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Sri Lankan school children benefit from successful USI

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IDD in Sri Lanka

Sri Lanka lies in the Indian Ocean, to the southwest of the Bay of Bengal and to the southeast of the Arabian Sea. It had an estimated population of 20.2 million in 2009. IDD was recognised as a public health problem in Sri Lanka following the 1986 national survey that found a goiter prevalence of 18.2% (1). The Sri Lankan government has shown great commitment toward elimination of IDD in the country in the past two decades. In 1995, the government launched universal salt iodization (USI). In 1995, the government made salt iodization mandatory by passing a law that bans the production and distribution of noniodized salt; this was revised in 2005. Despite these efforts, in 2001 the prevalence of goiter remained 20.9% but the median urinary iodine concentration (UIC) was 145 µg/L among school

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.

children (1). As a result, the salt iodization program was intensified. In a 2005 survey, the prevalence of goiter had fallen to 3.8% and median UIC increased to 154 µg/L.

The USI program in Sri Lanka

The government of Sri Lanka started USI in 1995 with the assistance of UNICEF. The subcommittee on control of IDD was formed in 1996 for the purpose of reviewing progress made in salt iodization and related IDD control measures. This committee comprised of representatives of Ministry of Health, Ministry of Industrial Development, Department of Customs, Government Analyst and leading salt producers. At the initial stage, the decisions made at the committee meetings were conveyed to the National Health council chaired by the Hon. Prime Minister. The Food Control Administration unit of the Directorate of Environmental and Occupational Health was given the responsibility of implementation and the Nutrition Department of the Medical Research Institute was given the responsibility of monitoring.

For achieving USI, the following laws have been enforced in the country:

- Regulation on Salt Iodization -1995- This Regulation bans the production, distribution and sale of noniodized salt for human consumption. The iodine content of iodized salt at household level was considered to be 25 ppm.
- Revised Regulation on Salt Iodization - 2005 - The iodine content of iodized salt at household level was considered to be 15 ppm.

Box 2: Milestones for IDD elimination in Sri Lanka

- Identification of IDD as a public health problem in Sri Lanka in 1986
- Food Regulation (salt iodization) came into operation on 01.01.1994. Regulated production, distribution and sale of iodized salt. Iodized salt at the household level was set at 25 ppm.
- IDD Awareness Programs through printed material –the „Sapatha Magazine“
- Launch of USI in Sri Lanka with the aid of UNICEF in 1995
- Formation of National Subcommittee on control of IDD in 1996.
- Regular Steering Committee meetings to review progress
- Surveys of iodine status by the Medical Research Institute in 2001 and 2005
- Destruction of Hambantota Saltern by the Tsunami in 2004 - Iodization and salt production was revitalised by the UNICEF/MI/ICCIDD assistance.
- Amendment to food regulation (salt iodization) came into operation in July 2005. Iodized salt at household level was set at 15ppm.
- District-based training for healthcare workers by Health Education Bureau in 2006 on iodine nutrition, IDD and prevention
- Regular inspection of the salt industry and awareness on IDD control activities to the employers and employees of industry by the Officials in the Ministry of Health

Achievements of the USI program

In the survey carried out by the Medical Research Institute in 2005, the prevalence of goiter among school children (6-10 years) was reduced to 3.8% and median UIC was > 100 µg/L in all provinces. The use of adequately iodized salt at household level had increased from 49.5% in 2001 to 91.2% in 2005. Median iodine content of salt samples was 28 ppm at household level in the year 2005. Today the household salt iodization rate is among the highest in southeast Asian. Table 1 shows the progress of indicators towards eliminating IDD in Sri Lanka.

Iodized salt production

The production of salt is mainly carried out by the two major producers: Puttalam Salt Limited and the Lanka Salt Limited. The annual production of salt in both factories was 107307.250 MT in 2008. The annual production of the Mannar saltern of the Manthai Salt Limited is 2900.50MT. The small scale salt producers operating under a Puttalam Salt Producers Welfare Society produces around 30000 MT (400 small scale producers) Production of salt is not done by the small scale producers in Hambantota.

In the past, about two thirds of the iodized salt was produced by the small scale producers. But recent data indicate more than half of the national requirement is now handled by the two major producers.

Table 1: The progress of indicators towards eliminating IDD in Sri Lanka.

Indicators	Goal	Before USI (1986)	5 y after USI introduced (2001)	10 y after USI introduced (2005)
Goitre prevalence (%)	<5	18.2	20.1	3.8
Median urinary iodine (μg/L)	100-199	–	145.3	154.4
Percentage of adequately iodised salt at household level (%)	>90	–	49.5	91.2

Table 2: Annual production of common salt and iodized salt in 2008 in Sri Lanka

	Total Production (MT)	Amount Iodized
Lanka Salt Limited Hambantota -	77,067.250	28,475.500
Puttalam salt	29,240.000	12,380.000
Manthai salt (Mannar)	2900.500	1394.850
Coop society Puttalam (verbal Communication)	30,000.00	15,000.000
Other	–	
Total	**139207.750**	**57503.500**

The salt production in year 2008 is given in Table 2. Although the production of the individual small scale producers is small, they are not exempt from the regulatory system. The median iodine content of salt samples at the production level in the survey conducted by the MRI in 2005 was 30.1 ppm (range 12.1 to 49.8 ppm).

The Food Unit of the Ministry of Healthcare and Nutrition issues permits for purchase, transportation, export and import of salt. Before issuing a permit or before renewal, the premises/production site is inspected and certified by Food and Drugs Inspectors using a checklist. The data are systematically recorded and available at the Food Unit.

Monitoring salt iodization in Sri Lanka

There is continuous monitoring of the salt industry by regulatory bodies through the permit system. This indirectly regulates the availability of iodized salt for consumption. There are two fully equipped food laboratories supported by the government analyst and city analyst of Colombo Municipal Council, along with the MRI. The Food Labs at National Institute of Health Science and the Medical Research Institute carry out testing of iodine content on request. Fourteen provincial food labs also carry out formal and informal testing of salt on request. Iodine content of iodized salt is regularly checked at the factory level for each batch of salt produced. Salt iodized by most of the small scale producers in Puttalam area are using the facilities provided by the Laboratory of Puttalam Salt Producers Welfare Society, and some use the iodine test kits.

The IDD review

At the request of the Ministry of Healthcare and Nutrition, Government of Sri Lanka, WHO SEARO in collaboration with the WHO Sri Lanka Country Office arranged an external review mission to assess Sri Lanka's IDD prevention program (IDD) in June 2009. Prior to the external review, the Government of Sri Lanka prepared a comprehensive report on the achievements and gaps in the program. This indeed was a commendable initiative, as all the stakeholders responsible for IDD elimination in Sri Lanka participated in the preparation of this document as a cohesive team.

Review team

The review mission members were:
Dr. Chandrakant Pandav, Regional coordinator ICCIDD (South Asia);
Prof. Rajata Rajatanavin, Mahidol University, Thailand;
Dr. Jigmi Singay and **Dr. Kunal Bagchi,** WHO Regional Office for South-East Asia.
The mission was assisted by
Dr. G. Pathirana, Director, Environmental and Occupational Health;
Dr. N. Pallewatte, Environmental and Occupational Health and
Mr. H. Tillekeratne, Food & Drug Inspector from the Food Control Administration – all from the Ministry of Healthcare and Nutrition, Government of Sri Lanka, as well as
Ms. V. Tillekeratne from WHO Sri Lanka.

The review was conducted from 8 – 13 June 2009. The mission members met Dr. U.A. Mendis, Director General of Health Services, Ministry of Healthcare & Nutrition and briefed him on the mission's terms of reference and expected outcome. Dr. Mendis expressed his Government's full support to the mission. He also referred to the on-going humanitarian crisis resulting from a large influx of internally displaced persons in the country and an outbreak of dengue fever, issues that were occupying considerable amount of the Government's time and resources.

The mission members later met the Representative and the Chief of Nutrition and Health, UNICEF Sri Lanka Country Office and briefed them about the purpose and expected outcome of the mission. The ensuing discussion referred to the status of IDD control in conflict areas and the quality of iodized salt provided by the World Food Program as part of its food aid. A detailed presentation based on the 'Desk Review' of the IDD situation in Sri Lanka was delivered by Dr P.G. Mahipala, Deputy Director General, Environmental and Occupational Health. He reported that 91.2% of households were consuming adequately iodized salt, compared to 49.5% at the initiation of the national IDD program. Median UIC was 154.4 µg /L and the total goiter rate was 3.8%, compared to 20.1% in 2000. Much of the information contained in the 'Desk Review' was derived from the 2005 national iodine status report. It did not provide any additional information beyond this date nor did it include information from any of the Annual reports published since 2006. The review mission members travelled to the two major salt producing areas of Sri Lanka – Hambantota and Puttalam. At the Office of Dr Karunaratna, the Regional Director and his senior staff of the District Health Services in Hambantota, the mission members received an overview of salt production, quality control and assurance concerning iodized salt in the area, as well as legislation and enforcement. In general, assessment of iodine at the production level was not well established and steps had been taken by the Department of Food Control Administration to address this gap. Prior to visiting Hambantota, the mission had visited the regional reference laboratory at Kalutara and were satisfied with its activities in testing iodized salt.

Dr Jigmi Singay, as leader of the external review mission, delivered its key findings and recommendations at a de-briefing session, chaired by H.E. the Minister of Healthcare and Nutrition and attended by the Secretary of the Ministry of Healthcare and Nutrition, the Director-General of Health Services and senior staff from the Nutrition and Food Control Administration departments and the Medical Research Institute. Several of these findings and recommendations were immediately discussed by H.E. the Minister with his senior staff at this session and decisions were taken for the implementation of these recommendations.

The underlying principle of this external review mission was to bring to the attention of the Ministry of Healthcare and Nutrition issues that would need to be addressed prior to initiating any request for external certification of IDD elimination. In consideration of this, the External Review Mission decided to follow the WHO/UNICEF/ICCIDD ten-point indicators used for tracking progress towards the elimination of iodine deficiency disorders for its assessment of the situation and in the formulation of its recommendations.

Three key areas were identified for immediate attention:
- adequate funds to be provided to the national IDD program to ensure sustainability of capacity development, regular monitoring, annual cyclical evaluation, laboratory equipments & reagents, inspection and testing of salt samples
- the national IDD reference laboratory at MRI needed immediate revitalization in terms of human resources, laboratory and equipment
- the national IDD database had to be improved

Salt Production in Puttalam

Goiter does not predict mental impairment in Russian school children

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In regions of moderate-to-severe iodine deficiency, the mean IQ in children may be reduced 10-15 points. Goiter is the most visible clinical sign of iodine deficiency, but how well correlated are goiter and mental deficiency? During the "Thyromobil" project conducted by Russian Endocrinology Research Centre (RERC) in several regions of the European part of the Russian Federation in 2003-2007, the Culture–Fair Intelligence Test (CFIT), CF 2A, was conducted in 94 randomly selected school-children aged 8 to 12 years with goiter (enlarged thyroid volume by ultrasonography) and in 83 children with normal thyroid volume. All children were selected from urban settlements of mild-to-moderate iodine deficiency with a comparable level of socioeconomic development. The choice of a test of nonverbal ("fluid") intelligence for use in the study reduced the potential confounding of education, social experience and culture on the tests. IQs in the range of 70 to 79 points were considered as borderline low, 80 to 89 as below average, 90 to 109 as average, 110 to 119 as above average, 120 and above as high.

As shown in Table 1, mean IQ was below average in both children with goiter and those with normal thyroid volume (87.7 and 88.9, respectively). But among the children with goiter there were more subjects with a borderline low IQ level (70-79) and fewer subjects with an average IQ level (90-99), compared to children with normal thyroid volume, but these differences were not statistically significant. Remarkably, no child had an IQ ≥ 100. The findings of this small study suggest that IQ levels in more than half of school-children from iodine deficient regions of Russia are borderline low or below average. Although the frequency of lower IQ was higher in the children with goiter, this was not statistically significant, possibly due to the small sample size. Alternatively, as goiter develops to compensate for low iodine intake and to improve thyroidal iodine economy, it may also help to protect the child from the detrimental effects of iodine deficiency on brain development.

Table 1: IQ levels in 8 to 12 y-old Russian children with goiter and in those with normal thyroid volume, expressed as percentages.

IQ	Goiter	Normal thyroid volume
70-79 (borderline low)	21.3% (n=20)	16.9% (n=14)
80-89 (below average)	37.2% (n=35)	36.1% (n=30)
90-99 (average)	41.5% (n=39)	47% (n=39)
100 and more	0%	0%

Micronutrient Powders and Iodine

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Background

Interventions directed towards eliminating or reducing the prevalence of vitamin and mineral deficiencies include fortification, supplementation and dietary diversification. Universal Salt Iodization (USI) is the fortification of all salt for human and animal consumption and is recommended as the primary global intervention to achieve the elimination of iodine deficiency disorders (1). While USI has been successful in a number of countries, in some areas USI has been difficult to achieve or maintain. A temporary strategy for improving the iodine status of populations until USI can be achieved is iodine supplementation (1).

Here we describe a relatively recent approach for improving the vitamin and mineral status of populations, micronutrient powders (MNPs). The primary motivation behind the use of MNPs has been to prevent and treat anemia and iron deficiency in pre-school children. However, MNPs usually contain multiple micronutrients in addition to iron, including iodine, and are being used in other target groups (e.g., women of reproductive age). Distribution of MNPs is becoming the preferred strategy for addressing nutrient deficiencies around the world (2). Because of their expanding use, MNPs may be of interest to the iodine community.

Micronutrient Powders (MNPs)

MNPs come in single dose packets that typically provide a specified level of vitamins and minerals in a single serving added to any semi-solid food without changing taste, color, or consistency (Figure 1). They are similar to fortification in that they are added to food and sometimes referred to as "home" or "point of use" fortification.

MNPs were developed as an approach for delivering iron and other micronutrients to populations where it has been difficult to implement certain types of interventions (i.e., supplementation) or where the target group is difficult to reach through fortification. MNPs are distributed as single-dose packets, also referred to as sachets, of dry powder containing chelated or lipid-encapsulated iron and other micronutrients (3). Compared to using iron drops in children, MNPs usually have higher acceptability and fewer side effects, and MNPs are becoming the preferred iron deficiency prevention strategy in some countries (2, 4). One specific type of MNP is Sprinkles™ which has been the most extensively studied MNP product and has shown to be effective at preventing and treating iron deficiency and anemia in young children (4).

There have been a variety of strategies on the distribution and use of MNPs. Most frequently, MNPs are distributed by government or non-governmental organizations, usually free of charge through the health sector. When providing the sachets to households, there have been a variety of schedules on the frequency of sachet use, such as daily, every other day, 60 sachets every 4 months, and other flexible schedules (5-7).

Sprinkles™ are currently manufactured in six facilities worldwide and used by more than four million children in 18 countries (8). There is variability in the formulation of MNPs, target groups, and settings in which MNPs are distributed (3). Table 1 presents two formulations of MNPs being used as per the Sprinkles Global Health Initiative: the five-micronutrient "Nutritional Anemia Formulation" and the "Multi-Micronutrient Formulation" (9). The most common target group for MNPs has been 6-24 month old preschool children, but some programs expand the target group up to 59 months of age. In some countries MNPs may be used in targeted regions while in others there are national programs for children (10, 11). There has been use of MNPs for other populations, such as emergency affected populations (12, 13) and pregnant women (14) which generally have different formulations from those shown in Table 1.

Figure 1: Sprinkles™ marketing and educational brochure from Kenya

Maize porridge fortified with MixMe™ micronutrient powder

Table 1: Micronutrient powder formulations per 1 gram packet for preschool children (9)

Vitamin/Mineral	Nutritional Anemia Formulation	Multi-Micronutrient Formulation
Folic acid	160 μg	150 μg
Iron	12.5 mg	12.5 mg
Vitamin A	300 μg RE	400 μg RE
Vitamin C	30 mg	30 mg
Zinc	5.0 mg	4.1 mg
Copper	–	0.56 mg
Iodine	–	90 μg
Niacin	–	6.0 mg
Vitamin B1	–	0.5 mg
Vitamin B2	–	0.5 mg
Vitamin B6	–	0.5 mg
Vitamin B12	–	0.9 μg
Vitamin D	–	5.0 μg
Vitamin E	–	5.0 mg

MNPs with iodine

As presented in Table 1, the Multi-Micronutrient formulation of MNPs for preschool children contains 90 μg of iodine, which is the recommended daily intake (RDI) for children less than 5 years of age by WHO/UNICEF/ICCIDD and the recommended daily allowance (RDA) for children 1-8 years of age by the Institute of Medicine (USA) (1, 15). As stated in the 2009 UNICEF Workshop Report on Scaling Up the Use of Multiple Micronutrient Powders to Improve the Quality of Complementary Foods for Young Children in Asia;

> "MNPs which contain iodine can be safely provided when iodized salt is also used by the household. There should be no concern of toxicity because the intake of iodine through MNPs in addition to iodine in salt is very unlikely to exceed the UL for most children. The micronutrient levels of the two standard formulations take into account that children of this age group in most developing countries have low micronutrient intakes. The formulations were developed after careful consideration of the availability of micronutrients from other sources including ongoing programmes, and the upper limits of individual micronutrients." (7)

Currently most MNP programs are directed towards pre-school children, but little is known about the iodine status in this age group. For instance, there are urinary iodine cutoffs for assessing iodine status in children >6 years old and <2 years of age, but not for those 2-5 years of age (1). Furthermore, the usual target groups for assessing iodine status in cross-sectional surveys are school-age children, non-pregnant women of childbearing age, and/or pregnant women. Although iodine assessments are not typically done in the same target groups as MNP programs, the provision of iodine through MNPs should be further examined.

Conclusions

This article was written to raise awareness within the iodine community on the distribution and use of MNPs containing iodine. The use of MNPs raises a number of issues.

- The use of MNPs containing iodine should complement USI efforts, but investigation on the combined impact of salt iodization and use of MNPs containing iodine is warranted.
- For countries that have achieved USI, it is unclear if iodine should be included in the MNP formulation unless there is documented evidence of iodine deficiency in the MNP target population. For MNPs targeted to 6-24 month old children, as mentioned previously, this is a group rarely assessed for iodine status in surveys. It is generally assumed that if school age children, women of childbearing age, and pregnant women are iodine sufficient, other groups in the population would also be iodine sufficient. Evidence to address this assumption is lacking.
- For those measuring iodine status and coverage of iodine interventions in surveys, assessing the use of MNPs may need to be considered. It would seem useful to assess coverage of the following iodine-related interventions in areas where programs are implemented:
  - Use of iodized salt in the household
  - Use of other iodine fortified food products in the household
  - Use of other fortified complementary foods (i.e., Plumpy Doz TM, Plumpy Nut TM, Nutri-Butter TM) which also contain iodine
  - Use of multivitamins containing iodine, including dosage, and frequency of use
  - Use of micronutrient powders containing iodine, including dosage, and frequency of use

The use of MNPs has been found to be a safe and effective intervention in reducing the prevalence of iron deficiency and anemia in preschool children. The effectiveness of MNPs containing iodine on the iodine status of various target groups warrants further investigation.

References

1. World Health Organization; UNICEF; and the International Council for the Control of Iodine Deficiency Disorders (ICCIDD). Assessment of Iodine Deficiency Disorders and Monitoring their Elimination: A Guide for Programme Managers. 3rd ed. Geneva: WHO, 2007.
2. de Pee S, Kraemer K, van den Briel T, et al. Quality criteria for micronutrient powder products: report of a meeting organized by the World Food Programme and Sprinkles Global Health Initiative. Food Nutr Bull 2008; 29:232-41.
3. Zlotkin SH, Schauer C, Christofides A, Sharieff W, Tondeur MC, Hyder SM. Micronutrient sprinkles to control childhood anaemia. PLoS Med 2005;2:e1 , Zeng L, Zlotkin S. Efficacy of daily vs. weekly home fortification of weaning foods with Sprinkles among infants and young children in Bangladesh. Food and Nutrition Bulletin 2007;28:159-164.
6. Ip H, Hyder SM, Haseen F, Rahman M, Zlotkin SH. Improved adherence and anaemia cure rates with flexible administration of micronutrient Sprinkles: a new public health approach to anaemia control. Eur J Clin Nutr 2009;63:165-72.
7. UNICEF. Workshop Report on Scaling Up the Use of Multiple Micronutrient Powders to Improve the Quality of Complementary Foods for Young Children in Asia: Summary – Outcomes, Conclusions and Next Steps Bangkok, 28 April - 1 May 2009. Accessed on February 3, 2010; http://www.unscn.org/files/Announcements/Other_announcements/Summary_MNP_workshop_3_June_2009.pdf.
8. Silversides A. Long road to Sprinkles. Canadian Medical Association Journal May 26, 2009;180:1.
9. Sprinkles Global Health Initiative. Micronutrient Sprinkles for use in Infants and Young Children: Guidelines on Recommendations for Use and Program Monitoring and Evaluation. Toronto, 2008. Accessed on February 10, 2010; http://www.sghi.org/resource_centre/GuidelinesGen2008.pdf.
10. Hyder SMZ HF, Rahman M, Tondeur MC, Zlotkin SH. Effect of daily versus once-weekly home fortification with micronutrient Sprinkles on hemoglobin and iron status among young children in rural Bangaldesh. Food Nutr Bull 2007;28:156-164.
11. Menon P, Ruel MT, Loechl CU, et al. Micronutrient Sprinkles reduce anemia among 9- to 24-mo-old children when delivered through an integrated health and nutrition program in rural Haiti. J Nutr 2007;137:1023-30.
12. de Pee S, Moench-Pfanner R, Martini E, Zlotkin S, Darton-Hill I, Bloem MW. Home-fortification in emergency response and transition programming: Experiences in Aceh and Nias, Indonesia. Food and Nutrition Bulletin 2007;28:189-97.
13. World Food Programme. Micronutrient Powder (MixMe™) use in Kakuma Refugee Camp in Kenya (AFRICA). Sight and Life May 2009;2:1-4.
14. Khambalia AZ, O'Connor DL, Macarthur C, Dupuis A, Zlotkin SH. Periconceptional iron supplementation does not reduce anemia or improve iron status among pregnant women in rural Bangladesh. American Journal of Clinical Nutrition November 2009;90:1295-1302.
15. Institute of Medicine, Food and Nutrition Board. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. Washington, D.C.: National Academy Press, 2001.

Malaysia needs wider coverage with iodized salt

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Malaysia, following a national IDD survey in 1996, implemented universal salt iodization (USI) in Sabah and the majority of districts in Sarawak, but concluded IDD was not a public health problem in Peninsular Malaysia (1). However, subsequent studies showed otherwise. A study in rural Malay women of reproductive age living on the outskirts of Kuala Lumpur found a goiter prevalence of 23 to 24.5% (2). Despite the use of a water-iodination system to supply iodine to 26 schools in the state of Terengganu, the median urinary iodine concentration (UIC) of children aged 8-10 years was only 75 µg/L, and was comparable to the median UIC of 73 µg/L measured in children from schools without water iodination (3).

Hence, to judge the need to institute USI for the whole of Malaysia, the Ministry of Health did a national survey in 2008 to assess the IDD status in the country. First, a nationwide cross-sectional school-based survey was done in all the 13 states and 3 Federal Territories and included 18,078 school children aged 8-10 years from 445 primary schools registered under the Ministry of Education, Malaysia; 55.9% and 44.1% were from urban and rural areas respectively. Approximately 1,200 school children were then randomly selected from both urban and rural schools from each state, and their UIC was determined using an in-house micro-method (4). To determine household iodized salt consumption, all children were asked to bring salt from their family kitchen, which was then tested using Rapid Test Kits for iodine. About 10% of the samples were also analyzed by titration. The findings of the study were reported as the weighted estimates after taking into account the complex survey design and disproportionate number of schools and school children involved.

By WHO/ICCIDD/UNICEF criteria, the overall result indicated that Malaysia is borderline iodine sufficient with median UIC of 109.0 µg/L, and an interquartile range of 67.1 to 166.3 µg/L (Figure 1).
As expected, the median UIC was higher in the IDD gazetted than non-IDD gazetted areas for both urban and rural areas (Figure 2). Children from rural schools were found to be mildly iodine deficient while those from urban schools were borderline sufficient. Confirming earlier reported findings, deficiency was more marked in six states, namely Kedah, Penang, Perak, Pahang, Terengganu and Kelantan, where median UIC was between 67.6 and 87.7 µg/L (Figure 1).

Only 17.6% of households consumed iodized salt containing the recommended iodine level of ≥15 ppm. Even in the fully-gazetted state of Sabah, the overall proportion using adequately iodized salt was only 73.3%, with significantly higher proportions of adequately iodized salt among urban households than rural ones.

The IDD eradication program in Sabah has been in effect since the implementation of USI. Despite this, the proportion of households consuming adequately iodized salt remains below the recommended target of >90%. This implies inadequate monitoring and law enforcement, and perhaps the lack of uniform access to iodized salt in the state. There is a need to strengthen the quality assurance procedures for iodized salt at every level, and particularly at the Port of Entry, as well as at importers and retailers. With almost 50% of the states in Peninsular Malaysia having median UIC <100 µg/L, it is justified to implement USI nationwide. Greater efforts need to be made by all relevant authorities to increase public awareness on the importance of adequate iodine nutrition, especially among women of child-bearing age. Even mild iodine deficiency could impair brain development and compromise the full intellectual potential of Malaysian children.

Figure 1: Median urinary iodine levels in the States of Malaysia in 2008

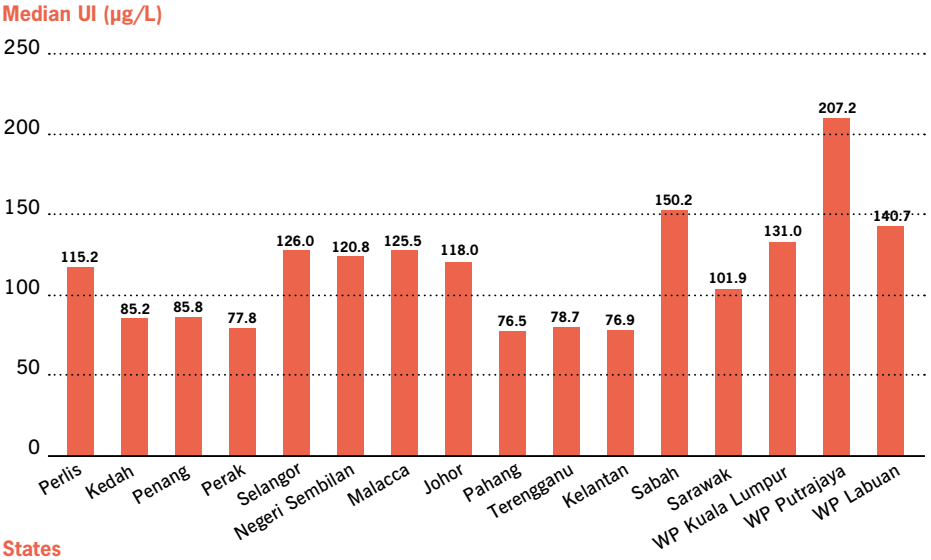
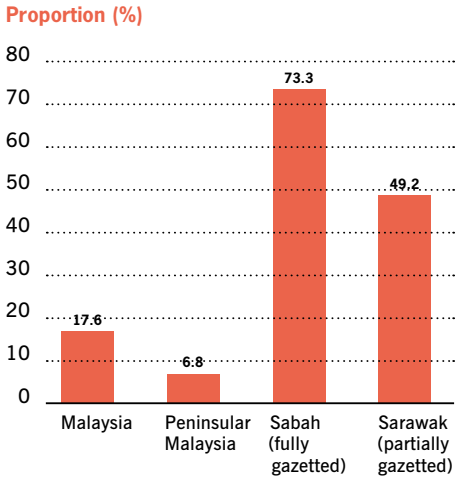


Figure 2: Proportion of adequately iodized household salt (iodine content ≥15ppm) in Malaysia and by region, in 2008



References

1. Institute for Medical Research, Ministry of Health, Malaysia. Survey of IDD in Peninsular Malaysia. Kuala Lumpur, Ministry of Health, 1995.

2. Osman A, Zaleha MI. Nutritional status of women and children in Malaysian rural populations. Asia Pac J Clin Nutr 1995; 4: 319-324.

3. Lim KK, Siti Rohana D, Zawiah A, Wan Nazaimoon WM. An evaluation of the effectiveness of water iodinator-system to supply iodine to selected schools in Terengganu, Malaysia. Tropical Biomedicine 2006; 23(2); 172-178.

4. Husniza H, Wan Nazaimoon WM. A cost-effective modified micro method for measuring urine iodine. Tropical Biomedicine 2006; 23(1): 109-115.

Renewed stimulus for USI in Kyrgyzstan

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Iodine deficiency is remembered by the people of Kyrgyzstan as a historical threat of goiter and cretinism that was overcome during the Soviet period by central prophylaxis that included iodized salt. Provincial surveys among school-age children during the 1980s showed that IDD had made a comeback already prior to Independence in 1991. The activities initiated under a 'National Program for Prevention of Conditions related to Iodine Deficiency, 1994-2000' consisted chiefly of technology development in local salt enterprises, educational campaigns to the public and in primary schools, improvements in salt quality inspections at production and retail, and training workshops for officials, scientists and salt producers. But despite some progress in increasing the national iodized salt supplies, only 27% of the households in Kyrgyzstan were found to use adequately iodized salt in 2000 (1).

In view of the limited improvement in the national iodine supply, the Kyrgyz Government enacted a Law on IDD Prevention in 2001 that prohibited the import and sale of non-iodized edible salt and stipulated the use of potassium iodate at 40±15 mg iodine/kg salt. Also in 2001, the State Committee on Standardization and Metrology issued a normative standard for iodized salt, which made it compulsory on producers and importers to have the product certified prior to selling it to their customers. At the Almaty Forum in October 2001, jointly supported by the Asian Development Bank (ADB) and UNICEF (2), a multi-sector delegation from Kyrgyzstan devised an action plan to further develop the national capacities in salt iodization, quality inspection and population status assessment, together with efforts to improve the public's acceptance and report publicly on progress. Upon adoption by Government, this plan was a foundation for the 'National Program for Decreasing IDD in Kyrgyz Republic, 2003-2007', launched in 2002. During early 2003, the local salt enterprises coalesced in the 'Kyrgyz Association of Salt Producers' (KASP), Government decided to abolish the import tariffs on the fortificant and equipment, and a National Fortification Alliance was formed to provide guidance on the USI strategy. Nevertheless, the ongoing illegal import by domestic traders of so-called 'industrial' salt continued posing an obstacle by the persistent presence of non-iodized salt in the Kyrgyz markets.

During 2003, concerned with the leniency in official enforcement practices, the Kyrgyz-Swiss Health Project started supporting the village-based health structures of Naryn province in using rapid salt test kits as a tool to persuade the traders and retailers to accept only iodized salt from the producers. In a 2y campaign in households and retail outlets, a quantum increase took place in the iodized salt supply in the province (3). Moreover, by using only the test kits specific for potassium iodate, the campaign also succeeded in shifting the share in the supply chain away from salt that was still iodized with potassium iodide, a less stable fortificant. This bottom-up activist approach has been extended to other provinces with similar success in

improving the iodized salt supply: In 2006, the Multiple Indicator Cluster Survey reported adequately iodized salt in 76% of the households (4). An important component in the campaign that helps to keep the success of the 'Power from Below' approach going is the ongoing provision of rapid test kits to salt retailers, asking them to use the kits when they purchase their salt supplies and check one packet in their shops each month to verify persistent quality (5). In fact, more than 90% of the salt tested during the MICS in 2006 already showed that some iodine had been added.

Two successive projects during 2001-2007, managed by ADB with grants from the Japan Fund for Poverty Reduction, have supported the improvements of production, quality assurance and control systems, and of monitoring the salt supply under the national IDD elimination policy (6). Equally important weight and attention in these projects was accorded to the needs for capacity development of the private and public sectors, such as iodization inputs and technology including product quality assurance, and regulatory inspection including iodized salt sampling, measurement and enforcement systems. Near the end of 2007, however, and despite continued readiness of ADB and UNICEF, the collaboration among partners at national level weakened appreciably after KASP went through a change of leadership and the Ministry of Health did not succeed in approval of new memberships for the National Fortification Alliance.

There are no viable deposits of salt 'fit for human consumption' in Kyrgyzstan. By 2000, three local companies had started processing of non-iodized salt imported from surface deposits in Kazakhstan. Imported salt, mostly from the AralTuz Company in Kazakhstan, supplied about 70% of the national salt needs at that time (7). Since then, the technical, material and training support by ADB, UNICEF and others has helped to stimulate the growth and extension of the local salt processing industries and by 2007, about 15 local salt enterprises were supplying 13,000 ton of iodized salt or ±65% of the national needs (8). During the same period, the Kyrgyz salt enterprises started self-reliant procurement of inputs and initiated modern quality assurance practices in their production (9). Since the producers of the fortificant do not commonly entertain purchase orders below 1,000kg, the reliable access to fairly-priced fortificant in small amounts has continuously been an obstacle for the salt enterprises in Kyrgyzstan. Among the services by KASP was to consolidate the purchases of the collective industry, but from 2006 onward this arrangement fell in dysfunction and the small enterprises were paying occasionally as much as US$30-35/kg for their fortificant purchases through intermediary traders. Trying to skimp on the amount of fortificant at production is an understandable practice under this scenario.

The vigorous price competition among salt brands in the markets of Kyrgyzstan at present is testimony of a vibrant salt industry. Twenty-five to 30% of the national edible salt needs of 16-18,000MT/y is imported as packed iodized salt from salt producers in Kazakhstan, Belarus, Tajikistan and Uzbekistan, and the remainder is imported as non-iodized edible salt from deposits in Kazakhstan (TarasTuz, Suzak and Balkash in Zhambyl Oblast) and Uzbekistan (Karakalpakstan and Sukhandarya) for local processing. An unknown share of the national salt supplies is purchased by the food industries which use salt in the manufacturing recipe. The bread bakeries are highly important among these food industries in view of the major role of bread in the common food consumption of the Kyrgyz population.

Figure 1: Iodine content in household salt, Kyrgyz Republic, 2007

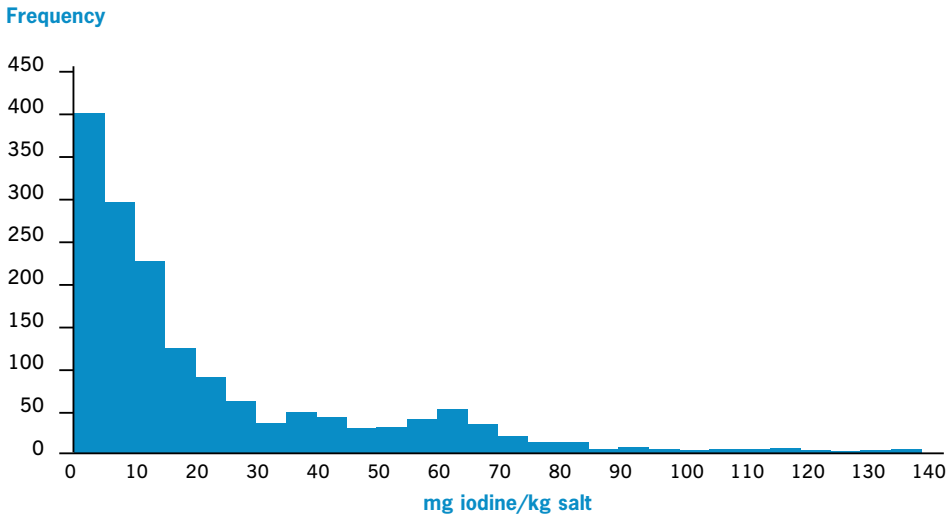
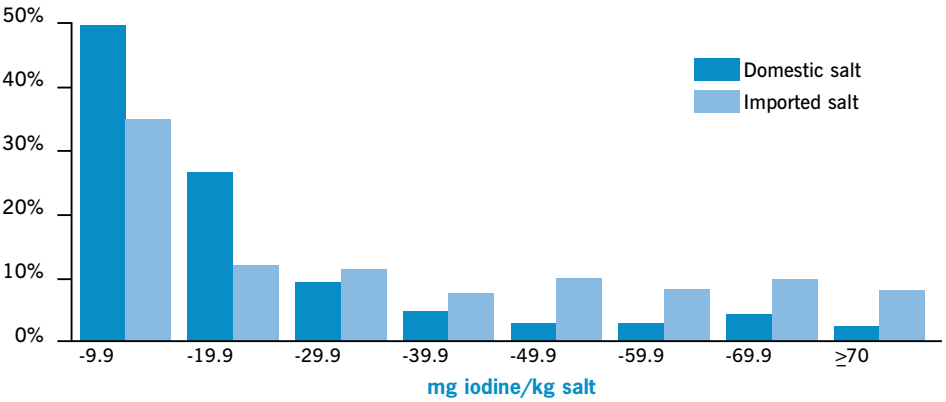


Figure 2: Salt iodine content by supply source



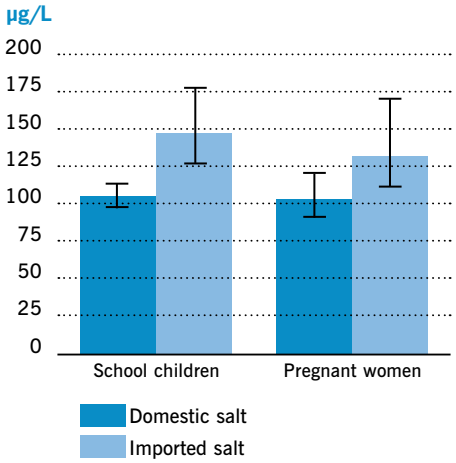
The completion of the 2nd National Program in 2007 was reason for conducting a national iodine survey with the standard 30x30 design, which collected population indicators of iodine supply, consumption and impact with a view to examine their interrelationships (9). The regular school-based sampling of 8-10y old children was extended by enrolling 20 pregnant women in prenatal clinics at close distance to each selected school. Casual urine samples were obtained of each participant, and their thyroid volume was measured by ultrasound. The survey participants were requested to bring the salt package used in the household to the examination site for recording the brand name and origin of the producer. Urinary iodine (UI) concentration was analyzed in the Endocrinology Dispensary of Bishkek, which participates successfully in the EQUIP program of CDC (10).

The survey yielded 27 different salt brands; 21 of domestic origin. No significant difference was found between the iodine content of salt samples brought by the children or the women. The median iodine content in salt (Figure 1) was 11.2mg/kg; 39.5% of the samples had ≥15mg iodine/kg and 15.0% fell in the compulsory range of 25-55mg/kg. Only 1.4% of the salt samples were not iodized, thus confirming the success of the ongoing salt testing campaigns in reminding the producers that they will suffer loss of market share if they do not iodize their product. Imported salt brands made up 26% of the samples with a discernable brand name. As illustrated in Figure 2, the iodine content in imported salt brands (median 22.7mg/kg) was two times higher ($p<0.001$) than in domestic brands (10.2mg/kg).

The UI concentrations of the children (median 114µg/L) and the women (111µg/L) did not differ significantly and analyzed by cluster, the UI levels of the women and the children were strongly correlated ($r=0.63$; $p<0.001$). The prevalence of elevated thyroid volume in children was 5.2%, based on the age reference. Pregnant women had significantly ($p<0.001$) larger thyroid volumes (median 7.9ml) than children (2.8ml) and an analysis by semester of pregnancy showed a significant ($p<0.001$) increase of the women's thyroid size with pregnancy duration. In view of the shortfall in status among pregnant women, the survey results indicated that the USI practice in Kyrgyzstan was failing to supply optimum nutrition in the population.

The usefulness of collecting information about the brand name and origin of household salt came out in various ways. For example, the UI concentration in the children as well as the women was significantly related to the supply source of the salt: Compared to the households with domestic salt brands, the UI in each group was higher by 30-40µg/L in households using imported salt (Figure 3). This finding would suggest that the check on the certificate of conformity at import may have been more instrumental in promoting adequate iodized salt supplies than the food inspections of the domestic salt enterprises. That the situation in reality was not so simple was borne out by an analysis by salt brands, which permitted insight into the degree to which the different salt manufacturers were supplying adequately iodized salt. As Figure 4 shows, only two domestic producers (coded H and J) and one foreign producer (code O) were supplying salt with generally adequate iodine levels.

Figure 3: Urinary iodine concentrations (Median, 95% CI) by source of salt in the household

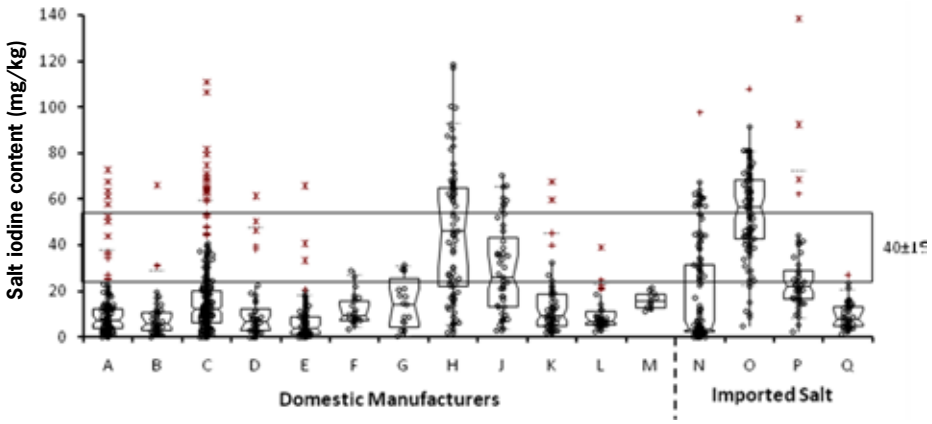


The two domestic producers encompassed about 10% of the total salt supplies and the single foreign producer 8%, and because imported salt constituted 25% of the total salt samples, the influence of the single foreign supplier was more pronounced in the end analysis than the two domestic producers.

The survey findings about brands and producer origin also played an important role in a multi-sector Round Table held in Bishkek in late 2009, which considered next steps. During the meeting, the time lapse since the 2007 survey mitigated any embarrassment that may have been perceived on behalf of the salt producers. A presentation using Figure 4 clearly articulated that the low iodization practice among producers was a key remaining issue. At the same time, the Figure also

offered the viewpoint that the practices in official enforcement were failing in their aim of assisting in the supply of only adequately iodized salt. A key Parliamentarian attended the meeting and later introduced the issue of national USI achievement in a Parliament session, while pressing to assist in reliable fortificant access for the producers. In the end, the Round Table created a renewed momentum for collaboration among partners: A local chemical import firm was accepted by the producers and officials the purchase and management of annual consolidated fortificant requirements, the salt producers elected a new and energetic KASP President, and the Chief Sanitary Doctor committed to more technical assistance and training to improve the quality assurance methods by industry technicians, along with full transparency of the inspections in the salt enterprises.

Figure 4: Salt iodine content by manufacturer



Through a combination of continued pressure 'from below' in the communities on the salt industry, along with revived collaboration at national level for improvements in fortificant access and quality iodized salt production, Kyrgyzstan has re-positioned for progress toward the goal of IDD elimination through USI.

References

1. Multiple Indicator Cluster Survey – Kyrgyzstan 2000

2. Van der Haar F, 2004. JFPR9005: Improving nutrition of poor mothers and children in Asian countries in transition. IDD Newsletter 20(4): 63-70

3. Schüth T, Jamangulova T, Janikeeva S, Tologonov T, 2005. Power from below: Enabling communities to ensure the provision of iodated salt in Kyrgyzstan. Food and Nutrition Bulletin 26(4): 366-375

4. National Statistical Committee of the Kyrgyz Republic, UNICEF, 2007. Multiple Indicator Cluster Survey 2006, Final Report

5. Schüth T, Sultanalieva R, 2008. Power from below – test kits in the hands of Kyrgyzstan retailers pressure producers to iodize salt. IDD Newsletter 29(3): 16-17

6. Van der Haar F, 2009. Promoting Universal Salt Iodization in Countries of Central Asia and Mongolia, 2001-2007. Manila, Asian Development Bank, technical assistance consultant's report. http://www.adb.org/Documents/Reports/Consultant/37721-REG/37721-01-REG-TACR.pdf

7. Varghese PO, 2002. Salt situation analyses in Kazakhstan, Kyrgyz Republic and Tajikistan, February-March 2002. Manila, Asian Development Bank, consultant's report

8. Locatelli-Rossi L, 2008. Kyrgyzstan 2010 – Towards USI/IDD compliance. Internal UNICEF report

9. Muzafarov R, 2008. Sustainable Food Fortification in Central Asia and Mongolia, financed by the Japan Fund for Poverty Reduction. Manila, Asian Development Bank, technical assistance consultant's report. http://www.adb.org/Documents/Reports/Consultant/37721-REG/37721-03-REG-TACR.pdf

10. Sultanalieva R, Mamutova S, Van der Haar F, 2009. The current salt iodization strategy in Kyrgyzstan ensures sufficient iodine nutrition among school-age children but not pregnant women. Public Health Nutrition E-copy prior to publication, doi:10.1017/S136898000999200X

11. Ivanova L, Timmer A, 2008. A new iodine laboratory improves Kyrgyzstan's capacity to monitor iodine nutrition. IDD Newsletter 28(2): 12-13

12. World Health Organization, Food and Agriculture Organization of the United Nations, 2004. Monitoring and evaluation. In: Guidelines for Food Fortification with Micronutrients, pp 178-206. Geneva, WHO

Progress towards sustainable elimination of IDD in Uzbekistan

Dr Chandrakant Pandav, ICCIDD South Asia, was invited by Unicef to review the national IDD program, make recommendations for strengthening the program and identify areas and/or strategies to accelerate progress in Uzbekistan.

Endemic goiter has been recognized as a public health problem in Uzbekistan for a long time. The reported prevalence of endemic goiter in 1935-39 was 32.4%. With the introduction of iodized salt in 1950's, the prevalence of goiter was reduced to 15.9% by 1988. Uzbekistan became an independent Republic in December, 1991. Prior to December 1991, iodized salt was supplied to Uzbekistan from Russia, Ukraine and Kazakhstan. IDD re-emerged as a major public health problem in Uzbekistan when the supply of iodized salt from the former Soviet Union was no longer available. In 1998, 92.7% of population used noniodized salt, 90% of the population had negligible UIC and prevalence of goiter was 65%.

Over the past decade, the government of Uzbekistan has shown increasing commitment towards elimination of IDD through universal salt iodization (USI). The key reforms include attaining self-sufficiency in salt production:

- commencement of production of iodized salt in 1998
- a single agency for procurement and distribution of potassium iodate (2006)
- adoption of legislation for IDD prevention and control (2007)
- lifting of the tax for importation of salt iodisation equipment
- initiation of community monitoring activities

Table 1: Current status of progress towards sustainable elimination of IDD as a public health problem in Uzbekistan

Indicators	Goals	Status in Uzbekistan
Salt Iodisation Proportion of households using adequately iodized salt	> 90%	• 53 % (MICS 2006) • 51 % (Institute of Endocrinology, 2008) • 60-70% (Personal communication, October 2009)
Median urinary Iodine General population	100-199 µg/l	• 70% have median urinary iodine greater than 100 µg/l (Inst. Endocrinology, 2008)

These efforts have resulted in increase in household coverage with iodized salt from 8.3% in 1998 to 51% in 2008-2009. There has also been an increase in proportion of the population with an optimal UIC, from 2.6% in 1998 to 70% in 2008. The prevalence of goiter has decreased from 65% to 44% in 2008. It was reported during the debriefing workshop at the Tashkent Paediatric Medical Institute and at meetings at the Ministry of Public Health that the latest coverage figures of adequately iodised salt at the household level for 2009 varied from 60% to 70%.

Thus, in a short period of time, considerable progress has been made towards elimination of IDD in Uzbekistan. However much more needs to be done to attain the IDD control targets specified by WHO/UNICEF/ICCIDD. The "troika" of interventions required to accelerate progress towards IDD elimination in Uzbekistan includes:

- Promoting access to quality iodised salt
- Effective Information, Education and Communication strategy
- Greater intersectoral coordination

The harmonization of the above three interventions and early implementation will accelerate the efforts towards sustainable IDD elimination in Uzbekistan.

GLOBAL IDD SCORECARD 2010

Country	Total population 2008 (thousands)	Annual no. births 2008 (thousands)	% households consuming iodized salt 2003-2008	Median UIE (ug/L)	Proportion of population with low UIE (<100 ug/L; %)	Total Goitre Rate (%)	Iodine deficiency protected population (thousands)	Iodine deficiency unprotected population (thousands)	Iodine deficiency protected infants (thousands)	Iodine deficiency unprotected infants (thousands)
Afghanistan	27'208	1'269	28	49	71.9	9.9	7'618	19'590	355	914
Albania	3'143	46	60	–	–	–	1'886	1'257	28	18
Algeria	34'373	714	61	27	77.7	65	20'968	13'405	436	278
Andorra	84	1	–	–	–	–	–	–	–	–
Angola	18'021	774	45	–	–	–	8'109	9'912	348	426
Antigua and Barbuda	87	1	–	–	–	–	–	–	–	–
Argentina	39'883	689	90	–	–	–	35'895	3'988	620	69
Armenia	3'077	47	97	313	6.3	–	2'985	92	46	1
Australia	21'074	267	–	104	46.3	19.4	–	–	–	–
Austria	8'337	76	–	111	49.4	–	–	–	–	–
Azerbaijan	8'731	166	54	54	74.4	11.1	4'715	4'016	90	76
Bahamas	338	6	–	–	–	–	–	–	–	–
Bahrain	776	14	–	204	16.2	1.7	–	–	–	–
Bangladesh	160'000	3'430	84	135	36.7	49.9	134'400	25'600	2'881	549
Barbados	255	3	–	–	–	–	–	–	–	–
Belarus	9'679	96	55	45	80.9	33.4	5'323	4'356	53	43
Belgium	10'590	119	–	80	66.9	–	–	–	–	–
Belize	301	7	90	184	26.7	–	271	30	6	1
Benin	8'662	342	55	289	8.3	19.6	4'764	3'898	188	154
Bhutan	687	15	96	298	12.0	14	660	27	14	1
Bolivia	9'694	263	88	250	19.0	4.5	8'531	1'163	231	32
Bosnia and Herzegovina	3'773	34	62	157	22.2	25.7	2'339	1'434	21	13
Botswana	1'921	47	66	219	15.3	16.5	1'268	653	31	16
Brazil	191'972	3'105	96	360	.0	4	184'293	7'679	2'981	124
Brunei Darussalam	392	8	–	–	–	–	–	–	–	–
Bulgaria	7'593	73	100	198	6.9	27.4	7'593	–	73	–
Burkina Faso	15'234	721	34	114	47.5	55.2	5'180	10'054	245	476
Burundi	8'074	278	98	70	60.5	–	7'913	161	272	6
Cambodia	14'562	361	73	–	–	17	10'630	3'932	264	97
Cameroon	19'088	704	49	52	91.7	10.3	9'353	9'735	345	359
Canada	33'259	353	–	–	–	–	–	–	–	–
Cape Verde	499	12	0	52	77.4	25.5	–	499	–	12
Central African Republic	4'339	154	62	21	79.5	60.9	2'690	1'649	95	59
Chad	10'914	498	56	213	29.4	63	6'112	4'802	279	219
Chile	16'804	251	100	984	.2	6.4	16'804	–	251	–
China	1'337'411	18'134	95	246	15.7	5.8	1'270'540	66'871	17'227	907
Colombia	45'012	918	92	249	6.4	6.5	41'411	3'601	845	73
Comoros	661	21	82	–	–	13.6	542	119	17	4
Congo	3'615	125	82	–	–	12	2'964	651	103	23
Cook Islands	20	0	–	–	–	–	–	–	–	–
Costa Rica	4'519	75	92	233	8.9	–	4'157	362	69	6
Côte d'Ivoire	20'591	722	84	203	27.6	44.8	17'296	3'295	606	116
Croatia	4'423	42	90	140	28.8	16.1	3'981	442	38	4
Cuba	11'205	118	88	95	51.0	–	9'860	1'345	104	14
Cyprus	862	10	–	–	–	–	–	–	–	–
Czech Republic	10'319	109	–	119	47.7	–	–	–	–	–
DPR Korea	23'819	327	40	–	–	–	9'528	14'291	131	196
DR Congo	64'257	2'886	79	495	10.1	28.4	50'763	13'494	2'280	606
Denmark	5'458	62	–	61	70.8	12.1	–	–	–	–
Djibouti	849	24	0	–	–	–	–	849	–	24
Dominica	67	1	–	–	–	–	–	–	–	–
Dominican Republic	9'953	224	19	39	86.0	5.3	1'891	8'062	43	181
Ecuador	13'481	281	99	420	–	–	13'346	135	278	3
Egypt	81'527	2'015	79	148	31.2	21.4	64'406	17'121	1'592	423
El Salvador	6'134	124	62	150	4.6	–	3'803	2'331	77	47
Equatorial Guinea	659	25	33	–	–	–	217	442	8	17
Eritrea	4'927	182	68	168	25.3	36.7	3'350	1'577	124	58
Estonia	1'341	16	–	65	67.0	n.d.	–	–	–	–
Ethiopia	80'713	3'093	20	58	68.4	53.3	16'143	64'570	619	2'474
Fiji	844	18	31	34	75.4	–	262	582	6	12
Finland	5'304	59	–	164	35.5	–	–	–	–	–
France	62'036	752	–	85	60.4	12.9	–	–	–	–
Gabon	1'448	40	36	190	38.3	17.1	521	927	14	26

Country	Total population 2008 (thousands)	Annual no. births 2008 (thousands)	% households consuming iodized salt 2003-2008	Median UIE (ug/L)	Proportion of population with low UIE (<100 ug/L; %)	Total Goitre Rate (%)	Iodine deficiency protected population (thousands)	Iodine deficiency unprotected population (thousands)	Iodine deficiency protected infants (thousands)	Iodine deficiency unprotected infants (thousands)
Gambia	1'660	61	7	42	72.8	16.3	116	1'544	4	57
Georgia	4'307	52	87	62	80.0	–	3'747	560	45	7
Germany	82'264	666	–	148	27.0	–	–	–	–	–
Ghana	23'351	757	32	54	71.3	–	7'472	15'879	242	515
Greece	11'137	107	–	–	–	17.5	–	–	–	–
Grenada	104	2	–	–	–	–	–	–	–	–
Guatemala	13'686	453	76	222	14.4	–	10'401	3'285	344	109
Guinea	9'833	392	41	139	32.4	59	4'032	5'801	161	231
Guinea-Bissau	1'575	65	1	–	–	32.6	16	1'559	1	64
Guyana	763	14	–	162	26.9	–	–	–	–	–
Haiti	9'876	273	3	84	58.9	–	296	9'580	8	265
Holy See	1	–	–	–	–	–	–	–	–	–
Honduras	7'319	202	80	204	31.3	–	5'855	1'464	162	40
Hungary	10'012	99	–	80	65.2	11.6	–	–	–	–
Iceland	315	5	–	150	37.7	–	–	–	–	–
India	1'181'412	26'913	51	133	31.3	17.9	602'520	578'892	13'726	13'187
Indonesia	227'345	4'220	62	229	5.2	9.8	140'954	86'391	2'616	1'604
Iran (Islamic Rep. of)	73'312	1'388	99	165	19.7	54.6	72'579	733	1'374	14
Iraq	30'096	944	28	–	–	–	8'427	21'669	264	680
Ireland	4'437	69	–	82	60.8	–	–	–	–	–
Israel	7'051	140	–	–	–	–	–	–	–	–
Italy	59'604	546	–	94	55.7	13.9	–	–	–	–
Jamaica	2'708	52	100	–	–	–	2'708	–	52	–
Japan	127'293	1'034	–	–	–	–	–	–	–	–
Jordan	6'136	157	88	154	24.4	33.5	5'400	736	138	19
Kazakhstan	15'521	304	92	97	53.1	36.7	14'279	1'242	280	24
Kenya	38'765	1'506	91	118	36.8	15.5	35'276	3'489	1'370	136
Kiribati	97	2	–	–	–	–	–	–	–	–
Kuwait	2'919	52	–	147	31.4	–	–	–	–	–
Kyrgyzstan	5'414	120	76	30	88.1	49.1	4'115	1'299	91	29
Lao PDR	6'205	170	84	162	26.9	–	5'212	993	143	27
Latvia	2'259	23	–	59	76.8	–	–	–	–	–
Lebanon	4'194	66	92	95	55.5	25.7	3'858	336	61	5
Lesotho	2'049	59	91	215	21.5	4.9	1'865	184	54	5
Liberia	3'793	145	–	321	3.5	–	–	–	–	–
Libyan Arab Jamahiriya	6'294	147	90	–	–	–	5'665	629	132	15
Liechtenstein	36	0	–	–	–	–	–	–	–	–
Lithuania	3'321	31	–	75	62.0	–	–	–	–	–
Luxembourg	481	5	–	148	–	–	–	–	–	–
Madagascar	19'111	687	75	–	65.4	22.8	14'333	4'778	515	172
Malawi	14'846	599	50	–	–	28.1	7'423	7'423	300	300
Malaysia	27'014	551	–	91	57.0	4	–	–	–	–
Maldives	305	6	44	115	43.1	23.6	134	171	3	3
Mali	12'706	542	79	69	68.3	–	10'038	2'668	428	114
Malta	407	4	–	–	–	–	–	–	–	–
Marshall Islands	61	1	–	–	–	–	–	–	–	–
Mauritania	3'215	108	2	55	69.8	30.9	64	3'151	2	106
Mauritius	1'280	18	0	154	4.4	–	–	1'280	–	18
Mexico	108'555	2'049	91	235	8.5	10.4	98'785	9'770	1'865	184
Micronesia	110	3	–	–	–	–	–	–	–	–
Monaco	33	0	–	–	–	–	–	–	–	–
Mongolia	2'641	50	83	97	52.8	23	2'192	449	42	9
Montenegro	9'839	115	71	–	–	–	6'986	2'853	82	33
Morocco	31'606	646	21	75	63.0	22	6'637	24'969	136	510
Mozambique	22'383	876	25	60	68.1	14.3	5'596	16'787	219	657
Myanmar	49'563	1'020	93	205	22.3	–	46'094	3'469	949	71
Namibia	2'130	59	63	216	28.7	–	1'342	788	37	22
Nauru	10	0	–	–	–	–	–	–	–	–
Nepal	28'810	732	63	188	27.4	40	18'150	10'660	461	271
Netherlands	16'528	185	–	154	37.5	1.8	–	–	–	–
New Zealand	4'230	58	83	66	–	–	3'511	719	48	10
Nicaragua	5'667	140	97	271	13.4	–	5'497	170	136	4
Niger	14'704	791	46	270	–	35.8	6'764	7'940	364	427
Nigeria	151'212	6'028	97	–	27.5	29.1	146'676	4'536	5'847	181
Niue	2	0	–	–	–	–	–	–	–	–
Norway	4'767	58	–	–	–	–	–	–	–	–
Palestine	4'147	148	86	–	–	–	3'566	581	127	21

Country	Total population 2008 (thousands)	Annual no. births 2008 (thousands)	% households consuming iodized salt 2003-2008	Median UIE (ug/L)	Proportion of population with low UIE (<100 ug/L; %)	Total Goitre Rate (%)	Iodine deficiency protected population (thousands)	Iodine deficiency unprotected population (thousands)	Iodine deficiency protected infants (thousands)	Iodine deficiency unprotected infants (thousands)
Oman	2'785	61	69	91	49.8	10	1'922	863	42	19
Pakistan	176'952	5'337	17	–	63.6	84.9	30'082	146'870	907	4'430
Palau	20	0	–	–	–	–	–	–	–	–
Panama	3'399	70	95	235	8.6	10.2	3'229	170	67	4
Papua New Guinea	6'577	207	92	181	27.7	4.6	6'051	526	190	17
Paraguay	6'238	154	94	294	13.4	–	5'864	374	145	9
Peru	28'837	609	91	180	10.4	–	26'242	2'595	554	55
Philippines	90'348	2'236	45	201	23.8	5.4	40'657	49'691	1'006	1'230
Poland	38'104	372	–	84	64.0	–	–	–	–	–
Portugal	10'677	105	–	–	–	–	–	–	–	–
Qatar	1'281	15	–	203	30.0	–	–	–	–	–
Republic of Korea	48'152	452	–	–	–	–	–	–	–	–
Republic of Moldova	3'633	45	60	78	62.0	36.7	2'180	1'453	27	18
Romania	21'361	214	74	–	46.9	12.8	15'807	5'554	158	56
Russian Federation	141'394	1'545	35	–	–	–	49'488	91'906	541	1'004
Rwanda	9'721	403	88	298	–	25.9	8'554	1'167	355	48
Saint Kitts and Nevis	51	0	100	–	–	–	51	–	–	–
Saint Lucia	170	3	–	–	–	–	–	–	–	–
SV/Grenadines	109	2	–	–	–	–	–	–	–	–
Samoa	179	4	–	–	–	–	–	–	–	–
San Marino	31	0	–	–	–	–	–	–	–	–
Sao Tome and Principe	160	5	37	–	–	–	59	101	2	3
Saudi Arabia	25'201	591	–	180	23.0	24	–	–	–	–
Senegal	12'211	470	41	45	75.7	28.7	5'007	7'204	193	277
Serbia	622	8	73	158	20.8	1.3	454	168	6	2
Seychelles	84	3	–	–	–	–	–	–	–	–
Sierra Leone	5'560	223	45	–	33.7	–	2'502	3'058	100	123
Singapore	4'615	37	–	–	–	–	–	–	–	–
Slovakia	5'400	55	–	183	15.0	4.4	–	–	–	–
Slovenia	2'015	19	–	–	–	79	–	–	–	–
Solomon Islands	511	16	–	–	–	–	–	–	–	–
Somalia	8'926	395	1	–	–	–	89	8'837	4	391
South Africa	49'668	1'091	62	177	29.0	40.9	30'794	18'874	676	415
Spain	44'486	491	–	109	50.1	10.4	–	–	–	–
Sri Lanka	20'061	365	94	153	30.0	20.9	18'857	1'204	343	22
Sudan	41'348	1'296	11	75	62.0	22	4'548	36'800	143	1'153
Suriname	515	10	–	–	–	–	–	–	–	–
Swaziland	1'168	35	80	170	34.5	5.4	934	234	28	7
Sweden	9'205	107	–	–	–	–	–	–	–	–
Switzerland	7'541	73	–	141	24.0	14.5	–	–	–	–
Syrian Arab Republic	21'227	590	79	–	42.3	–	16'769	4'458	466	124
Tajikistan	6'836	193	49	–	56.8	68.7	3'350	3'486	95	98
Thailand	67'386	977	47	150	34.9	2.2	31'671	35'715	459	518
The former Yugoslav Republic of Macedonia	2'041	22	94	228	8.7	5.8	1'919	122	21	1
Timor-Leste	1'098	44	60	–	–	–	659	439	26	18
Togo	6'459	213	25	171	6.2	32.6	1'615	4'844	53	160
Tonga	104	3	–	–	–	–	–	–	–	–
Trinidad and Tobago	1'333	20	28	–	–	–	373	960	6	14
Tunisia	10'169	164	97	164	26.4	36.3	9'864	305	159	5
Turkey	73'914	1'348	69	75	60.9	30.3	51'001	22'913	930	418
Turkmenistan	5'044	111	87	170	18.7	25	4'388	656	97	14
Tuvalu	10	0	–	–	–	–	–	–	–	–
Uganda	31'657	1'466	96	464	3.9	60.2	30'391	1'266	1'407	59
Ukraine	45'992	459	18	50	70.1	55.6	8'279	37'713	83	376
United Arab Emirates	4'485	63	–	91	56.6	40.4	–	–	–	–
United Kingdom	61'231	743	–	–	–	–	–	–	–	–
United Rep. of Tanzania	42'484	1'771	43	–	14.5	44	18'268	24'216	762	1'009
United States	311'666	4'399	–	221	19.4	–	–	–	–	–
Uruguay	3'349	50	–	–	–	–	–	–	–	–
Uzbekistan	27'191	553	53	141	39.8	73	14'411	12'780	293	260
Vanuatu	234	7	23	–	–	–	54	180	2	5
Venezuela	28'121	599	90	286	–	–	25'309	2'812	539	60
Viet Nam	87'096	1'494	93	40	84.0	21.9	80'999	6'097	1'389	105
Yemen	22'917	846	30	173	30.2	16.8	6'875	16'042	254	592
Zambia	12'620	542	77	60	72.0	31.6	9'717	2'903	417	125
Zimbabwe	12'463	378	91	245	14.8	–	11'341	1'122	344	34

Steady progress against IDD in East, Central and Southern Africa

David P Haxton Executive Director ICCIDD

"News from and about Africa usually has a focus on what is not working. In the case of USI achievements and IDD elimination, progress is steady and significant."

Background

The Ministers of Health of ECSA requested a session at the 50th Meeting in February 2010 in Kampala on progress to date on micronutrient nutrition, with particular emphasis on iodine. David Haxton, Executive Director of ICCIDD was invited to speak at the meeting. The following is a synopsis of his report to the UNICEF Regional Office in Nairobi, Kenya on issues of commitment to USI and IDD elimination in East Africa. Table 1 shows that 5 countries have reached household levels of iodized salt that are recommended by WHO, ICCIDD and UNICEF; that 5 have reached household levels above 75%; that the top leadership in ECSA is committed and aware of the priority for success and the values of that success to achievement of the MDGs.

Kenya

For many years, the standard set for iodized salt was higher than needed and recommended under the ICCIDD WHO UNICEF guidelines. During all that time, the producers continued to pay for the potassium iodate and to obey the law even while voicing persistent complaints. Following a report provided by ICCIDD, the Government adjusted the level downward to comply with international norms. Regular monitoring seems to suggest that the new product is reaching all locations in the country, but this needs to be carefully reviewed and the results shared. The Government of Kenya had requested a formal international assessment but preliminary discussions demonstrated that the documentation and evidence was not sufficient nor as current as required and action was postponed. Meanwhile, political challenges in the country delayed bureaucratic action until recently.

There is a national committee and it meets; perhaps not as regularly as required nor with an action oriented agenda in most cases, but it is representative, except for participation of key civil society entities and the communications community. It is not clear just what oversight duties have been assigned to it and how they would be enforced. There is serious political commitment but it is mostly sectoral in nature and does not seem to involve the senior officials of government, active participation of members of parliament or elements of government that could be major allies in sustaining achievement, such as agriculture, education, and rural development. There is a regular monitoring system but it seems that the results are not analyzed as promptly as might be desired. An information and education plan is needed and it should be part of a long range advocacy plan. The collaboration of the salt industry is stellar. It might now be useful to move toward approaches to the food processing industry to press for use of iodized salt.

Conclusions

Kenya is in good position to comply with international guidelines. However, it is vital that urgent attention be paid to bringing the monitoring and data records up to date and sharing them. A plan for improved and more widespread evidence of political commitment is suggested. An advocacy plan with a comprehensive public education plan as part of this is strongly advised. An urgent review of the capacity and the most recent reports from monitoring systems, lab practices and quality assurance is suggested. Finally, while modest progress is evident in the use of modern technology (cellular transmissions) for monitoring, the innovations in the ministry do not stress iodine nutrition issues as a priority. The leadership and commitment of UNICEF is excellent. At the moment there does not seem to be a major issue on procurement of raw materials from abroad. But over time, that may change so it is suggested that this issue be looked at soon with a view to assuring a secure system which is transparent and which assures continued success.

Kenya is facing challenging political issues at the moment, many contentious and partisan. The question of optimal iodine nutrition and protection from preventable brain damage should avoid getting tangled up in that. But, that said, it is also timely to 'think politically' on the issue and take advantage of the present partisan difficulties which penetrate all systems and focus on "a success story of which all can take pride and credit" i.e., USI achievement, IDD elimination, protection of preventable brain damage for the entire nation, thus assuring progress in education, health, economic development and other MDGs.

Tanzania

Significant progress is reported. The National Committee seems to be representative and active. The leadership is in the Tanzania Food and Nutrition Center with strong support of the MOH. Household access is reported at 80% or more but a good portion of that is not optimally iodized salt. (The official data is a bit out of date; new survey data is expected shortly.) A focus on encouraging increased and better quality production of the many small pan holders has been expensive but not as productive as desired.

The review presented by the TFNC center was clear and frank. It followed the suggested indicators of progress in the Guidelines for Assessment and reported that Tanzania had achieved five, perhaps six, of the indicators, but these needed to be consolidated. More attention to the indicators not showing significant achievement will be forthcoming upon completion of the national survey on iodine nutrition currently under the direction of the TFNC. A preliminary report is expected in a couple of months.

Discussion seemed to reveal that more attention should be paid to: (a) making the national committee more effective and addressing specific issues and formulating tactics to address them, such as how to use the Retailers Association to maximum benefit, for instance in public information about the values of iodine, the dangers of its absence; and on monitoring of products to assure optimal iodization levels; (b) a plan for advocacy that will improve political commitment in more than the MOH, create and stimulate interest in the education and agriculture sectors and be more comprehensive in national public education in public media; (c) expanding the request for technical assistance; (d) make better and wider use of cellular communications for reporting and for communications of appropriate messages; (e) work directly with the producers that are identified as not complying with the legislated standards to improve quality and./or to apply sanctions as per the legislation (f) in suggesting acceptable ideas to small producers, it would be wise perhaps to think about involving experts from the microcredit field to assist.

In correspondence earlier, ICCIDD had commented on the draft proposal for technical assistance calling for two experts in various elements of salt production, processing and marketing by suggesting that the request was limited. It was proposed to add a senior consultant to assist with planning to improve political commitment, address key issues of national policy formulation and advocacy, and to help to pull together the various national elements in the programme and the major donors so that there is one national plan in which all can play a key role instead of various plans seeking for 'by in' from others.

Conclusions

Significant progress has been made. Major problems seem well identified, but more aggressive and imaginative approaches to them are indicated. The National Committee is good and members seem eager to be helpful. A major effort should be made to work out improved and practical ways to take maximum advantage of the network of retail outlets that are connected into an association, a channel not now sufficiently addressed. It is hoped that the comments in early correspondence and in these discussions will be acted upon and that a team of three persons be invited to address the issues: two on questions of salt production and marketing; one on advocacy and political commitment issues. In addition, the special problem of the stalled production plant in Zanzibar should be addressed before it becomes a major issue. All of these consultants can be recruited and deployed in the first half of the year. Meanwhile the national survey will have been completed and will provide excellent information to redesign efforts. While the 80% household salt coverage must be sustained, more attention needs to be paid to the producers not now complying so that all of the salt delivered is optimally iodized. Cellular communications systems should be investigated to seek applications for monitoring and more rapid reporting. The management of UNICEF is committed and well informed. An urgent matter is to look at the issue of procurement, beginning with potassium iodate, and design an effective, fair, transparent, well managed procurement system that allows for more access at fair (lower) prices to those small producers not now purchasing as they should; or not iodizing as they should. Such a system could consider replacements for reagents and for assurance of lab stability and management as well. Microcredit organizations should be approached to seek ways to assist the small producers.

Uganda

Most of the salt sold in Uganda is imported from Kenya. The change in regulation in Kenya thus assists Uganda with regard to iodization levels, but the regulation in Uganda regarding import restrictions and other internal regulatory procedures are in need of change, a change which is in process. New data is being collected, but it seems reasonable to assume that an assessment to confirm reporting success in the country could be undertaken this year. The UNICEF office is pressing for this and the Government seems interested, but cautious and careful.

The national committee is being revised to assure that appropriate representation of importers is more active. A national communications plan seems required, but this needs to be looked at. UNICEF and the Government are using cellular communications networks for reporting on a variety of issues and it seems reasonable to assume that with modest pressure, a system could be put into place to report on availability and quality of iodized salt products nation wide.

Table 1: USI status in ECSA

Reached USI (≥90%)		Closing in on USI Goal (50-89%)		Lagging Behind (<50%)	
Burundi	98%	Rwanda	88%	Angola	45%
Uganda	96%	Comoros	82%	Tanzania	43%
Kenya	91%	Swaziland	80%	Mozambique	25%
Lesotho	91%	Zambia	77%	Ethiopia	20%
Zimbabwe	90%	Madagascar	75%	Somalia	1%
		Eritrea	68%		
		Botswana	66%		
		Namibia	63%		
		South Africa	62%		
		Malawi	50%		

No Data Mauritius, Seychelles

Summary

Looking at Figure 1, it is thought that five of the countries in group two could relatively easily reach household iodized salt coverage of 90% or greater with modest additional pressure. Three of them are land locked and dependent upon imported salt for a good portion of their needs; one is a major producer and exporter that simply allows too much noniodized salt into the market under the guise of 'consumer choice'. National program reviews in each led by UNICEF could within this year put success stories in Africa on the global map. ICCIDD can assist in most cases with individual consultants on monitoring and reporting, on oversight especially regarding regulatory management and political advocacy.

Meetings and Announcements

Vincent Assey earns Dr. Phil. Degree at University of Bergen, Norway

On 11 December 2009, ICCIDD Board Director Vincent Didas Assey of Tanzania successfully defended his dissertation entitled "Controlling Iodine Deficiency Disorders through Salt Iodation in Tanzania" at the University of Bergen, Norway. Dr Assey's work was based on an ongoing collaboration project between the International Child Health Center at Uppsala University, Sweden and the Centre for International Health at the University of Bergen. Prof. Thorkild Tylleskär functioned as Supervisor and the Committee consisted of Dr Frits van der Haar of Emory University, Atlanta, USA, Prof. Arne Oshaug of Akershus University College, Lillestrøm, Norway and Prof. Eystein Husbeye of Bergen University. The studies reported in the dissertation offer evidence of the enormous improvement in iodine nutrition of the Tanzanian population, in most part due to universal salt iodization. Five papers were published in the international peer-reviewed literature and consist of three major surveys, a policy analysis and a hands-on experiment to improve the salt iodization practices in small-scale salt enterprises. In the assessment of the Committee, the work by Dr Assey "shows clear and convincing evidence of scholarship in practice-based service." The educational benefit of eliminating iodine deficiency in Tanzania was subject of a first-page review in the previous IDD Newsletter.

Vincent Assey responds to a question during his defense ceremony

Iodine deficiency the focus of the current issue of *Best Practice & Research Clinical Endocrinology & Metabolism*

The entire February 2010 issue of the journal ***'Best Practice & Research Clinical Endocrinology & Metabolism'*** (Volume 24, Issue 1, Pages 1-158) is dedicated to iodine deficiency (*http://www.bprcem.com/issues/*). The issue includes contributions by leading experts from ICCIDD, Unicef and WHO. The contents are:

A. Epidemiology

Epidemiology of iodine deficiency: Salt iodisation and iodine status
Maria Andersson, Bruno de Benoist, Lisa Rogers

Iodine intake as a determinant of thyroid disorders in populations
Peter Laurberg, Charlotte Cerqueira, Lars Ovesen, Lone Banke Rasmussen, Hans Perrild, Stig Andersen, Inge Bülow Pedersen, Allan Carlé

B. Lifecycle

Iodine deficiency in pregnancy, infancy and childhood and its consequences for brain development
Alida Melse-Boonstra, Nidhi Jaiswal

Cretinism revisited
Zu-Pei Chen, Basil S. Hetzel

C. Monitoring and controlling IDD in populations

Assessment of nodular goitre
Massimo Tonacchera, Aldo Pinchera, Paolo Vitti

Neonatal TSH screening: is it a sensitive and reliable tool for monitoring iodine status in populations?
Mu Li, Creswell J. Eastman

Methods for determination of iodine in urine and salt
Pieter L. Jooste, Emmerentia Strydom

The challenges of iodine supplementation: a public health programme perspective
Juliawati Untoro, Arnold Timmer, Werner Schultink

The challenges of implementing and monitoring of salt iodisation programmes
Kevin M. Sullivan

Iodine excess
Hans Bürgi

D. Special topics

The impact of common micronutrient deficiencies on iodine and thyroid metabolism: the evidence from human studies
Sonja Y. Hess

Perchlorate, iodine and the thyroid
Angela M. Leung, Elizabeth N. Pearce, Lewis E. Braverman

Iodine in Enteral and Parenteral Nutrition
Michael B. Zimmermann, Catherine M. Crill

14th International Thyroid Congress, Paris, Sept 11-16, 2010

The 14th International Thyroid Congress will be held from 11th to 16th September 2010 in Paris, at the Palais des Congrès. Every five years the American, European, Asia-Oceania and Latin-American thyroid associations combine their annual scientific meetings into one: the International Thyroid Congress. The congress is widely regarded as a major event in international thyroidology due to its truly global character. There will be a session dedicated to IDD. Please see:
http://www.itc2010.com/

ICCIDD Board Meeting, Washington D.C., April 23-24, 2010

The 2010 ICCIDD Annual Board Meeting will take place on April 23-24 in Washington, D.C. For further information, please contact the ICCIDD Executive Director, David Haxton, at:
DPHaxton@aol.com

Abstracts

Community monitoring of the National Iodine Deficiency Disorders Control Programme in the National Capital Region of Delhi.

The present study was conducted to assess the current status of iodine-deficiency disorders (IDD) in the National Capital Region of Delhi (NCR Delhi) and evaluate the implementation and impact of the National Iodine Deficiency Disorders Control Programme (NIDDCP). School children (n=1230) in the age group of 6-12 years were enrolled from thirty primary schools in the Municipal Corporation of Delhi. The median urinary iodine excretion (UIE) was found to be 198.4 µg/l. The proportion of households consuming adequately iodized salt (salt with iodine levels of at least 15 ppm at consumption level) was 88.8 %. The authors concluded that significant progress has been achieved towards elimination of IDD from NCR Delhi.

Agarwal J, et al. Public Health Nutr. 2010 Mar 1:1-4. [Epub ahead of print]

Nationwide trends in surgery and radioiodine treatment for benign thyroid disease during iodization of salt.

Iodization of salt was introduced in Denmark in 1998 because of mild-to-moderate iodine deficiency (ID). The aim of this study was to analyze the utilization rate of surgery and radioiodine therapy for benign thyroid disorders before and after the introduction of iodization. Treatment rates were presented for surgery and for radioiodine separately and as a combined rate, both nationwide and split into regions of prior mild and moderate ID. In the first years of iodization (1998-2000) the combined treatment rate increased by 2.5%. Split by prior ID-level the increase was seen in the region of moderate ID, but a decrease in mild ID. After 2000, the combined rate decreased, and ended up being 11.1% lower in 2007 than before iodization. The changes were primarily due to changes in use of radioiodine therapy as the surgery rates remained almost constant. The authors concluded that iodization seemed to be associated with a temporary increase in the utilization rate of surgery and radioiodine therapy in the region of prior moderate ID, probably as a result of treatment of iodine-induced hyperthyroidism, but the rates ended up lower than before iodization.

Cerqueira C, et al. Eur J Endocrinol. 2010 Jan 18. [Epub ahead of print]

Suboptimal iodine status of Australian pregnant women reflects poor knowledge and practices related to iodine nutrition.

A cross-sectional study was conducted at a public antenatal clinic in New South Wales. One hundred thirty-nine pregnant women across all trimesters provided a spot urine sample (n = 110) and completed a short questionnaire (n = 139). Median UIC was 87.5 µg/L (interquartile range 62); only 14.5% of participants had an adequate UIC value ≥150 µg/L. Knowledge of the adverse health effects of an inadequate iodine intake was poor. Only a small number of participants (11%) reported that they had intentionally changed their diet to increase iodine intake during pregnancy, but 59% indicated supplement use, of which 35% contained iodine. Those who were taking supplements that contained iodine had significantly higher UIC levels (139.1 µg/L) than those who were not (90.8 µg/L, $P < 0.05$). Thus, public health strategies, including nutritional education and supplementation, are urgently required to improve the iodine status of pregnant women.

Charlton KE, et al. Nutrition. 2010 Jan 14. [Epub ahead of print]

Iodine intake is still inadequate among pregnant women eight years after mandatory iodination of salt in Turkey.

The study aim was to investigate iodine status, iodized salt consumption rate, and goiter prevalence in first trimester pregnant women eight years after the mandatory iodization of salt in Turkey. One hundred forty-one first trimester pregnant women were included. The median UIC of pregnant women was 149.7 µg/L. Total goiter prevalence was 24.8%, of which 9.2% were visible goiters. Among the study patients, 2.1% had subclinical hypothyroidism, and 0.7% had overt hypothyroidism. The rate for iodized salt use among the pregnant women was 95%. The authors concluded that iodine deficiency remains a problem for pregnant women, and that antenatal follow-up protocols in the primary care setting in Turkey must include iodine supplementation.

Kut A, et al. J Endocrinol Invest. 2009 Dec 22. [Epub ahead of print]

Perchlorate consumption, iodine status, and thyroid function.

Perchlorate inhibits the uptake of iodide into the thyroid gland, thereby possibly affecting the synthesis of thyroid hormones. Pregnant women and their fetuses and newborns have the greatest potential for risk of adverse health effects following exposure to perchlorate. Perchlorate is present in some foods and in drinking water in certain areas of the United States. Based on the available information, the United States Food and Drug Administration (FDA) is not recommending that consumers of any age alter their diet or eating habits due to perchlorate exposure. If one eats a healthy diet that is consistent with the Dietary Guidelines for Americans, taking iodine supplements is not necessary for protection against health effects associated with perchlorate at the levels present in water and foods.

Trumbo PR. Nutr Rev. 2010;68(1):62-6.

Urinary Iodide Excretion in Adults in Germany 2005 Meets WHO Target.

Recent investigations have shown that the abolition of the requirement to declare iodine in foodstuffs and the greater emphasis on information about goitre prevention led to an increase in urinary iodine excretion in German schoolchildren. The authors examined the urinary iodine excretion in the spontaneous morning urine of 1 538 healthy adults in 357 places from all over Germany. The median iodine excretion amounted to 132 µg/l. There were no significant differences between age groups, sexes or regions. 29% had a iodine excretion >200 µg/l. According to the WHO guidelines, there is no longer an iodine deficiency in German adults.

Hampel R, et al. Exp Clin Endocrinol Diabetes. 2009 Dec 8. [Epub ahead of print]

The economic cost of a poor start to life

A primary challenge for nutrition policy in low-income settings is to position nutrition as an investment rather than simply as a form of social spending that governments grant poor people to the degree that governments prioritize equity. Various economic models have produced estimates of the economic costs of malnutrition as a combination of the impact of malnutrition on mortality, on health care costs for the survivors, including those that manifest in adult years, and on the lost productivity attributable to malnutrition. However, these estimates often center on the costs of early mortality and are sensitive to assumptions on how to place a dollar cost on mortality. This study argues that even when focusing only on the productivity impact of malnutrition – clearly a lower bound of the full costs – the economic consequences of malnutrition are substantial. Stating this somewhat differently, the economic returns to preventing malnutrition are on a par with those investments generally considered at the heart of economic development strategies. Moreover, the body of evidence that has been accumulated to indicate these productivity gains is both substantial and robust.

Alderman H. Develop Origins Health Disease 2010, 1(1), 19–25.

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For further details about the IDD Newsletter, please contact:
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