INTERNATIONAL COUNCIL FOR CONTROL
OF IODINE DEFICIENCY DISORDERS

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IN THIS ISSUE:

Iodized salt spreads across India

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

Adequately iodized salt covered seventy-one percent of India in 2009

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The Ministry of Health and Family Welfare, Government of India and UNICEF conducted a Coverage Evaluation Survey in 2009 (CES 2009). The CES 2009 covered all the States and Union Territories of India. The survey was commissioned by United Nations Children's Fund (UNICEF) with the funding from IKEA Social Initiative, and the ORG Center for Social Research carried out the survey. The field work was done between November 2009 and January 2010.

Data was collected from 22,604 mothers/caretakers of children aged 12-23 months and 22,984 mothers who delivered during 12 months prior to the survey. In each state, a rural-urban sample was allocated in 60 to 40 ratios. A multistage Probability Proportional to Size (PPS) cluster sampling was done separately for rural and urban areas. From each selected Primary Sampling Unit (a village or census enumeration block), 10 households with a child age 12-23 months and 10 with mothers who had delivered in the last 12 months were selected using a systematic random sampling procedure. From selected households all eligible mothers/caretakers were interviewed.

During the data collection and administration of questionnaires, the common salt used for cooking in the household was obtained to test the iodine content. Salt was tested for iodine content by the interviewers at the household level using semi-quantitative salt test kits.

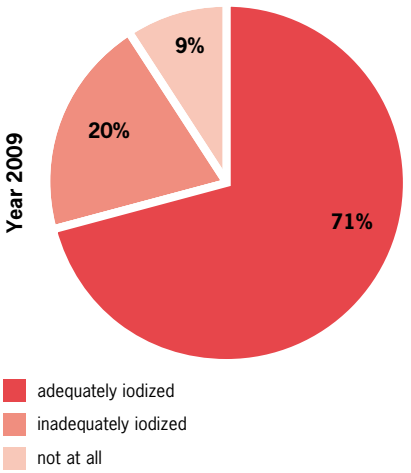
Overall, 71.1 percent of the households were using cooking salt which was iodized at the recommended level of 15 ppm or more. (Figure 1) Only 9.3 percent of the households used salt that was not iodized at all and 19.3 percent used salt that was iodized inadequately (<15 ppm). The rural-urban differential in salt iodization was pronounced. (Figure 2). Around 83.2 percent of households in urban areas used salt with 15 ppm or more iodine content compared with 66.1 percent of households in rural areas. The proportion of households using non-iodized salt was greater in rural areas (11.0 percent) than in urban areas (5.1 percent).

The use of iodized salt was high in north-eastern States and in States of Delhi, Goa, Haryana, Himachal Pradesh, J&K, Punjab and all UTs, ranging from 80 percent to 94 percent (Figure 3). In the States of Karnataka, Andhra Pradesh, Tamil Nadu, Madhya Pradesh, Uttar Pradesh, Orissa, and Jharkhand use of iodized salt was low as compared to other States (Figure 4)

Comparison with earlier surveys

The results of the CES 2009 show the tremendous progress made towards achieving USI in Indian in recent years. In the last national level survey conducted in 2005-06 (National Family Health Survey 3) the consumption of adequately iodized salt at household level was only 51% (Table 1 and Figure 5). No increase in iodized salt coverage was seen between the two national level surveys in 1998-99 (NFHS 2) and 2005-2006 (NFHS 3). The stagnation in the household level coverage of adequately iodized salt between 1998 and 2006 was primarily because of the lifting of the ban on the sale of non-iodized salt in India in year 2000.

Figure 1: Iodized salt consumption at household level in India



Factors in the increase in iodized salt coverage

The remarkable progress made in iodized salt coverage in the country was driven by a multitude of factors and by bringing together all stakeholders of USI at National and State level. A National Coalition for Sustained Iodine Intake (NCSII) was formed in India in 2006. Since 2008, the ICCIDD Regional Office (South Asia) has been hosting the Secretariat of the Coalition.

Salt production in Uppalam

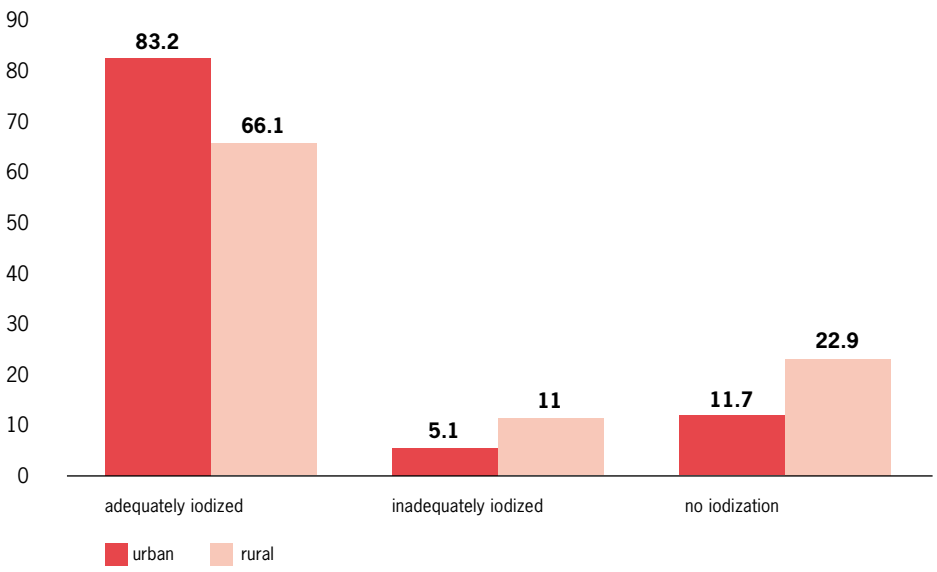
The Indian salt industry has made rapid progress over last decade with an increase in both quantity and quality of iodized salt produced in the country. In year 2008-2009, for the first time, the iodized salt production (5.37 million MT in year 2008-09) was greater than the national requirement of edible salt (5.2 million MT). There has been a trend in recent years towards an increasing share of refined salt and packaged in edible salt category. The share of refined edible salt in total salt production in India is increasing by approximately 10 percent annually (currently approximately 50% of salt production in India consists of refined salt).

The increasing uptake of packaged salt in India is driven both by dynamics from the supply side and the consumer side. On the supply side, there is increasing mechanization of salt production, including setting up of new refineries/washeries. Refined/ washed edible salt (sold packaged) is usually better iodized as compared to common raw/ crystal salt (sold loose). On the demand side, the primary drivers of the increase in the share of refined salt are preference of the consumer for „salt tasting good", „white" and „packaged/branded" salt. Awareness of iodized salt and demand for iodized salt is a distant fourth, as a factor of salt quality identified by the consumer.

At the consumer level, the cultural preference for a particular type of salt and „availability/access" are the determining factors driving the type of salt consumed, at least in difficult-to-reach rural areas. For example, in some rural areas of Uttar Pradesh, „Bara Gara/ Phoda" (Loose Crystal Salt) is the culturally preferred salt. In these difficult-to-reach areas, only this type of salt is available. In these rural pockets, consumers have both limited awareness and access to packaged salt.

The cost difference in different type of salts is one of the factors in determining the sale of a particular type of salt. As shown by different surveys, the profit margin of retailers is different for different types of salt. It is highest for the loose crystal salt and lowest for packaged, branded refined salt. Thus, the retail salt shopkeeper has an incentive to sell loose crystal salt (which often is not iodized or inadequately iodized).

Figure 2: Rural-Urban differential in iodized salt coverage in India in 2009



At the consumer level, cost factors seem to operate more at the community level (i.e., the purchasing power at the aggregate level). Based on the paying capacity of a community as a whole, the wholesale/retail traders make a particular type of salt available in that particular area/region. The individual consumer may be willing to pay more for a better quality product but have access to only one type of salt. In a recent study carried out in rural areas of India, more than 72% of people were willing to pay more for better quality salt. Other factors leading to the nearly 20% increment in the coverage of adequately iodized salt in India over last half a decade include:

- strengthening of quality assurance in the Salt Commissioners' laboratories translating into better production-end monitoring of iodized salt
- strict implementation of Prevention of Food Adulteration Act (PFA), 1955
- increased awareness amongst consumer regarding iodization of salt and its demand

The National Coalition for Sustained Iodine Intake (NCSII) has, since its inception, provided much needed harmonization and acceleration to IDD elimination activities in the country. The coalition has seen active participation from Government of India agencies (Ministry of Health and Family Welfare, Salt Commissioners Office), State Government agencies (Ministry of Health and Family Welfare at the State level), National Institutes/Organizations (NIHFW, NCC), partner agencies (WHO, UNICEF, WFP, GAIN, MI, ICCIDD), health professionals groups (IPHA, IAPSM, ITS, ISPAE), salt manufacturers associations (ISMA), civil society/consumer advocacy groups (CLARA, Sharnum) and media advocacy groups like Communicators India, ITM Solutions, Via Media, etc. The Coalition provided a platform bringing together all partner agencies, government agencies and departments. The partner agencies shared their ongoing projects and future plans with the entire group, thus enabling greater synergy of the individual efforts of all partner agencies.

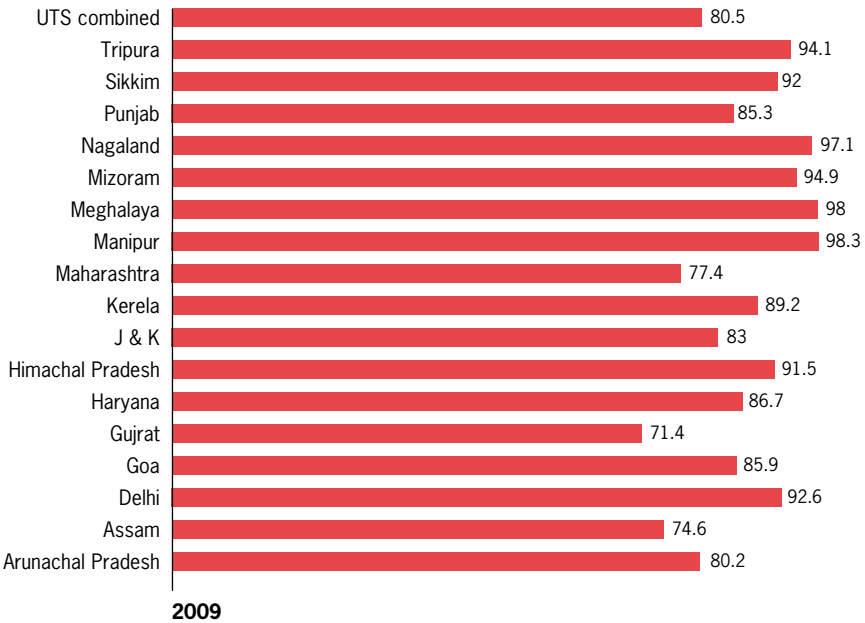
Although there is clear progress on Indian USI, the rural-urban differential in salt iodization remains pronounced

The way forward

The results of the CES 2009 survey are extremely encouraging and with further acceleration of the efforts to eliminate IDD in India, the country may achieve Universal Salt Iodization (USI) soon.

Keys to achieving USI in India is better understanding of changing consumer preferences, and the trend toward an increasing share of refined/branded/packaged edible salt in India.

Figure 3: Indian State level iodized salt coverage: States with coverage above national average



More Indian children are consuming iodized salt than ever before

Figure 4: Indian State level iodized salt coverage: States with coverage below national average

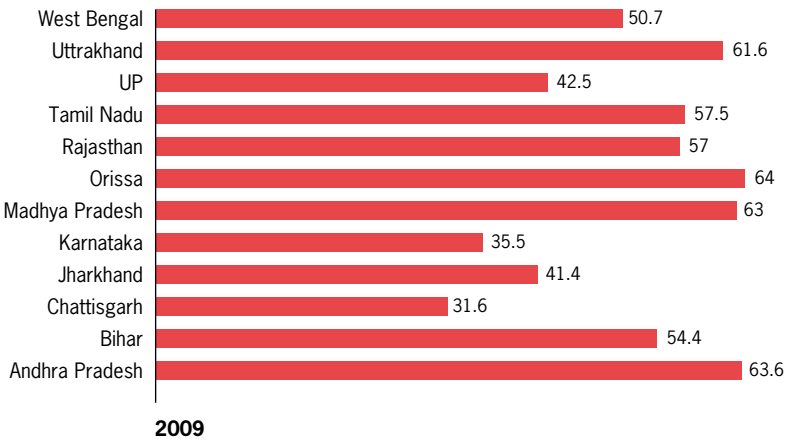
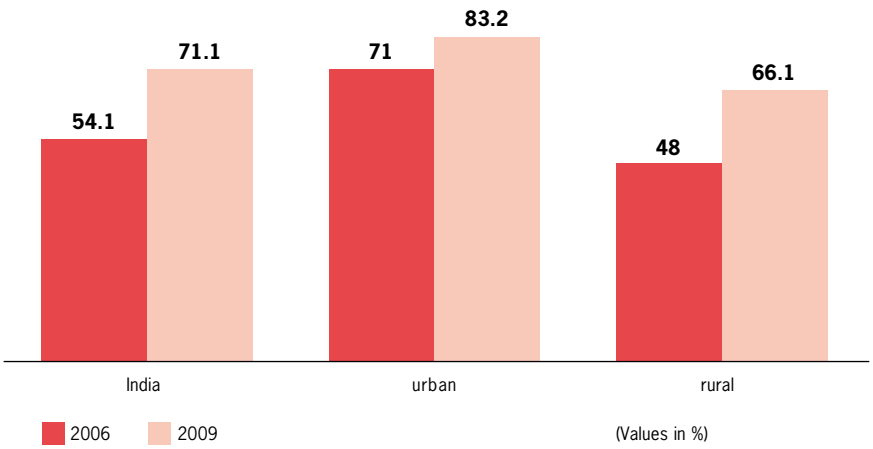


Figure 5: Rural-Urban differential in iodized salt coverage in India in 2006 and 2009



The focus of future efforts should be:

- ensuring adequately iodized salt to rural and marginalized populations
- addressing wide inter-state variation in the adequately iodized salt coverage
- distribution of iodized salt through the Public Distribution System
- strengthening of the quality assurance of laboratories of the private salt producers
- improved monitoring of the road movement of adequately iodized salt
- supporting small and medium scale salt producers to improve quality of raw salt being produced
- strengthening of community monitoring of salt iodization and strict implementation of Prevention of Food Adulteration (PFA) Act 1955
- future surveys should shift from using salt testing kits to the more accurate iodometric titration method for iodine estimation in salt
- the National Coalition for Sustained Iodine Intake (NCSII) needs to expand its activity to the state level and establish state level coalitions

Table 1: Iodized salt consumption at household level in India in 2006 and 2009

Iodine Content of Salt Consumed	2006	2009
Adequate (≧ 15 ppm)	54%	71.1%
Inadequate (<15 ppm)	31%	19.3%
No iodine	13%	9.3%

Reaching the rural poor in India with iodized salt: the Micronutrient Initiative's *Iodized Salt Coverage Study 2010*

Barbara Strange Micronutrient Initiative. Study report by **Mathew Joseph, S Kaushik, Suvabrata Dey** Micronutrient Initiative; **Sucharita Dutt, Ranjan Kumar Jha** Micronutrient Initiative India Trust.

A study of iodized salt coverage among rural populations in eight Indian states provides important new information to help guide efforts to scale up production and consumption. Importantly, this study accurately quantified iodine in household salt using titration.

Funded by the Micronutrient Initiative (MI), the *Iodized Salt Coverage Study 2010* was designed and guided by the Salt Commissioner's Office, Ministry of Commerce & Industries, Government of India and a consortium of agencies. AC Nielsen conducted the study in 2010, and the South Asia regional office of the International Council for the Control of Iodine Deficiency Disorders (ICCIDD) conducted the analysis of the salt samples.

In contrast to the UNICEF study reported above, given the importance of not only quantity but also quality in salt iodization, this study employed titration techniques in order to present the most accurate picture possible in relation to adequately iodized salt at the level of 15 ppm. The sample size was 1,200 rural households per state, for a total of 9,600 households across eight states. Additionally, 1,872 retailers and 478 wholesalers were interviewed. The eight States included in the study are shown in green on the Map.

Evidence of Progress

It is estimated that 200 million people in India are exposed to the risk of IDD and more than 71 million suffer from goitre and other forms of IDD. The good news is that the 2010 *Iodized Salt Coverage Study* reveals signs of significant progress in iodized salt coverage in rural areas. In 2005-2006, the National Family Health Survey 3 (NFHS 3) revealed that roughly half of the country was consuming iodized salt. However, in eight states – representing more than half of the Indian population – consumption of iodized salt was significantly below the national average. Rural populations fared particularly badly, with only 27% of households in these states consuming iodized salt.

The findings of the *Iodized Salt Coverage Study* show that by 2010, 47.3% of rural households in the same eight states were consuming adequately iodized salt. This in an impressive 20% increase in household consumption – and means that hundreds of millions of people have newly-gained access to adequately iodized salt. While the proportion of adequately iodized salt in India faltered between 1999 and 2005, these latest findings demonstrate a positive new momentum that reflects recent changes in India's salt industry. These changes include better production, better refining and iodization practices, improvement in salt quality, improvements to packaging, effective monitoring of iodine levels from production to consumption, and better consumer awareness. Also notable, is the reinstatement, in 2005, of the ban on the sale of non-iodized edible salt.

The Poverty Gap

Although the increase in access is positive news, the overall levels of access still present a dire picture for far too many people. A total of 52.7% of rural households in the eight states do not have access to adequately iodized salt. In analysing the data further, an even bleaker picture emerges for the poorest of rural households. The surveyed households were stratified into economic quintiles based on wealth indices: poorest, poor, middle, rich and richest. An overview of findings from the eight states reveals that, in fact, 64.7% of households in the richest wealth quintile have access to adequately iodized salt, whereas only 36.2% of those in the lowest wealth quintile have access.

This data is evidence that the poorest households continue to be the most disadvantaged in terms of access to adequately iodized salt. It convincingly points to the need to accelerated efforts to reach the uncovered 63.8% of people in this economic category through innovations that target small salt processors and employ creative nutrition education campaigns.

Type of Salt

The study findings demonstrate that the type of salt consumed has important ramifications for iodized salt coverage. In the rural households of the eight states studied, 71.7% of packaged crushed salt was adequately iodized, whereas only 24% of packaged crystal salt and a mere 6.8% of loose crystal salt were adequately iodized. Among the households surveyed, 57.3% are using crushed salt, though the results varied across the states. Most people in Rajasthan (86.6%) and Uttarakhand (84.5%) use packaged crushed salt. Rajasthan is a salt producing state and it is interesting to note that the great majority of even rural people are now buying packaged crushed salt with only small numbers buying crystal salt.

The total number of rural households purchasing packaged crystal salt is 19.2%, although in Tamil Nadu and Karnataka, a high number of rural households use packaged crystal salt. The biggest users of loose crystal salt are in Uttar Pradesh, where nearly half of the rural people consume salt in this form. This fact, alone, presents a major challenge to the salt iodization program in India and points to the need to introduce better technologies for crushing and refining salt in certain regions.

Awareness

There is fair knowledge among the rural population about the effects of iodine deficiency on the human body. Across the eight states, an average of 62% of the people surveyed knew iodine deficiency results in goitre, with the highest awareness in Orissa (81.7%) and the lowest in Andhra Pradesh (39.7%). Interestingly, 70.3% of the people in Andhra Pradesh, while having little knowledge of the link to goitre, knew iodine deficiency can result in less physical development or stunted growth.

Overall, 35.4% of the people knew that iodine deficiency causes "less mental development and diminished intelligence". Awareness of this link was highest in Karnataka at 62.4%, yet iodized salt consumption is among the lowest in this state. Among people surveyed, 57.8% were aware of iodized salt, and 55% of these had iodized salt in the household. However, in general, this awareness is not matched by the presence of adequately iodized salt in the household.

Consumer Motivation

Iodization of salt is not generally seen as an important quality when people are assessing quality of salt. In fact, iodization of salt as an important attribute to the quality of salt is highest in Rajasthan at only 33.9% of the rural population, followed by Uttarakhand at 23.9%, and Madhya Pradesh at 19.4%.

Of all the important attributes that people ascribe to salt, "Tastes good" seemed to be the most important (52%) followed by "Whiteness" (48%), "Looks attractive" (17.7%) and "Packaged/branded" (15.9%). Results show that 68.3% of the people think that the salt they buy is of good quality and only 1% thought it was poor quality salt. An average of 72.4% of households indicated that they are willing to pay more for higher quality salt. Thus, price is not a deterrent for purchase of better quality salt among rural households, but this is of little help to iodization efforts until iodization is seen by more people as an attribute of good quality.

Salt Trade

Most retailers serving rural markets procure salt from general wholesalers. The other common procurement source is from locally based merchants or vendors, followed by wholesalers who deal only in salt. Most of the retailers reported dealing primarily in packaged crushed salt, although the sale margin, for both retailers and wholesalers, is lowest in packaged crushed salt and highest in loose crystal salt.

Across all states more than 78.3% of retailers and 94% of wholesalers said they had seen promotional campaigns for iodized salt, with the most prominent medium being TV, followed by radio and newspaper advertisements. The field functionaries played a very small role in being the source of information to the retailers.

Using Information for Action

The *Iodized Salt Coverage Study* has provided a valuable picture of iodized salt awareness, trade and consumption in rural areas of the eight Indian states covered. It provides us with information on underlying factors that may be inhibiting the consumer switch to iodized salt.

If the report tells us one thing, it is the importance of accelerating efforts to reach the poorest of the rural population. With this report in hand, we have a new tool in our information arsenal for doing just that. To read the report summary, visit: www.micronutrient.org.

Belgrade Forum accelerates national efforts in the Russian Federation and Ukraine to ensure optimum iodine nutrition

Russia and Ukraine are the two most populous countries in the CEE/CIS region and the only two countries in the region that have not yet passed mandatory legislation on universal salt iodization at a national level

On 2-3 March 2011, UNICEF Regional Office for Central and Eastern Europe and the Commonwealth of Independent States (UNICEF-CEE/CIS), along with the Global Alliance for Improved Nutrition (GAIN), organized a joint forum hosted by the Serbian Ministry of Health in Belgrade, Serbia. Its purpose was to create new coalitions in the Russian Federation and Ukraine to move forward implementation of national salt iodization strategies. Russia and Ukraine are the two most populous countries in Central and Eastern Europe and the Commonwealth of Independent States, and also the only two countries in the region that have not yet passed mandatory legislation on universal salt iodization at a national level.

An estimated 1.5 million infants in Russia and Ukraine are born each year in households that are not using adequately iodized salt and are therefore unprotected from preventable brain damage due to iodine deficiency.

According to a cost benefit analysis undertaken by UNICEF in 2006, in ten years the Ukraine economy will lose $330 million, or an estimated 54 million work days due to iodine deficiency (IDD). In that same time period it is estimated that Universal Salt Iodization would cost the country $2.6 million. In Russia, where over 1 million children are born unprotected annually, the cost of IDD prevention with iodine pharmaceuticals for one child during the first 3 years of life was evaluated at US$33, or $67.76 including costs of iodine supplementation during pregnancy and breastfeeding (IDD Newsletter May 2008, "IDD elimination in Russia: challenges and solutions"). Meanwhile, iodized salt costs an estimated $ 0.05 per person per year (The World Bank).

A New Approach

In addition to mandatory iodization of household salt, mandatory use of iodized salt in bakeries and other food industries has led to vast progress in neighboring countries given that a significant level of salt intake comes from processed foods (IDD Newsletter February 2011, "Progress in CEE/CIS"). Due to their previous history of salt iodization and recent investment in technologies, Russian and Ukrainian salt industries have the technical capacity to iodize all salt required for the market, but political resistance has continued to hinder implementation. The main barriers to USI adoption have been a vague government position about the problem as well as commercial interests which cite alleged prevention of "freedom of choice" as an argument against USI. In response to these challenges, UNICEF and GAIN organized a joint forum to call these issues to the attention of Russian and Ukrainian decision makers and industry leaders, and reframe the discussion to emphasize that optimum iodine nutrition can be achieved without depriving consumers of their choice between iodized and non-iodized table salt.

Participants in the forum included salt producers and traders, food industry representatives, public sector officials, civil society organizations, and academic advisors from both countries. The program shared examples from countries which were successful in eliminating IDD through specific strategies geared towards iodized salt use in the food industries and public catering, in particular, Kazakhstan and Belarus. The strategy to allow free sale of iodized and non-iodized salt but mandating iodized salt in the food industries was particularly appealing to proponents of free consumer choice. One salt trader reported that in Russia, nearly half of the edible salt produced goes to the food industries and that this supply channel could therefore be a significant contributor to optimum iodine nutrition of the population.

Positive Momentum

This meeting marked first-time participation of certain key ministerial and parliamentary representatives from both countries, who presented proposals for national salt iodization strategies. As industry acceptance is also crucial for a successful IDD elimination program, one Russian salt producer expressed willingness for the first time to promote iodized salt to their major customers, including retail chains and food industries. Also, food industry participants agreed that there is no legal or technical barrier to the use iodized salt in the food industries. In the case in the bread industry in Russia, the private sector can begin using iodized salt voluntarily. While supportive legislation would be required to scale up this approach, gaining buy-in from opinion setters in the bread industry is a step forward. At the end of last year, the Russian government adopted the "Fundamentals of Public Policy in Healthy Food and Nutrition for the Period until 2020," which defines national policy in healthy nutrition for the next decade. This development represents a positive shift in prioritizing nutrition and mass food fortification at a high political level.

In the closing session, the following points were achieved:

- a joint Declaration (see below) was approved by all participants expressing their motivation to change the situation in their countries
- each country presented concrete actions to take in the coming months to move national efforts forward
- Russian salt and bread baking industries expressed interest in collaborating with their Belarusian and Kazakh counterparts
- participants from Russia decided to discuss harmonization of requirements regarding iodized salt within their regional Customs Union Committee
- Russian and Ukrainian participants agreed to look at solutions to resolve the regulatory needs for the food industries, and to collaborate with UNICEF and GAIN on the issue.

Text of the „Declaration of the Belgrade Forum on Optimum Iodine Nutrition, March 3, 2011":

The Forum on Optimum Iodine Nutrition was held on 2-3 March 2011 in Belgrade, Serbia with support of UNICEF,

Discussions at The Belgrade Forum may lead to progress on salt iodization in the region

the Global Alliance for Improved Nutrition (GAIN) and the World Health Organization (WHO). It gathered influential policymakers, leaders of food industry, researchers and experts from the Russian Federation and Ukraine together with their colleagues and experts from Belarus, Kazakhstan, Serbia and other countries. At the Forum, participants examined and learned from experiences of national salt iodization programs as safe, effective, cost-efficient and sustainable strategy. It was emphasized that over the past 10 years Russia and Ukraine have not made significant progress in eliminating iodine deficiency and that nutritional supplements were not effective for population based iodine prophylaxis. The sessions at the Forum emphasized the importance of joint supportive advocacy and collaboration among the governments, salt producers and traders, food industries, scientists and civic society in the adoption and execution of a national salt iodization strategy aimed at achieving optimum iodine nutrition of the population.

A new study, entitled *Universal Salt Iodization in Central and Eastern Europe and the Commonwealth of Independent States,* provides persuasive evidence that during the decade of 2000-2009, countries in the region where the legislation directed that all the salt supplies, including for food industries, should be iodized have been more successful than those where the iodization efforts focused on table salt only. With the ongoing industrialization in the region, the share of the population's salt intake from processed common foods such as bread, meat, cheese and dairy products has become ever more predominant. Experiences in Serbia, Kazakhstan and Belarus have taught that the engagement of the salt suppliers and food manufacturing industries is increasingly critical for successful implementation of salt iodization strategies to prevent decrease of intellectual capacity resulting from iodine deficiency.

At the closing session, the Forum participants supported this Declaration and pledged to:

1. Bear the responsibility to develop, adopt and implement effective programs to reach optimum iodine nutrition of the population and aiming at prevention of decrease of intellectual capacity of children and other iodine deficiency disorders.

2. In order to reach optimum iodine nutrition of the population, empower all iodized salt supply channels, including food industry, public institution caterers and retail trade. Consider as a priority expanded use of iodized salt in baking industry and for production of other staple foods.

3. Strengthen monitoring systems to track quality and supplies of iodized salt and iodine status of the population by garnering political commitment and oversight from government and civic sector organizations.

4. Ensure that the population is aware of the negative consequences of iodine deficiency and have consumer rights for access to good quality and adequately iodized salt

5. Call on the Presidents, Parliaments and Governments of Ukraine and Russia on the need for legislation on salt iodization.

IDD in the Ukraine and a passionate call for mandatory salt iodization

Prominent scientists have called for legislative approval of mandatory iodization of table salt in Ukraine in order to avoid iodine deficiency its impairment of mental abilities of the population. The relevant draft law has been submitted to Volodymyr Lytvyn, the Speaker of the Verkhovna Rada of Ukraine, and to Serhiy Ryzhenko, Chief Sanitary Inspector of Ukraine. This statement was made by Yuriy Kundiyev, vice-president of the National Academy of Medical Sciences of Ukraine (AMS), who represented the position of AMS and a number of AMS member institutes working in the areas of health care and biology.

Professor Kundiyev emphasized that medical science has identified iodine deficiency as a common global cause of mental retardation and irreversible brain damage. He said:

"With the level of iodine deficiency that we have in Ukraine, 32.5 thousand mentally-retarded children are born annually. And in the future these 32.5 thousand children will become a burden for the society instead of being worthy addition to our GDP. We are losing our nation's gene pool, we are losing our scientific and intellectual potential".

"And now we face the question: why haven't we still done this simple thing as it has already been done by 102 countries – even countries with less acute iodine deficiency situation as compared to Ukraine? 102 countries of the world fortify salt with iodine! What do we want to have - an ark of fools, or a smart country striving towards the development and achievements based on knowledge and science?"

Ukrainian children need more iodine from iodized salt

The academician pointed to the fact that iodized salt is absolutely affordable for all groups of population, and its effectiveness and safety has been proven by global experience. He added that no other iodized food products or iodine-based medications are capable of ensuring mass prevention of iodine deficiency disorders. At the same time, Professor Kundiyev noted that non-iodized salt may also be available through pharmacies – though in limited quantities – to those with medical contraindications.

According to proposed draft law, salt used for manufacturing of food products (excluding technologies that require the use of non-iodized salt), as well as fodder salt (excluding lump salt and salt blocks), shall be subject to iodization. According to the draft law, sales of iodized table salt shall be made mandatory for all retail trade, while the retail price for iodized salt should not exceed the retail price of non-iodized salt. It is also suggested to cover all iodization-related expenditures of salt manufacturers via preferential taxation mechanisms, which should be developed by the Cabinet of Ministers of Ukraine.

The urgent necessity of mass introduction of iodized salt to eliminate iodine deficiency in Ukraine was actively discussed and confirmed by the participants of an international workshop, organized within the framework of the Fourth National Competition on Bioethics in Kyiv in 2010. Two Board Members of ICCIDD, Dr. Frits van der Haar and Dr. Michael Zimmermann, were invited by UNICEF Ukraine to speak on IDD at its consequences and that meeting. Studies conducted in 2007–2009 by medical scientists and experts of the Ministry of Health of Ukraine have confirmed that regions with pronounced iodine deficiency lack children with above-average intellectual capacity; moreover, there are a too many children with low and very low levels of intellect.

Reflections in a salt lake in the Ctimea, Ukraine

Iodine deficiency during pregnancy and infancy in the south-eastern Ukraine

Natalia Tananakina Central Regional Hospital, Dnipropetrovsk, Ukraine; **Victor Kravchenko** Institute of Endocrinology, Kiev, Ukraine; **Oksana Belkina** Medical University, Lugansk, Ukraine; and **Frits van der Haar** ICCIDD, Atlanta, GA, USA

In 2006, a population-representative, randomized cluster survey among school-age children and non-pregnant women of Dnipropetrovsk Province, south-eastern Ukraine, found a mean goiter rate of 38% and a median urinary iodine concentration (UIC) of 82μg/L, indicating mild-to-moderate iodine deficiency by WHO criteria. Also, 27% of newborn TSH concentrations were elevated (>5mU/L) in screening of 1205 serial newborns in the city of Dnipropetrovsk, suggesting their mothers were iodine deficient during pregnancy.

During 2008, an exploratory study of pregnant women in Dnipropetrovsk was done to assess the relationship of their current method of iodine prophylaxis to their iodine nutrition status. At mean 31 weeks of pregnancy, women were enrolled purposely in rural and urban prenatal clinics on the basis of their practice of dietary iodine provision as follows:

- A. using only iodized household salt (n=23)
- B. using once-daily supplements with 200 μg iodine (n=16)
- C. using iodized salt and iodine supplements (n=15)
- D. using common table salt (n=57).

The median UIC of all the women was 77.5μg/L, which confirmed the existence of iodine deficiency in the population. Group-specific median UIC levels were (A) 95; (B) 122; (C) 226; and (D) 30μg/L and demonstrated a highly significant difference ($p<0.05$) between groups. Optimal iodine nutrition (150-299μg/L) was present in only 19% of the women.

In 2008, for the first time in Ukraine, the dietary iodine provision of newborns was assessed in a study of iodine content of colostrums (early breast milk). The median colostrum iodine concentration was 40 μg/L, which is below similar studies in non-affected populations in Western Europe. A direct linear relationship ($p<0.05$) existed between the colostrum iodine content and the UIC of the breast-feeding mothers. After childbirth, 66% of the breast-feeding mothers had UIC levels <100 μg/L (median 66 μg/L), suggesting that the insufficient iodine intake in newborns from the first days of life was caused by dietary iodine deficiency in their mothers.

Thus, these studies show that dietary iodine deficiency and its consequences are prevalent in an area of Ukraine hitherto officially believed to be unaffected by IDD. Under current national legislation, only the use of properly iodized household salt combined with daily iodine supplements would ensure sufficient iodine nutrition during pregnancy and infancy in the south-eastern Ukraine.

Salt for Survival: Canadian students spread the word on the benefits of iodized salt

Connor Emdin and **Alex Ognibene** co-presidents of Salt for Survival, Toronto, Canada

Salt for Survival is a student-run organization at the University of Toronto, Queen's University and McGill University that seeks to promote awareness of iodine deficiency and to raise money for salt iodization projects in the developing world. The organization was co-founded by Connor Emdin and Alex Ognibene in 2009, during their first year of undergraduate studies at the University of Toronto's Trinity College. Specializing in Biochemistry and Peace and Conflict Studies, the founders sought to engage their respective fields and the wider campus community.

Iodine deficiency was chosen as the organization's target issue due to its detrimental and widespread effects on global health and development. Iodine deficiency is endemic to many of the world's poorest regions, and results in severe health disorders such as hypothyroidism and goiter, in addition to the loss of an estimated 1 billion IQ points each year. Despite the adverse and well-documented consequences of iodine deficiency, the issue has received very little public attention. College campuses are known for being relatively attuned to global issues, yet iodine deficiency remains virtually unknown relative to other health problems such as AIDS, cholera, and tuberculosis. Fundraising at a local level is particularly difficult as individuals are unlikely to donate to a cause that they have never heard of. Salt for Survival's mandate is to combat this lack of awareness by educating the campus and surrounding community about iodine deficiency through advocacy and fundraising initiatives.

Salt for Survival has come a long way since its creation two years ago. The organization has established chapters at Queen's and McGill Universities and raised over $6,000 for initiatives spearheaded for the International Council for the Control of Iodine Deficiency Disorders (ICCIDD).

***Leadership of Salt for Survival at Queen's University in Canada. From the left:** Alice Lin: Events Director, Madison Barr: Secretary, Greg Kaladeen: Co-president, Maura Christie: Co-president*

This year, Salt for Survival organized a variety of events around University of Toronto including activities for Trinity College frosh-week and a screening of the Micronutrient Initiative's short film, Dibocor's Salt. They also ran a highly successful fundraising drive raised money through a bracelet campaign and bake sale. Salt for Survival also partnered with small businesses in the Toronto community to distribute small donation tins and pamphlets on iodine deficiency. At Queen's University, Salt for Survival held bake sales and raffle draws as well as partnering with Queen's UNICEF for a bingo night.

Salt for Survival also partnered with the International Relations society at University of Toronto to host a speaking event in March for Mr. Harry Black, Officer of the Order of Canada, former UNICEF Canada Executive Director, and Senior Advisor to the ICCIDD. Mr. Black discussed iodine deficiency and his experiences working with international institutions during a luncheon at the Munk School of Global Affairs.

In the future, Salt for Survival hopes to continue its advocacy and fundraising activities and to expand its membership. A campus organization at University of Ottawa is planned in the fall. Salt for Survival thanks all of its supporters for their contributions and assistance, and looks forward to planning more events and nurturing relations with other campus groups and external organizations. For more information about Salt for Survival, feel free to visit *www.saltforsurvival.org* or contact the authors at contact@saltforsurvival.org.

Regional Standards on Salt Iodization in West Africa

Roland Kupka, Nations Children's Fund Regional Office for West and Central Africa; **B Ndiaye,** the Micronutrient Initiative Regional Office for Africa; and **Pieter Jooste,** ICCIDD Secretariat, South African Medical Research Council, Cape Town.

Participants of the Workshop to Revise Regional Draft Standards on Salt Iodization

Background

Iodine deficiency is the single greatest cause of preventable mental impairment, a problem that can be effectively and inexpensively prevented by iodizing all salt for human and animal consumption. There has been longstanding political support for the elimination of iodine deficiency disorders (IDD) in Africa, starting with the 1990 World Health Assembly Resolution 43.2 that established the goal of eliminating IDD as a public health problem and the endorsement of universal salt iodization (USI) as the means to sustainably eliminate IDD by West African Heads of State and Government in 1994 (1). The West African Economic and Monetary Union (or UEMOA from its name in French, Union économique et monétaire ouest-africaine) (Figure 1) has also recognized the importance of alleviating IDD and to facilitate intra-region trade of high-quality iodized salt. Such commitment, coupled with increased production of iodized salt and advocacy, awareness creation, and interagency collaborations provided the basis for improvements in the household coverage of adequately iodized salt (Table 1).

Each of the eight UEMOA countries has mandatory legislation in place on salt iodization. However, poor monitoring and enforcement of this legislation is considered a major reason why the household consumption of iodized salt remains suboptimal (2). Efforts to enforce legislation have been hampered by variations in required iodization levels at production, export, and import stages; such variations also cause difficulties for salt producers, exporters, and importers in a region in which intercountry salt trade is common. In an effort to address this problem, key stakeholders including the West African Health Organization, Helen Keller International, the Micronutrient Initiative (MI), the International Council for Control of Iodine Deficiency Disorders (ICCIDD), the United Nations Children's Fund (UNICEF), and the UEMOA Technical Committee for Food Products met in 2005 to develop UEMOA Regional Standards on Iodization of Food Grade Salt (Table 2), alongside Standards on the laboratory assessment of salt iodized with potassium iodide and potassium iodate. However, this draft document was not adopted by the UEMOA Commission and its Member Countries in the five years to come. Such delays are likely a reflection of competing priorities that have trumped the agenda on Universal Salt Iodization (USI).

Figure 1: Member countries of the West African Economic and Monetary Union (UEMOA) (blue) and the Economic Community of West African States (ECOWAS). All UEMOA countries are also part of ECOWAS.

Table 1: Progress in households consuming adequately iodized salt in the UEMOA region

Country	% of households consuming adequately iodized salt	
	Around 1995[1]	Around 2006[2]
Benin	35	55
Burkina Faso	23	34
Cote d'Ivoire	31	84
Guinea Bissau	2	1
Mali	1	79
Niger	7	46
Senegal	9	41
Togo	1	25
UEMOA[3]	17	55

[1] Sustainable Elimination of Iodine Deficiency, UNICEF 2008. Based on data from 1990-2000.
[2] The State of the World's Children, UNICEF 2010. Based on data from 2003-2008.
[3] Weighted by country population size

Table 2: Proposed iodization ranges of the 2005 UEMOA Regional Draft Standards

Stage	Iodine concentration (ppm)
Production	50-80
Export	50-80
Import	50-80
Sale	30-50

Rationale for 2010 UEMOA Workshop

In 2010, the UEMOA Technical Committee for Food Products, and the Micronutrient Initiative and UNICEF Regional Offices discussed strategies to achieve the crucial adoption of Regional Salt Standards. The agencies agreed that new knowledge emerged that should be taken into account before the adoption of Standards is promoted. It was thus deemed to be necessary to formally update the 2005 Draft document through a regional workshop led by the UEMOA Commission. As per UEMOA protocol, such a meeting would have to be attended by one government representative from the Department of Nutrition and from the Bureau of Standards, as well as of one representative from the salt producers or importers, as indicated. Regional technical partners would complete the attendance list. Prof. Pieter Jooste, Interim Director of the Nutritional Intervention Research Unit at the South African Medical Research Council, and member of the ICCIDD Board of Directors, was hired as a resource person to present recommendations for updates of the three 2005 documents and to share insights on how to improve national salt iodization programs after the adoption of Regional Standards. He was accompanied by Dr John Egbuta, ICCIDD Regional Coordinator for Anglophone West African countries.

Results of 2010 UEMOA Workshop

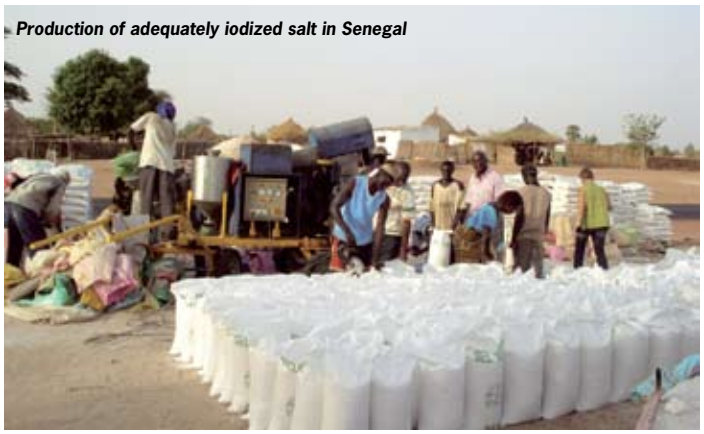
I. The participants were able to discuss the ten indicators used to assess progress in USI country programs (Table 3), and to examine recommendations for USI programs in West Africa (Table 4). Such guidance will prove useful for strengthening national IDD programs, especially in countries where efforts towards reaching USI have stalled.

II. The required iodization ranges were lowered to 30-60 ppm iodine at production, export, and import (Table 5). These iodization ranges are thus in line with the spirit of lower iodization ranges that was expressed in the 2007 WHO/UNICEF/ICCIDD guidelines (3). The new levels constitute a significant change for Guinea Bissau, Niger, Senegal, and Togo, whose national legislation requires iodization levels of 80-100 ppm iodine at production. The recommended levels for the UEMOA region are higher than the reference levels provided in the 2007 WHO/UNICEF/ICCIDD guidelines, however (3). Several considerations underlie this decision to choose 30 ppm as the lower level. The average salt consumption is likely to be lower in this region than in calculations used by WHO and partners (4-6), and furthermore iodized salt may not be used in all processed foods in this region. It can then be calculated that a lower recommended iodine level of 20 ppm in salt is unlikely to provide sufficient iodine to vulnerable groups such as pregnant women. Keeping in mind that these standards apply to a regional grouping of countries as opposed to specifications applying to a specific country, as well as to accommodate salt producers who have difficulty in iodizing salt within narrow margins, a 30 ppm range of 30-60 ppm was proposed and accepted. This range allows for iodine losses due to tropical hot and humid climatic conditions, for the fact that there are many small scale producers in this region without access to high technology for producing and iodizing salt, some of the salt may contain impurities, and to compensate for the low likelihood that a significant percentage of pregnant and lactating women would have access to iodine supplements.

Table 3: The ten criteria for country program assessment (ref. 3)

Criteria
Presence of a national multi-sector coalition
Demonstration of political commitment
Enactment of appropriate legislation
Establishment of methods for assessment of progress
Access to laboratory facilities
Establishment of a programme of education and social mobilization
Routine availability of data on fortification concentration
Availability of population biochemical data
Demonstration of ongoing cooperation from the food industry
Presence of national database for monitoring

III. A focus was placed on the importance of improved packaging of salt, as per current international recommendations. The proper packaging of salt from production to storage has been a neglected area in discussions on determining salt iodization levels, even though it is a major determinant of the amount of iodine that reaches consumers.



Production of adequately iodized salt in Senegal

Harvested salt in Senegal

Next steps

The UEMOA Commission aims to adopt the Regional Salt Standards in early 2011. If the Standards are adopted as a bylaw ('règlement' in French), then they would automatically update the national legislation of all member countries; if they are adopted as a directive or guideline ('directive' in French), then member countries can choose whether to go through a national adoption process or not. Even though adoption is likely, this latter option may lead to delays. The Regional Salt Standards should be adopted alongside standards on the fortification of cooking oil and wheat flour with micronutrients, which have been actively supported by governments, regional bodies, and partners in recent years, to develop a comprehensive fortification approach throughout West Africa. To speed up adoption, it would undoubtedly be preferable if the standards were adopted as bylaws rather than directives or guidelines. National fortification alliances should then work on the implementation of these standards and the recommendations given during the meeting. In parallel, the Economic Community of West African States (ECOWAS) Commission should adopt the same standards in the ECOWAS region, which contains the eight UEMOA countries in addition to seven other West African countries (Figure 1). The adoption of UEMOA and ECOWAS regional standards on salt iodization and food fortification would be a major step forward towards creating regional policies to eliminate the devastating consequences of hidden hunger in West Africa.

Table 4: Recommendations for UEMOA salt iodization programs

Recommendations
Start or maintain an IDD coalition
Employ a non-punitive approach initially towards enforcement
Implement a comprehensive (holistic) approach towards assessment
Understand the purpose of monitoring at production, retail and household levels
Use quantitative measurements for monitoring
Narrow the gap between health providers/authorities and food industry
Improve the level of knowledge on salt iodization of industrial managers
Overcome the inevitable turnover in industrial management
Identify strengths and weaknesses/challenges in iodization programs

Acknowledgements

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Correspondence: Roland Kupka, United Nations Children's Fund, PO Box 29720 Yoff, Dakar, Senegal. E-mail: rkupka@unicef.org.

Table 5: Proposed iodization ranges of the 2010 UEMOA Regional Draft Standards

Stage	Iodine concentration (ppm)
Production	30-60
Export	30-60
Import	30-60
Sale	20-60

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Strengthening ties between ICCIDD and the United Arab Emirates

Izzeldin Hussein Oman, ICCIDD Regional Coordinator for the Gulf Region

The United Arab Emirates (UAE) was one the first countries to begin the fight against IDD when in 1999 a survey showed the total goiter prevalence was 40% and coverage of iodized salt was only 6%. The UAE hosted the first regional meeting on IDD elimination in the year 2000, attended by all Eastern Mediterranean and MANARO member states, and attended by most of the international agencies and NGOs (WHO, UNICEF, ICCIDD, MI) and the salt industry from the region.

In 2007, the UAE, represented by the Ministry of Health, signed a 5 year contract with ICCIDD to support the National Control Program for the elimination of IDD. Surveys in 2009 and 2010, conducted jointly by the Ministry of Health, ICCIDD and WHO, reported that more than 94% of the population is consuming iodized salt, the median urinary iodine concentration (UIC) is 160 µg/L and the total goiter rate is 8% (Figure 1).

The UAE Ministry of Health recently invited the Chair of ICCIDD, Prof. Gerald Burrow, to discuss progress on IDD elimination efforts in UAE, issues in care of thyroid cancer, and to strengthen the collaboration between UAE and ICCIDD. The visit took place on May 1-6, 2011. During the visit Dr. Burrow and Dr. Izzeldin met with H.E the Minister of Health and his advisors in Abu Dhabi (the capital of UAE) and briefed them on the objectives of the visit and the role of ICCIDD, globally and regionally. The meeting also discussed the current contractual status with ICCIDD and future cooperation, including the possibility to include other micronutrients into the surveillance and monitoring system in UAE. On May 3, a half day workshop and presentations took place at the Ministry of Health premises in Dubai, headed by H.E. Dr. Mahomud Fikri, the Undersecretary for Health Polices. The IDD Committee in UAE presented the progress achieved in the country and confirmed the readiness of the country to be declared free of IDD as soon as possible. H.E. Dr Fikri presented how the country was able to protect the population of the UAE through USI and monitoring. Dr Izzeldin delivered a talk on the programmatic indicators that need to be adopted before the country review, and discussed the procedures to establish a permanent surveillance system. Dr. Burrow spoke on the role of the ICCIDD and commended the country's efforts.

Prof. G. Burrow, ICCIDD Chair (2nd from right), honored by UAE government, represented by H.E. Dr. M. Fikri (center), together with the ICCIDD Regional Coordinator, Dr. I. Hussein (far left)

On 3rd May 2011, a full day workshop on IDD and Thyroid Cancer took place in Sharjah, UAE, attended by many physicians, nurses, program managers, school health managers, and the press. The workshop was officially inaugurated by H.E the Minister of Health, who welcomed the visit of Dr. Burrow to UAE, and commended the role of ICCIDD in the global effort for USI and efforts in the UAE. Dr Izzeldin presented a film on the consequences of IDD, followed by a presentation by H.E. Dr. Fikri on the current status of IDD prevalence in the UAE and the plans to declare UAE free of IDD.

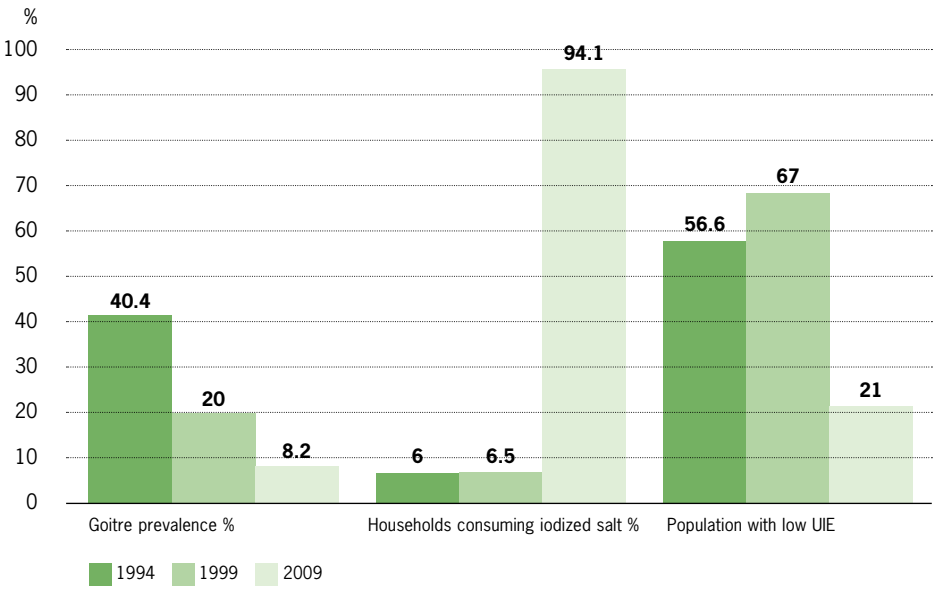
Professor Gerard Burrow presented a lecture on thyroid cancer, the thyroid in pregnancy, and the consequences of IDD. On May 5, a similar workshop was held in Al Fujerah state in the UAE.

Conclusions and final agreements

- The visit was very productive and strengthened the cooperation between UAE and ICCIDD.
- The material delivered on thyroid cancer and the consequences of IDD was informative and useful for medical and nursing professionals in UAE.
- The meetings between the ICCIDD Chair and the Ministry of Health led to an agreement to renew the contract for another year with the same amount and terms.
- It was agreed that the UAE will submit a proposal for establishing an ICCIDD regional office in the country.

Dr Hanif Hassan, the Minister of Health of UAE (far right) meeting with Dr. Gerald Burrow, ICCIDD Chair (2nd from right) in Abu Dhabi, 2nd May 2011

Figure 1: Progress against IDD in the United Arab Emirates



Meetings and Announcements

The U.S. Office of Dietary Supplements Iodine Workshop, May 12-13, 2011

The National Institutes of Health, Office of Dietary Supplements (ODS) held an Iodine Workshop in Rockville, Maryland on May 12-13, 2011. The purpose of the Workshop was to bring together federal and non-federal researchers, health professionals, regulators, and policymakers to shape the development of an iodine initiative at the National Institutes of Health. The overarching goal of the meeting was to identify research needs that will inform public health decisions.

Objectives included:

- Determine if a need exists to improve the assessment and monitoring of iodine status of the U.S. population and how best to assess the prevalence of iodine insufficiency (and excess), particularly among vulnerable population groups
- Discuss if there is a need for mandatory fortification of items in the food supply with iodine or if more targeted approaches (i.e. iodine supplements for vulnerable groups) are warranted in the U.S.
- Identify research topics that would inform future Dietary Reference Intake's on iodine
- Assess interest in holding a conference at NIH to inform and engage researchers, health professionals and other stakeholders
- Engage other federal agencies in participation of a broader iodine initiative
- Identify potential non-federal stakeholders, national and international organizations, professional societies engaged in research and clinical practice, trade associations and industry

On Thursday, May 12, after a welcome by Dr. Paul Coates, the Director of the ODS, Dr. Christine Swanson (ODS), the coordinator of the Workshop, outlined the objectives of the Workshop. The first speaker was Dr. Kevin Sullivan of Emory University, USA, ICCIDD Board Member, who outlined the consequences of severe iodine deficiency in developing countries. Dr. Michael Zimmermann, from the ETH Zurich, Switzerland, then discussed the consequences of mild to moderate deficiency. Next, Dr. Elizabeth Pearce, from Boston Medical Center, USA, ICCIDD Board Member, outlined the physiological adjustments to iodine deficiency during pregnancy. Short presentations on the iodine status of pregnant women in industrialized countries were then given, focusing first on the United States (Dr. Kathleen Caldwell; CDC, Atlanta, USA); then Australia and New Zealand (Dr. Sheila Skeaff, University of Otago, New Zealand) and finally, the fortification program in Canada (Dr. Christine Zehaluk, Dr. Steve Brooks; Health Canada).

After a break for lunch, analytical methods and standardization in iodine analysis were discussed. Dr. Amir Makhmudov (CDC, USA) spoke on the assessment of the urinary iodine concentration. Harmonization of iodine measurements were outlined by Dr. Karen Phinney, Dr. Steve Long and Dr. Karen Murphy (National Institute of Standards, USA). Dr. Alicia Carriquiry (Iowa State University, USA) discussed population estimates of iodine exposure. The U.S. Food and Drug Administration (FDA) regulations related to iodine in the food supply were presented by Dr. Paula Trumbo (FDA), and then Drs. Regan Bailey and Karen Andrews (ODS) presented data on use of iodine-containing prenatal supplements. Current Dietary Reference Intakes (DRIs) for iodine were discussed by Dr. Allison Yates. The Workshop then adjourned and began again on the next morning, with the BOND (Biomarkers of Nutrition for Development) Initiative being presented by Dr. Daniel Raiten (NIH). The participants then broke out into group sessions to discuss individual issues related to iodine nutrition, followed by group reports in plenary. It was agreed that the meeting was an effective way to inform the anticipated U.S. ODS Iodine Research Initiative. The ODS has recently published an on-line iodine 'fact sheet'. The link is: ***http://ods.od.nih.gov/factsheets/Iodine-HealthProfessional/***

China customizes salt iodization level

May 15, 2011 was „Iodine Deficiency Disorders Prevention Day" in China and the Ministry of Health used the occasion to announce that the single national standard for iodized salt in the world's most populous country will be customized by region to deliver the appropriate level of iodine to supplement the common diet in each region. The revised guidance will be released later in 2011. The current standard is 20-50 mg/kg with an average of 20-30 mg/kg. Some provinces will see the maximum level increased to 60 mg/kg, most will remain unchanged, but some provinces have exceeded urinary iodine levels of 300 mcg/L and their salt iodization level will be reduced. The Ministry noted that „the (new) standard test will be continuously adjusted." This is the model pioneered successfully in Switzerland. Han Zu, economics reporter of the Chinese Free Paper on May 13, 2011, quoted Wang Jinbiao, the director of the IDD Prevention Research Institute in Shandong province. Wang Jinbiao stated „At present, residents in Shandong have slightly higher than the appropriate amount of iodine content in their urine, but it is not excessive. Therefore, there is some room for downward adjustment of the iodine content of salt in our province. Although for some provinces the salt iodine content will be strengthened to up to 60mg/kg, most provinces will implement a standard up to 50mg/kg. Due to the complexity of Shandong Province, the current policy is becoming more specific and scientific. Differences in coastal vs. inland, rich vs. poor, and varying dietary habits can all affect the level of iodine nutrition of the residents. Thus, consideration of local conditions is critical, not ‚one size fits all'."

Abstracts

Genome-wide association study identifies four genetic loci associated with thyroid volume and goiter risk

Thyroid disorders such as goiters represent important diseases, especially in iodine-deficient areas. Sibling studies have demonstrated that genetic factors substantially contribute to the interindividual variation of thyroid volume. The authors performed a genome-wide association study of this phenotype by analyzing a discovery cohort consisting of 3620 participants of the Study of Health in Pomerania (SHIP). Four genetic loci were associated with thyroid volume on a genome-wide level of significance. Of these, two independent loci are located upstream of and within CAPZB, which encodes the βsubunit of the barbed-end F-actin binding protein that modulates actin polymerization, a process crucial in the colloid engulfment during thyroglobulin mobilization in the thyroid. A third locus marks FGF7, which encodes fibroblast growth factor 7. Members of this protein family have been discussed as putative signal molecules involved in the regulation of thyroid development. These results increase the knowledge about genetic factors and physiological mechanisms influencing thyroid volume.

Teumer A et al. Am J Hum Genet. 2011;88(5):664-73.

Assessment of dietary iodine intake of population in non-high-iodine areas in China

This paper by the Institute of Nutrition and Food Safety, Chinese CDC, Beijing, assessed the potential risk of dietary iodine insufficiency of population in non-high-iodine areas (water iodine < 150 μg/L) in China. The dietary iodine intake of 13 age/gender population groups were estimated by combining the data of iodine intake from food, table salt and drinking water. Under the condition of consuming iodized salt, the average iodine intake of all population groups was higher than the Recommended Nutrient Intake (RNI), while the iodine intakes of individuals above Upper Limits (UL) and below RNI were 5.8% and 13.4% respectively, and the iodine intake of individuals lower than the Estimated Average Requirement (EAR) was 9.4% in adults above 18 years of age (including pregnant and lactating women). If non-iodized salt was consumed, the iodine intake of 97.6% of individuals would be lower than RNI, while the iodine intake of 97.4% of adults would be lower than EAR. The contribution of iodine from table salt was much higher than that from drinking water and food in the condition of consuming iodized salt, while food was the predominant contributor of dietary iodine in the condition of consuming non-iodized salt. The health risk of iodine deficiency was higher than that of iodine excess in areas where water iodine was < 150 μg/L in China, and the risk of iodine insufficiency was much higher if non-iodized salt was consumed. The authors concluded that iodized salt should be the main sources of dietary iodine intake for population in areas where water iodine was < 150 μg/L in China.

Song X et al. Wei Sheng Yan Jiu [Article in Chinese] 2011;40(2):138-41.

Selenium deficiency a factor in endemic goiter persistence in Sub-Saharan Africa

Goiter is still common in Uganda, despite the present iodized salt coverage of at least 95%. Where there is endemic goiter after adequate iodine supplementation, selenium deficiency could be a factor for the continued occurrence of goiter. The objectives of the present study, therefore, were to determine the serum selenium levels among goitrous patients and nongoitrous controls and to determine the association between goiter and selenium levels among these patients. This was a case control study in which 92 subjects were enrolled, 46 cases and 46 controls of similar age and sex distribution. The overall mean serum selenium levels were 77.25 μg/l for the goiter patients and 95.50 μg/l for the nongoiter controls.

The difference between goitrous and non-goitrous populations was statistically significant (p = 0.0001). Selenium levels above 102.8 µg/l had a statistically significant protective effect against goiter with adjusted odds ratio 0.3 (0.13-0.69); p = 0.005. Other factors, such as age, main food constituent, and use of iodized salt, had no association with goiter. The authors concluded there were significant differences between selenium levels among goitrous patients and nongoitrous controls. High selenium levels seem to have a protective effect against goiter.
Kishosha PA et al. World J Surg. 2011 Apr 27. [Epub ahead of print]

Is placental iodine content related to dietary iodine intake?

Delivery of iodine to the fetus depends not only on maternal dietary iodine intake but also on the presence of a functioning placental transport system. A role for the placenta as an iodine storage organ has been suggested and this study compares the iodine content of placentas from women giving birth at term in Ireland and Iran, areas with median urinary iodine of 79 µg/L and 206 µg/L respectively. Placental cotyledon iodine was measured. Samples were taken from 6 sites from the centre and periphery of each cotyledon. Placentas (Ireland n=58; Iran n= 45), were obtained from consecutive euthyroid women delivering at term. The median placental iodine (µg/g wet weight) was significantly higher in Iranian than in Irish women (187.2 µg/g vs 34.3 µg/g; p< 0.001. The distribution of individual placental iodine values showed that values > 50 µg/g were found in 71.0% of Iranian and in only 21.0% of Irish samples. In Irish subjects the relationship of placental iodine to pregnant population urinary iodine (UI) (ng/g: µg/L) was 1:2 (40:79) while in Iranians this ratio is closer to 1:1 (211:206). The authors suggest these findings, by demonstrating an apparent ability of the placenta to store iodine in a concentration dependent manner, suggest a hitherto undetected role for the placenta. Whether placental iodine has a role in protecting the fetus from inadequacies in maternal dietary iodine intake is as yet unknown.
Burns R et al. Clin Endocrinol (Oxf). 2011 Mar 9. doi: 10.1111/j.1365-2265.2011.04039.x. [Epub ahead of print]

Low urinary iodine postpartum is associated with hypothyroid postpartum thyroid dysfunction and predicts long-term hypothyroidism

Postpartum thyroid dysfunction (PPTD) is characterized by an early hyperthyroid phase followed, with peak prevalence at 6 months, by a hypothyroid phase which carries a risk of long-term hypothyroidism. Iodine has a major effect on thyroid function. The study objective was to examine the iodine status of women with and without PPTD and the relationship of iodine status postpartum with long-term hypothyroidism. The design was a case-control with follow-up, and a total of 149 women at 6 months postpartum (74 PPTD, 75 controls) with 98 (46 PPTD, 52 controls) followed up at 12years. Low UIC measured at 6 months postpartum is associated with hypothyroid PPTD and independently predicted long-term hypothyroidism. The authors suggested it results from more severe preceding destructive thyroiditis, with discharge of thyroidal iodine, and thereby predicts a greater risk of long-term hypothyroidism.
Stuckey BG et al. Clin Endocrinol (Oxf). 2011 May;74(5):631-5. doi: 10.1111/j.1365-2265.2011.03978.x.

Does iodine gas released from seaweed contribute to dietary iodine intake?

Living near the sea may confer advantages for iodine intake. Iodine gas released from seaweeds may, through respiration, supply a significant fraction of daily iodine requirements. Gaseous iodine released over seaweed beds was measured by mass spectrometry and iodine intake assessed by measuring urinary iodine (UI) excretion. Urine samples were obtained from female schoolchildren living in coastal seaweed rich and low seaweed abundance and inland areas of Ireland. Median iodine ranged 154-905 pg/L (daytime downwind), with higher values (~1,287 pg/L) on still nights, 1,145-3,132 pg/L (over seaweed). A rough estimate of daily gaseous iodine intake in coastal areas, based upon an arbitrary respiration of 10,000L, ranged from 1 to 20 µg/day. Despite this relatively low potential intake, UI in populations living near a seaweed hotspot were much higher than in lower abundance seaweed coastal or inland areas (158, 71 and 58 µg/L, respectively). Higher values >150 µg/L were observed in 45.6% of (seaweed rich), 3.6% (lower seaweed), 2.3% (inland)) supporting the hypothesis that iodine intake in coastal regions may be dependent on seaweed abundance rather than proximity to the sea.
Smyth PP et al. Environ Geochem Health. 2011 Mar 23. [Epub ahead of print]

Effect of iodine supplementation during pregnancy on infant neurodevelopment at 1 year of age.

Iodine is the main constituent of thyroid hormones, which in turn are required for fetal brain development. However, the relation between iodine intake during pregnancy, thyroid function, and child neurodevelopment needs further evaluation. The authors assessed the association of maternal iodine intake from diet and supplements during pregnancy and of maternal and neonatal thyroid function with infant neurodevelopment. The Mental Development Index and Psychomotor Development Index (PDI) for 691 children were obtained between 2005 and 2007 using the Bayley Scales of Infant Development at age 1 year in a prebirth cohort in Valencia, Spain. In multivariate analyses, a maternal thyrotropin level >4 µU/mL was associated with an increased risk of a PDI <85 (odds ratio = 3.5, P = 0.02). Maternal intake of ≥150 µg/day, compared with <100 µg/day, of iodine from supplements was associated with a 5.2-point decrease in PDI (95% confidence interval: -8.1, -2.2) and a 1.8-fold increase in the odds of a PDI <85 (95% confidence interval: 1.0, 3.3). When analyses were stratified by sex, this association was intensified for girls but was not observed for boys. Further evidence on the safety and effectiveness of iodine supplementation during pregnancy is needed before it is systematically recommended in iodine-sufficient or mildly deficient areas.
Murcia M et al. Am J Epidemiol. 2011;173(7):804-12.

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