC for Eastern Europe and Central Asia).

Abstracts

Iodine content in bread, milk and the retention of inherent iodine in commonly used Indian recipes.

Iodine deficiency disorders (IDD) are still a major public health problem and iodized salt remains the most effective means to control IDD in India. The authors investigated the iodine content in bread, milk and commonly used Indian recipes prepared without iodized salt and the retention of inherent iodine therein. Results showed considerable iodine content in bread (25µg/100g) and milk (303µg/L) as a positive reflection of universal salt iodization. Iodine content in 38 vegetarian recipes prepared without iodized salt was very low (2.9±2.4µg/100g). Retention of inherent iodine (65.6±15.4%) and iodine from iodized salt (76.7±10.3%) in the same recipes was comparable. Thus, USI remains the single most important source of dietary iodine for the Indian population.

Longvah T, et al. *Food Chem.* 2013 Jan 15;136(2):384-8.

Poor Knowledge and Practices Related to Iodine Nutrition during Pregnancy and Lactation in Australian Women: Pre- and Post-Iodine Fortification.

A before-after review was undertaken to assess whether knowledge and practices related to iodine nutrition, supplementation and fortification has improved in Australian women since the introduction of mandatory iodine fortification in 2009. A self-administered questionnaire was completed and dietary intake of iodine was assessed using a validated food frequency questionnaire. A generally poor knowledge about the role and sources of iodine in the diet remained after fortification. Post-fortification, iodine-containing supplements were being taken by 60% (up from 20% pre-fortification) and 45% of pregnant and lactating women, respectively. Dairy foods were the highest contributors to dietary iodine intake (57%-62%). A low intake of fish and seafood resulted in this food group contributing only 3%-8% of total intake. A low level of public awareness regarding the role of iodine in health supports the need for public health strategies in addition to fortification, such as an accompanying consumer education campaign, increased uptake of supplementation, and on-going monitoring.

Charlton K et al. *Nutrients.* 2012 Sep;4(9):1317-27.

Iodine deficiency and subclinical hypothyroidism are common in cystic fibrosis patients.

The authors investigated 129 children, adolescents, and adults with cystic fibrosis (CF), who were living in the northern part of Bavaria/Germany. Malnutrition and lung function were analyzed. Urinary iodine excretion, TSH (thyroid-stimulating hormone), and ft4 (free thyroxine) were measured and set in relation to population-based, age-adjusted

reference ranges. The results showed that subclinical hypothyroidism (normal ft4, elevated TSH) was found in 11.6% of subjects, and iodine deficiency in 83.7%. Dramatic iodine deficiency was found in this cohort of CF patients and may be associated with subclinical hypothyroidism; therefore, an individual iodine supplementation program is necessary.

Naehrlich L et al. *J Trace Elem Med Biol.* 2012 Oct 26. [Epub ahead of print]

Urinary iodine concentrations of pregnant women in Ukraine.

The authors examined the urinary iodine concentrations (UIC)s of pregnant women in Ukraine, where the iodine status is showing improvement among the general population. They enrolled 148 pregnant women <16 weeks pregnant and 80 healthy women as a control group living in Zhitomir, Ukraine. The median UICs were significantly lower in pregnant women than in control women [13.0 (ND-51.0) µg/L vs. 62.0 (35.3-108.5) µg/L, p<0.001]. TSH concentrations were significantly lower in pregnant women than in control women [1.7 (1.2-2.7) IU/L vs. 2.2 (1.4-3.1) IU/L, p=0.011]. The UICs in 142 pregnant women (95.9%) were <150 µg/L indicating insufficient iodine intake. The UICs of pregnant women in Ukraine revealed severe iodine deficiency. Regular monitoring is essential because iodine deficiency can be easily prevented by adequate iodine intake.

Sekitani Y et al. *Clin Chem Lab Med.* 2012 Sep 18. [Epub ahead of print]

Low Urinary Iodine Excretion during Early Pregnancy Is Associated with Alterations in Executive Functioning in Children.

In a population-based cohort the authors examined the association between maternal urinary iodine during early pregnancy and executive functioning in children at 4 y of age. In addition, they investigated the modification of this association by maternal diet and thyroid function. During pregnancy, urinary iodine and thyroid hormone concentrations were measured in 1156 women. In 692 of their children impairment of executive functioning was assessed by the Behavior Rating Inventory of Executive Function. Five hundred mothers of Dutch national origin completed a FFQ. The children of mothers with low urinary iodine showed higher scores on the problem scales of inhibition [β = 0.05 (95% CI: 0.01, 0.10), P = 0.03] and working memory [β = 0.07 (95% CI: 0.02, 0.12), P = 0.003]. Associations between urinary iodine and problems of inhibition were attenuated after adjustment for maternal psychological symptoms. Thus, low maternal urinary iodine during pregnancy is associated with impaired executive functioning in children.

van Mil NH et al. *J Nutr.* 2012 Oct 17. [Epub ahead of print]

Breastmilk iodine concentrations following acute dietary iodine intake.

The authors assessed the effect of and time to peak breastmilk iodine levels after potassium iodine ingestion. Sixteen healthy lactating Boston-area women with no known thyroid disease were each given 600µg oral potassium iodide (KI) (456µg iodine) after an overnight fast. Iodine was measured in breastmilk and urine at baseline and hourly for 8 hours following iodine intake. All dietary iodine ingested during the study period was also measured. Results: Median (interquartile range [IQR]) baseline breastmilk and urine iodine levels were 45.5µg/L (IQR 34.5-169.0) and 67.5µg/L (IQR 57.5-140.0), respectively. Following 600µg KI administration, median increase in breastmilk iodine levels above baseline was 280.5µg/L (IQR 71.5-338.0), and median peak breastmilk iodine concentration was 354µg/L (IQR 315-495). Median time to peak breastmilk iodine levels following KI administration was 6 hours (IQR 5-7). Dietary iodine sources provided an additional 36-685µg iodine intake during the 8-hour study. The authors concluded that following ingestion of 600µg KI, there is a measurable rise in breastmilk iodine concentrations, with peak levels occurring at 6 hours.

Leung AM, et al. *Thyroid.* 2012 Nov;22(11):1176-80.

Assessment of iodine nutrition in populations: past, present, and future.

Iodine status has been historically assessed by palpation of the thyroid and reported as goiter rates. Goiter is a functional biomarker that can be applied to both individuals and populations, but it is subjective. Iodine status is now assessed using an objective biomarker of exposure, i.e., urinary iodine concentrations (UICs) in spot samples and comparison of the median UIC to UIC cut-offs to categorize population status. This has improved standardization, but inappropriate use of the crude proportion of UICs below the cut-off level of 100 µg/L to estimate the number of iodine-deficient children has led to an overestimation of the prevalence of iodine deficiency. In this review, a new approach is proposed in which UIC data are extrapolated to iodine intakes, adjusted for intraindividual variation, and then interpreted using the estimated average requirement cut-point model. This may allow national programs to define the prevalence of iodine deficiency in the population and to quantify the necessary increase in iodine intakes to ensure sufficiency. In addition, thyroglobulin can be measured on dried blood spots to provide an additional sensitive functional biomarker of iodine status.

Zimmermann MB, Andersson M. *Nutr Rev.* 2012 Oct;70(10):553-70.

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