THE SUSTAINABLE ELIMINATION OF IODINE DEFICIENCY DISORDERS IN LATIN AMERICA

REPORT OF THE SUB REGIONAL WORKSHOPS TO EVALUATE THE CURRENT SITUATION OF THE LATIN AMERICAN COUNTRIES
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Eduardo A. Pretell, Regional Coordinator for America

The Iodine Global Network (formerly International Council for Control of Iodine Deficiency Disorders - Global Network)
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Importance of iodine deficiency and overview of the Latin American situation. *Eduardo A. Pretell*

Optimum intake of sodium/salt and iodine as part of PAHO/WHO regional initiative on reduction of sodium/salt consumption to prevent cardiovascular diseases in particular hypertension. *Branka Legetic*

**Assessment of the IDD control programs and lessons learned in the Latin American countries**

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Importance of iodine deficiency and overview of the Latin American situation

Eduardo A. Pretell
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Iodine is essential for thyroid function and the synthesis of thyroid hormones, which play an important role in growth and development, with important implications for human health. A normal thyroid function requires an optimal iodine intake, which, according to WHO’s guidelines is 100-300 µg daily. During pregnancy and lactation the requirements are higher, thus pregnant and lactating women must be guaranteed an iodine intake of 150-250 µg daily.

Iodine deficiency is recognized as the world’s most common cause of preventable brain damage and mental retardation. It also causes goiter, hypothyroidism, damaged reproduction, and other disorders, together termed Iodine Deficiency Disorders (IDD) (Table 1). Pioneering studies in the Latin American Region (LAR) and elsewhere in the 1970s pointed to a lack of iodine during pregnancy as a major cause of brain damage in the fetus, and this, rather than goiter, emerged as the gravest consequence.

Table 1.
The spectrum of Iodine deficiency disorders (IDD)

<table>
<thead>
<tr>
<th>Physiological groups</th>
<th>Health consequences</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ages</td>
<td>Goiter, Hypothyroidism, Increased susceptibility to nuclear radiation</td>
</tr>
<tr>
<td>Fetus</td>
<td>Spontaneous abortion, Stillbirth, Congenital anomalies, Perinatal mortality</td>
</tr>
<tr>
<td>Neonate</td>
<td>Endemic cretinism including mental deficiency with a mixture of mutism, spastic diplegia, squint, hypothyroidism and short stature, Infant mortality</td>
</tr>
<tr>
<td>Child and adolescent</td>
<td>Impaired mental function, Delayed physical development, Iodine-induced hyperthyroidism</td>
</tr>
<tr>
<td>Adults</td>
<td>Impaired mental function, Iodine-induced hyperthyroidism</td>
</tr>
</tbody>
</table>
of iodine deficiency. Iodine deficiency during pregnancy has been shown to result in maternal hypothyroidism and impairment of mental development in the fetus, which can be prevented by providing iodine to the mother (Table 2).

Iodine deficiency is a permanent, natural phenomenon, widely distributed around the world. The Latin American countries have a long history of iodine deficiency, with the worst endemics affecting isolated mountain communities. The Andean Regions and Central Mexico were afflicted the most, but many other parts of the hemisphere were also severely involved, and virtually no country in mainland Latin America was free of iodine deficiency. Surveys for goiter in the 1930s showed that almost all countries had at least some regions with goiter prevalence above 50%, and several countries such as Argentina, Bolivia, Brazil, Ecuador, Paraguay, Peru, Mexico and Guatemala were iodine deficient across most regions. During the 1950s and 1960s, virtually every country passed a law mandating iodized salt and establishing a range of iodization levels. In some countries, prophylaxis with iodized salt was transiently successful, but in most it was not. Those programs that were initially successful later relapsed, mainly because of several common problems: (1) laws were not enforced, (2) monitoring was either absent or inadequate, and (3) the importance of iodine deficiency and its correction was not adequately communicated to the relevant sectors. Thus, by the 1990s, after laws mandating iodized salt had existed for 30 years, only a few countries were nearing iodine sufficiency, and the overall goiter prevalence had not significantly changed (Table 3). This failure in Latin America provides a valuable lesson of what could happen when political, cultural, technological, and economic sustainability is not secured.

The elimination of IDD as a public health problem by the year 2000 was advocated at the UN World Summit for Children (WSC) in 1990. In 1993, WHO and UNICEF recommended universal salt iodization (USI) as the main strategy to achieve the elimination of IDD. Three years later, recognizing the importance of IDD elimination, the World Health Assembly adopted Resolution WHA58.24, committing to reporting on the global IDD situation every 3 years.

### Table 2.
Neuromental development of children born to iodine deficient and iodine supplemented mothers

<table>
<thead>
<tr>
<th>Group</th>
<th>Pregnant women</th>
<th>Children, 5 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>UIC µg/gr cr</td>
<td>Thyroid function</td>
</tr>
<tr>
<td>Iodine Deficient</td>
<td>33 ± 3</td>
<td>1.08 ± 6.1</td>
</tr>
<tr>
<td>Iodine Supplemented</td>
<td>316 ± 81</td>
<td>1.93 ± 3.7</td>
</tr>
<tr>
<td>p</td>
<td>0.000</td>
<td>0.001 ± 0.01</td>
</tr>
</tbody>
</table>

Following the WSC, most Latin American countries reassessed their iodine status and implemented programs for the control of IDD. Over the past 25 years, the Latin American Region has made great progress against iodine deficiency disorders: several countries have successfully achieved sustainable elimination of IDD, and a few are close to reaching it. However, in several countries, sustainability of the success may be at risk. In parallel, the risk of iodine excess has increased in more than one country. The virtual elimination of IDD has been declared in five countries by external evaluations: Peru in 1996, Colombia in 1998, Ecuador and Venezuela in 1999, and Panama in 2002. Bolivia was also declared free of IDD in 1996, but it relapsed three years later due to a lack of sustainability efforts.

The LAR currently has the widest population coverage with iodized salt of all WHO Regions. However, universal HHIS, a key aspect of sustainability, has not yet been achieved in all countries, and insufficient efforts have been made to improve the capacity and technology of the small- and medium-size iodized salt producers. The proportion of the population covered with adequately iodized salt (≥15 ppm) has remained unchanged since 2003 at about 85%.

Based on the prevalence of urinary iodine excretion (UIE) <100 µg/L among school-age children (SAC), the Americas have the lowest prevalence of low intakes (13.7%) of all WHO Regions, but there has been slippage since 2003 when only 10% were at risk of low intakes. While in 2003 there were five iodine deficient countries, currently only three remain iodine deficient at the national level: Guatemala, Guyana, and Haiti. At the other end of the spectrum, six countries show iodine excess including Brazil, Colombia, Costa Rica, Honduras, Paraguay, and Uruguay.

But despite the great progress made in the past two decades, problems remain. Low levels of governmental support and a lack
of effective monitoring of salt iodization in some countries prevent the effective and sustained elimination of IDD. Nearly 99% of the total SAC population in the WHO Americas Region is covered by iodine surveys, but nearly one-third are sub-national. Monitoring is not carried out in all countries, and follow-up data are lacking in some. In some countries, the data on iodized salt coverage and UIE may be out of date. An additional concern is the growing trend to focus on reducing salt consumption before universal salt iodization (USI) and the sustained elimination of IDD have been achieved.

It should be remembered that, in countries affected by iodine deficiency, sustainable elimination of IDD contributes to socioeconomic development and achievement of the Millennium Development Goals.
Optimum intake of sodium/salt and iodine as part of PAHO-WHO regional initiative on reduction of sodium/salt consumption to prevent cardiovascular diseases in particular hypertension

Branka Legetic
PAHO-WHO Regional Adviser for prevention and control of NCDs

Most people in the Americas over consume salt, well above the internationally recommended limit of <5g/day/person. Recent dietary and urinary sodium excretion estimates confirm high per capita salt intake: Brazil at 11 g of salt/day; Argentina with 12 g of salt/day; Chile at 9.8 g of salt/day; the United States with 8.7 g of salt/day and Canada with 7.7 g/day (Final Report of Regional Expert group). Such high salt intake is associated with multiple adverse health issues but in particular it has a causal and linear relationship to rising blood pressure among both hypertensive and normotensive people and is attributable to 30% of the prevalence of hypertension. Even in the normal range, increased blood pressure is a major cause of disability by causing heart disease, stroke and kidney failure and is the leading risk for premature death world-wide. Whereas most health care professionals consider systolic blood pressure at 140 mmHg and over to be hypertension, the relative risk for cardiovascular diseases begins to rise when blood pressure rise above 115 mmHg. Already in 2000, about one in four adults world-wide had hypertension. Prevalence is expected to rise from a combination of people generally living longer and prevention of raised blood pressure being largely ineffective up to now.

Reducing dietary salt at the population level is the most cost-effective public health measure available to lower blood pressure and mortality. It can save lives and healthcare dollars across low, middle and high-income countries. Lowering blood pressure by reducing salt intake even a small amount (15%) is estimated to prevent 8.5 million premature deaths in 10 years in low- and middle-economies and can deliver cost-savings in high-income countries. Three countries have proven that sustained wide-ranging initiatives can reduce salt intake population-wide and in two countries, health benefits have accrued: between 1955-89 average salt consumption in Japan dropped from 13.5 g to 12.1 g per day resulting in a gradual fall in blood pressure and a marked decline in deaths from stroke; Finland reduced population level salt intake by 25% over two decades beginning in the 1970s and similarly observed a marked reduction in blood pressure and stroke deaths; England reduced salt consumption in the population from 9.5 g in 2001 to 8.6 g in 2008.

WHO and the UN Food and Agriculture Organization (FAO) issued a joint report in 2003 in which the recommended individual salt intake be less than 5 g/ day, what was confirmed in 2012 WHO Guidelines for sodium intake of adults and children. As part of the implementation of the WHO Global Strategy on Diet, Physical Activity and Health (DPAS) and the 2008-2013 Action Plan for the Global Strategy for the Prevention and Control of Non-communicable Diseases, WHO established a salt reduction strategy with three platforms: Creating enabling environment, Monitoring and Evaluation and Sodium as vehicle for Iodine Fortification.

In 2013, WHO with member states has stated a global target of 30% relative reduction of the salt/sodium consumption in the population by 2025 guaranteeing that the salt is iodized. The Pan American Health Organization (PAHO) in September
2009 has launched a region-wide initiative “Cardiovascular Disease Prevention through Population-wide Dietary Salt Reduction” Its activities were to be in line with and support the WHO global platforms for dietary salt reduction and were to take into consideration the specific features and contexts of the region and its Member States. Critical among the latter are that salt is still seen predominantly as a vehicle for micronutrient fortification; many countries in Central America and the Caribbean import much or most of their foods; surveillance capacities are often limited; national food regulatory agencies and capacities are often lacking; small and medium enterprises, the informal food sector and discretionary salt use can account for large proportions of total salt intake in many countries; and that the nutrition transition emerging in several countries calls for timely action.

Working closely with countries, the Expert group developed resources to aid policy development through work of five subgroups, 1) advocacy and communication; 2) surveillance of salt intake, sources of salt in the diet and knowledge and opinions on salt and health; 3) salt fortification with iodine; 4) addressing industry engagement and product reformulation and 5) economic studies on salt effectiveness.

The Initiative has set the policy goal for the Region and produced the Road map for different stakeholders called Policy statement, that was widely endorsed by Policy and decision makers in government, leaders in non-governmental organizations, civil society, and international organizations. The policy goal states: The internationally recommended intake of less than 5 g salt per capita per day (in the absence of equivalent or lower national targets) to be reached by 2020 among people in the Americas.

Regarding particular interest in the Americas for salt as vehicle for iodine fortification, and based on WHO supported technical consultation (2007), the PAHO Expert Group’s Policy Statement (2009) and an international Iodine Network resolution from February 2010 that all agree that there is no inherent conflict between salt iodization and salt reduction initiatives, PAHO group convened two meetings in 2011: the first as preparatory meeting with a small group of international and regional technical experts on iodine deficiency disorders and dietary salt reduction, among them members of the Expert Group, who confirmed that collaboration between and synchronization of the two programs to achieve a common goal – the optimal intake of sodium and iodine in the Americas – will be cost effective and of great public health benefit; it was agreed that synchronization of salt iodization and dietary salt reduction programs will bring together several stakeholders at international and national levels: the agencies working to optimize iodine supplementation and those focused on cardiovascular disease prevention; national governments; and various sectors of the salt and food industries. When the knowledge and experience of the stakeholders involved in the two programs are coordinated, with the stakeholders playing their respective roles within a
framework for action directed at a common goal of mutual benefit, cost savings can be realized for healthcare systems.

The second larger meeting gathered representatives of regional and international agencies working to optimize iodine supplementation along with PAHO and Expert Group members when was prepared a White Paper on Improving Public Health in the Americas through Optimal Intake of Sodium and Iodine

(www.paho.org/hq/index.php?option=com_content&view=article&id=5206&Itemid=1767). The White Paper includes a framework for action with recommendations to national governments, civil society, various sectors of the salt and food industries and international organizations active in the region. Within White paper, the following areas were identified as areas for coordination and synergy:

1. Common and coordinated messaging at global, regional and national levels to: a) policy and decision makers; b) the salt and food industries; c) stakeholders among the health professions; d) the public and consumers.

2. Common advocacy platforms to: a) integrate the development/adjustment of iodine fortification of salt and dietary salt reduction policies and programs; b) implement effective and regular quality assurance and monitoring programs for iodization of salt and dietary salt reduction policies and programs; c) synchronize national efforts to monitor iodine as dietary salt is reduced and where iodine deficiency is a concern, advance policies for the voluntary or mandatory use of iodized salt or iodine-containing premixes in commercially produced food at levels appropriate to population iodine needs; d) harmonize wherever possible cross country approvals processes to admit new food products with low salt content and an adequate amount of iodine; e) emphasize the importance of optimal iodine intake; f) emphasize the importance to health and the cost savings to health care systems of reduced dietary salt intake.

3. Concurrent surveillance of salt and iodine intake where feasible to inform salt iodization and dietary salt reduction programs including but not limited to: a) methods that optimally assess and monitor salt and iodine intake including potassium where a public health concern; b) comprehensive food surveys to distinguish the main sources of salt and iodine in the diet (including potassium where a public health concern); c) establishing, promoting and supporting laboratory proficiency for iodine and sodium analysis, (and potassium where a public health concern); d) knowledge, attitudes and behaviour surveys on salt consumption; e) monitoring the plans and patterns of the processed food industry with regards to provision of sodium (and/or salt) data on food labels and the feasibility of including iodine on labels.

4. Coordinated evaluations of national salt iodization and dietary salt reduction programs; a) applying a common set of principles including transparency and minimized conflicts of interest; b) committed to information sharing; c) independent of food and salt industries; d) demonstrating the link between action and disease outcomes.

5. Strategic joint research to fill knowledge gaps relevant to both salt iodization and reduction of dietary salt that emphasizes but is not limited to pilot and case studies in countries of differing economic and cultural make-up on: how to most effectively optimize sodium and iodine intake and the most effective and feasible collaborative surveillance methods to determine sodium and iodine intake and the sources of salt and iodine in the diet.

6. Shared forums with relevant sectors of the food industry to deal with iodine and sodium additives and promote

7. Promote coordinated mapping of existing and needed resources and
mobilization of resources towards but not limited to concurrent surveillance, policy development, advocacy and consumer education.

Current challenge is that recommendation about iodine content (20-40 ppm) is based on salt intake of 10g/ person/per day. As salt reduction happens in population going toward recommended 5 gr/person/day, it is necessary adjust iodine content to reach optimum sodium and iodine content.

The white paper and meeting report can be found at the last Guide for country action “Salt Smart Americas” (http://www.paho.org/hq/index.php?option=com_docman&task=doc_view&Itemid=270&gid=21554&lang=en).
Assessment of the IDD control programs and lessons learned In the Latin American countries

In response to the need to achieve and sustain the elimination of IDD across the LAR, the ICCIDD-GN conducted three sub-regional workshops to review the current status of USI and iodine nutrition in each country, along with salt intake reduction strategies, under the umbrella of the Program Cooperation Agreement between UNICEF’s Latin America and Caribbean Regional Office and the ICCIDD-GN, signed on 1st August, 2013.

OBJECTIVES

1. Review the current situation of the IDD control programs and activities to eliminate IDD across the region.
2. Strengthen sustainability of USI efforts by identifying the key factors responsible for USI’s success.
3. Increase household coverage of adequately iodized salt to ≥90% in all LAR countries.
4. Improve monitoring of iodine status and monitoring of salt iodization.
5. Improve sustainability of national IDD control programs.
6. Discuss the feasibility of an integrated strategy for iodine fortification and salt intake reduction.

WORKSHOP ORGANIZATION

The workshops were organized jointly by ICCIDD-GN and UNICEF’s Regional Office in Panama. The PAHO’s Expert Committee responsible for promoting policies to reduce salt intake and control iodine deficiency collaborated on the program. The organizational steps were as follows:

Step 1. Most recent data were collected from each country prior to the workshops. This was the responsibility of the ICCIDD-GN National Coordinators (NCs) in collaboration with local health authorities. The national data were collated and processed by the ICCIDD-GN’s Regional Coordinator.

Step 2. Communication was sent to the health authorities and salt industry representatives in each country clarifying the objectives of the workshops and requesting their official participation. The invitations were made on behalf of ICCIDD-GN and UNICEF.

Step 3. Guidelines were sent to each country’s delegation on how to prepare a report and a poster presentation on the country’s IDD activities and the current USI and iodine nutrition status. The countries were also asked to prepare a work plan of future activities.

The NCs played a key role in these initial steps, providing technical assistance and advocacy.

Step 4. During the two-day workshops, the country reports were presented and discussed, ending in the formulation of a work plan to be implemented afterwards.

Step 5. At the conclusion of the workshops, a summary report with recommendations was drafted, for distribution among the national authorities in each country, UNICEF, PAHO and other stakeholders.

WORKSHOP PLAN

The workshop was conducted as three sub-regional workshops, two in the South American sub-region, and one in the Central American/Caribbean sub-region. The first workshop took place on November 12–13, 2013 in Buenos Aires, Argentina. Participating countries included Argentina, Brazil, Chile, Paraguay and Uruguay. The second workshop was held on March 26–27, 2014 in Guatemala, and it was attended by Guatemala, Honduras, Nicaragua, El
Salvador, Costa Rica, Panama, Belize, Haiti, Dominican Republic and Cuba. The third workshop took place on June 11–12, 2014 in Quito, Ecuador, attended by Colombia, Ecuador, Guyana, Peru, Venezuela, Bolivia and Mexico.

Delegates were invited to meet and share their experiences and recommendations in order to identify and tackle problems specific to each country. Each workshop was attended by country delegations led by representatives of the MOH and the salt industry.

**AGENDA**

The goal of the workshops was to present recent findings relevant to IDD control and salt iodization at the national level, alternative mechanisms of iodine delivery, iodine nutrition status, and public health advantages of reducing salt intake. Case studies, including lessons learned from salt iodization programs in the region, were among the workshop presentations. The workshops’ focus was on integrated approaches based on nationally-owned programs to overcoming the challenges to USI in each of the sub-regions.

**PROGRAM**

The program for each workshop (Annex 1) included: (a) Inauguration Ceremony, with remarks by UNICEF, PAHO, and ICCIDD representatives; (b) presentation of objectives and expected outcomes; (c) significance of iodine deficiency and an overview of the current IDD status in the Americas; (d) overview of existing initiatives for salt intake reduction in the Americas; (e) country presentations and discussions; (f) technical presentations to update delegates on the latest advanced knowledge and strategies for achieving sustained elimination of IDD in the region, and to advocate the reduction of salt intake. The topics of the technical presentations included QA/QC in the salt industry (how to provide consistently high-quality iodized salt for national programs), surveillance and monitoring of iodine nutrition status, communication (how to deliver the iodization message to the government, salt and food industry, health, and consumers in the context of different objectives and existing programs), and the role of coalitions and advocacy in iodine nutrition; (g) group discussions, including reflection on the technical presentations; (h) case studies; and (i) presentation of work plans by each country.

**PARTICIPANTS**

The attendees included representatives of the MOH and the salt industry as well as ICCIDD-GN’s National Coordinators from each participating country (except Belize, Guyana and Haiti, which were represented only by the MOH). A group of experts, representatives of UNICEF and PAHO, the ICCIDD-GN Regional Coordinator for America, and other local health and academic staff also participated in each workshop (Annex 2).
OUTCOMES

I. IDD CONTROL PROGRAMS: ORGANIZATION AND ACTIVITIES

The current status of country IDD programs is summarized in Table 4. Of the twenty two countries recognized as iodine deficient, seventeen maintain official IDD control programs mainly aiming to attain USI and adequate iodine status, with varied degrees of success. Five countries do not have an official program dedicated to IDD: in Argentina and Chile the surveys and field work are carried out by the Argentinean Federation of Endocrine Societies (FASEN), and the Institute of Food and Nutrition of the University of Chile, respectively. Colombia discontinued its IDD program once the country was declared free of iodine deficiency. Belize and Guyana never had a dedicated IDD program. Information, education, and communication activities have slowed down in most countries. In general, IDD-related activities are now integrated into other official micronutrient and epidemiology programs rather than standalone IDD programs. In some countries, the interest in sustaining IDD elimination has waned, and the political support has declined. National coalitions exist in thirteen countries, but they are active only in eight.

II. USI SITUATION

In all countries except Belize and Guyana, iodization of all salt for human consumption is mandatory, with most countries using KIO$_3$, and five countries (Costa Rica, Dominican Republic, Guatemala, Mexico, and Venezuela) using

<table>
<thead>
<tr>
<th>Country</th>
<th>Population</th>
<th>Official IDD Program / Activities</th>
<th>National Coalition</th>
<th>Laboratory facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Exists?</td>
<td>Actual Situation</td>
<td>Salt - I</td>
</tr>
<tr>
<td>Argentina</td>
<td>41`803,000</td>
<td>No*</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Belize</td>
<td>340,000</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Bolivia</td>
<td>10`848,000</td>
<td>MOH</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Brasil</td>
<td>202 034,000</td>
<td>MOH</td>
<td>Yes Active</td>
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</tr>
<tr>
<td>Chile</td>
<td>17 773,000</td>
<td>No**</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Colombia</td>
<td>48`930,000</td>
<td>No</td>
<td>No</td>
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<td>Costa Rica</td>
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<td>MOH</td>
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</tr>
<tr>
<td>Dominican Rep.</td>
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<td>MOH</td>
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<td>Yes</td>
</tr>
<tr>
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<td>15`938,000</td>
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<td>Yes</td>
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<td>6`384,000</td>
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<td>Guatemala</td>
<td>15`860,000</td>
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<td>Yes</td>
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<tr>
<td>Guyana</td>
<td>804,000</td>
<td>No</td>
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<td>Haiti</td>
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<td>Honduras</td>
<td>8`261,000</td>
<td>MOH</td>
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<tr>
<td>Mexico</td>
<td>123`799,000</td>
<td>MOH</td>
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<tr>
<td>Nicaragua</td>
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<td>Panama</td>
<td>3`926,000</td>
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<td>Uruguay</td>
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<td>Venezuela</td>
<td>30`851,000</td>
<td>MOH</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

MOH= Ministry of Health
* Federation of Argentinean Enndocrine Societies, FASEN
** Institute of Nutrition and Food Technology, University of Chile
both KIO₃ and KI. Although some countries have updated their legislation regarding salt iodization, there is still a wide range of permitted iodization levels (15–100 ppm) across the region (Table 5). In nine countries, more than 70% of iodized salt is processed by large plants with advanced technology and quality control, and another nine are mainly dependent on salt processed by small- and medium-size producers, which lack safe technology and quality assurance. QC/QA at production level is carried out in about a quarter of the countries.

In eleven countries, more than 90% of households are consuming adequately iodized salt (≥15 ppm), and in four countries the coverage is 80–89%. There are only three countries (El Salvador, Guatemala, and Venezuela) with a coverage between 54–79% (Table 6). Although regular quality control is lacking in some countries (only seven carry out regular monitoring: Cuba, Ecuador, El Salvador, Panama, Paraguay, Peru, and Venezuela), it is assumed that these coverage levels remain constant. Thus, compared with the coverage reported ten years ago at the Regional Meeting “Optimal Iodine Nutrition in the Americas” (Lima, Peru, 2004), the proportion of countries with HHIS coverage of more than 80% has increased from 76% (16/21) to 83% (15/18) in 2013. On average, the household coverage with adequately iodized salt across the LAR has increased from 84.7% in 1995–2004 to 90.6% in 2005–2013.
III. IODINE NUTRITION STATUS

Based on the urinary iodine concentration (UIC) in SAC, the overall regional iodine nutrition has continued to improve since the 2004 Regional Meeting in Lima. While in 2004 there were five iodine deficient countries, currently only Haiti is still classified as iodine deficient. Bolivia, Guatemala, and the Dominican Republic have become iodine sufficient (Table 7). The situation of Guyana is uncertain because the last survey was conducted in 1997. The median UIC in SAC is above 100 µg/L in almost all LAR countries, and in six the MUIC is above 300 µg/L (Brazil, Colombia, Costa Rica, Honduras, Paraguay, and Uruguay), indicating a risk of iodine excess (Fig. 1). However, the data from three of these countries (Colombia, Honduras, and Uruguay) may be out of date. Only five countries (Ecuador, Panama, Paraguay, Peru, and Venezuela) conduct regular national surveys every 2–3 years, and the data in the remaining countries come from sub-national or regional surveys carried out sporadically. The classification of countries according to the WHO UIC cut-offs is shown in Fig. 2.

Studies of iodine nutrition during pregnancy have reported that pregnant women may be at risk of iodine deficiency in some countries, despite normal UIC levels in SAC (Table 8).

<table>
<thead>
<tr>
<th>Table 6. Classification of countries based on the proportion of households consuming adequately iodized salt (&gt;15 ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Región</strong></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>North America</td>
</tr>
<tr>
<td>Central America</td>
</tr>
<tr>
<td>South America</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Caribbean</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
Table 7.
Urinary Iodine Concentration in SAC

<table>
<thead>
<tr>
<th>Country</th>
<th>Monitoring Frecuency</th>
<th>Year</th>
<th>Extension</th>
<th>Median µg/L</th>
<th>&lt; 100µg/L %</th>
<th>Sample N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>Sporadic</td>
<td>2010</td>
<td>R</td>
<td>144</td>
<td>29</td>
<td>6942</td>
</tr>
<tr>
<td>Belize</td>
<td>Sporadic</td>
<td>1995</td>
<td></td>
<td>184</td>
<td></td>
<td>1656</td>
</tr>
<tr>
<td>Bolivia</td>
<td>Sporadic</td>
<td>2005</td>
<td>N</td>
<td>191</td>
<td>17.7</td>
<td>7907</td>
</tr>
<tr>
<td>Brasil</td>
<td>Sporadic</td>
<td>2008</td>
<td>N</td>
<td>304</td>
<td>9.9</td>
<td>13620</td>
</tr>
<tr>
<td>Chile</td>
<td>Sporadic</td>
<td>2006</td>
<td>F</td>
<td>252</td>
<td>0</td>
<td>230</td>
</tr>
<tr>
<td>Colombia</td>
<td>Sporadic</td>
<td>2002</td>
<td>N</td>
<td>409</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Costa Rica</td>
<td>Sporadic</td>
<td>2008</td>
<td>N</td>
<td>314</td>
<td>7.1</td>
<td>368</td>
</tr>
<tr>
<td>Cuba</td>
<td>Every 3 yr</td>
<td>2012</td>
<td>N</td>
<td>176</td>
<td>7.6</td>
<td>848</td>
</tr>
<tr>
<td>Dominican Rep.</td>
<td>Sporadic</td>
<td>2012</td>
<td>N</td>
<td>223</td>
<td></td>
<td>853</td>
</tr>
<tr>
<td>Ecuador</td>
<td>Every 2ys</td>
<td>2012</td>
<td>N</td>
<td>234</td>
<td></td>
<td>4360</td>
</tr>
<tr>
<td>El Salvador</td>
<td>Sporadic</td>
<td>2012</td>
<td>N</td>
<td>206</td>
<td>19.1</td>
<td>1237</td>
</tr>
<tr>
<td>Guatemala</td>
<td>Sporadic</td>
<td>2005</td>
<td>N</td>
<td>144</td>
<td>29</td>
<td>942</td>
</tr>
<tr>
<td>Guyana</td>
<td>Sporadic</td>
<td>1997</td>
<td>N</td>
<td>169</td>
<td>29.9</td>
<td>342</td>
</tr>
<tr>
<td>Haiti</td>
<td>Sporadic</td>
<td>2008</td>
<td>N</td>
<td>39</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Honduras</td>
<td>Sporadic</td>
<td>2005</td>
<td>N</td>
<td>356</td>
<td>9.13</td>
<td>150</td>
</tr>
<tr>
<td>Mexico</td>
<td>Sporadic</td>
<td>2011</td>
<td>N</td>
<td>297</td>
<td>14.25</td>
<td>1488</td>
</tr>
<tr>
<td>Nicaragua</td>
<td>Sporadic</td>
<td>2007</td>
<td>N</td>
<td>196</td>
<td></td>
<td>443</td>
</tr>
<tr>
<td>Panama</td>
<td>Every 2ys</td>
<td>2010</td>
<td>N</td>
<td>254</td>
<td>4.9</td>
<td>991</td>
</tr>
<tr>
<td>Paraguay</td>
<td>Every 3 yr</td>
<td>2010</td>
<td>N</td>
<td>352</td>
<td>3.8</td>
<td>7149</td>
</tr>
<tr>
<td>Peru</td>
<td>Every 3ys</td>
<td>2009</td>
<td>N</td>
<td>262</td>
<td>24.3</td>
<td>3626</td>
</tr>
<tr>
<td>Uruguay</td>
<td>Sporadic</td>
<td>2004</td>
<td>N</td>
<td>310</td>
<td>2.8</td>
<td>500</td>
</tr>
<tr>
<td>Venezuela</td>
<td>Every 3ys</td>
<td>2011</td>
<td>N</td>
<td>180</td>
<td>16</td>
<td>1197</td>
</tr>
</tbody>
</table>

N= National  R= Regional  F= Focal

Fig. 1. Urinary Iodine Concentration (µg/L) in School Age Children by Country

* Data > 10 years old
Fig. 2. 
Classification of countries based on median UIC

Table 8. 
Urinary Iodine Concentration in pregnant women (PW) and school age children (SC)

<table>
<thead>
<tr>
<th>Country</th>
<th>Region/City</th>
<th>Year</th>
<th>PW  µg/L</th>
<th>SAC µg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>NOA</td>
<td>2012</td>
<td>119</td>
<td>116</td>
</tr>
<tr>
<td>Argentina</td>
<td>Buenos Aires</td>
<td>2005</td>
<td>137</td>
<td>143</td>
</tr>
<tr>
<td>Argentina</td>
<td>Cordoba</td>
<td>2004</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td>Sao Paulo</td>
<td>2009</td>
<td>138</td>
<td></td>
</tr>
<tr>
<td>Brazil</td>
<td></td>
<td>2011</td>
<td>125</td>
<td>139</td>
</tr>
<tr>
<td>Mexico</td>
<td>Hidalgo</td>
<td>2002</td>
<td>116</td>
<td>123</td>
</tr>
<tr>
<td>Mexico</td>
<td>Querétaro</td>
<td>2014</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td>Peru</td>
<td>Ayacucho</td>
<td>1998</td>
<td>115</td>
<td>180</td>
</tr>
<tr>
<td>Uruguay</td>
<td></td>
<td>1998</td>
<td>70</td>
<td>119</td>
</tr>
</tbody>
</table>
**IV. ENDEMIC GOITER PREVALENCE**

Endemic goiter prevalence (EGP) is no longer frequently used as an indicator of iodine deficiency. However, a high prevalence of endemic goiter reported in the Northwest Region of Argentina (NOA), a well-known iodine deficient area, may indicate a persisting problem, where pregnant women may be at higher risk of iodine deficiency. A similar situation has been reported in Cuba and the Dominican Republic, where a USI strategy has only been in place for several years. A high prevalence of goiter in El Salvador, where the UIC in SAC is adequate but the percentage of households with access to iodized salt is low, is difficult to interpret.

**V. EXCHANGE OF EXPERIENCES, DISCUSSION AND LESSONS LEARNED**

The workshops paid particular attention to the following topics:

**a. Political support and sustainability of IDD elimination**

The key pre-requisites for sustainability are government commitment and ownership, enforcement of USI legislation, salt industry support, and monitoring. However, the meeting recognized that these pre-requisites are not fulfilled in all countries; in particular, some countries have noted a decline in political commitment and undue complacency as a result of partial success. Therefore, the meeting stressed the need to strengthen the commitment from the government, the salt industry, and from other stakeholders, and to further promote the understanding of IDD consequences and the vital role of USI in contributing to the nation’s economic and social development.

*Lessons learned:*

The five Andean countries were declared virtually free of iodine deficiency more than 15 years ago (Bolivia and Peru in 1996, Ecuador in 1999, Colombia in 1998, and Venezuela in 1999). Since then, their individual IDD control programs have followed different paths. Peru, Venezuela and Ecuador reported recent UIC data consistent with sustained elimination of IDD. Conversely, Bolivia is still struggling to secure iodized salt production, and since 2004 Colombia has discontinued all official activities including the surveillance of USI and UIC. While in Peru and Venezuela regular surveillance and monitoring are important components of their programs, in the latter countries, the efforts to meet the key pre-requisites for sustainability have either waned or disappeared.

**b. Salt iodization and quality assurance**

The workshops led to renewed attention and commitment from the countries to securing universal and sustained household access to good quality iodized salt. Among issues that remain to be addressed
are: (a) heterogeneous legislation leading to an unjustifiably wide range of permitted iodization levels; (b) concurrent use of KI03 and KI in one country for salt iodization, which leads to higher costs of monitoring salt iodine levels and quality control; (c) rudimentary technology used by small- and medium-size producers due to insufficient efforts to improve their capacity, which contributes negatively to the quality of the product; (d) decline of interest within the government and the salt industry in regular monitoring of iodine levels; (e) ongoing shortages of KI03 for salt iodization as a result of bureaucracy, as reported by the salt industry representative from Bolivia (a situation which is very concerning); and (f) questionable value of using “composite” salt samples (i.e. a mixture of many samples) to perform a single analysis of iodine content which is then reported as a mean value. Although this method of surveillance and quality control is recommended in the countries of Central America, its validity should be investigated further.

Lessons learned:

i. Difference in the quality of iodized salt produced by large-, medium-, and small-scale producers using, respectively, high- and low-end technology, has been clearly demonstrated by quality control results from Mexico: 95% of the salt from large plants contained ≥15 ppm of iodine, but only 54% of the salt produced by small plants was adequately iodized.

ii. In Peru, with the support of UNICEF, technical consultants who were well-acquainted with the salt iodization process were hired for an extended period to train the personnel in charge of the plants. Being at hand at all times, the consultants taught the personnel not only about iodization methods, but also about good practices in the salt industry. This experience led to an improvement in product quality, and it motivated the plants to form cooperatives and become larger producers.

iii. The Dominican Republic case study illustrates the difficulties associated with using both KI03 and KI to iodize salt. The country reported a MUIC of 223 μg/L in SAC. However, based on 1791 household iodized salt samples collected in 2009, only 37% of household salt was found to contain ≥15 ppm of iodine. These results led to speculations that there may be other sources of dietary iodine. However, it transpired that the samples had been tested only for KI03, and not KI. At a later date, 19 new samples collected at retail level were tested for both compounds, and the result showed that 95% of the samples contained ≥15 ppm iodine (48.6% as KI03 and 46.4% as KI).

To prevent this problem in future, laboratory capacity must be ensured in countries where both compounds are used in the process of salt iodization. In Guatemala and Venezuela, where KI03 and KI are also used concurrently, the UIC reflects adequate iodine intake, however, they have reported that only 54% of salt at household level is adequately iodized. This situation is difficult to explain since, in both countries, iodized salt is the main source of dietary iodine.

c. Role of the salt industry

In the implementation of USI for sustained elimination of IDD, the salt industry is by far the most important ally. Unfortunately, its important role is not fully understood or exploited in all the countries. In particular, the small and medium producers may be less able to fulfill their role without receiving support themselves.

Lessons learned:

Mexico and Brazil are good examples to be followed. The main producers of iodized salt in those countries formed associations that provide strong and effective support to their national IDD control programs. Mexico’s AMISAC (Asociacion Mexicana de la Industria de la Sal), in association with
governmental institutions, is responsible for conducting regular quality control surveys at the retail level and for organizing training seminars for small producers.

d. Surveillance and monitoring

In some countries, the enthusiasm for USI has not translated into increased efforts to monitor its impact on iodine nutrition. The immediate consequences of this situation include persisting iodine deficiency in some areas, a surge of iodine excess in others, and a risk of iodine deficiency during pregnancy. Regular surveillance and monitoring still need strengthening in these countries. Lack of funding is commonly quoted as a reason for inactivity.

Lessons learned:

Regular monitoring and surveillance of iodized salt and UIC is carried out in four countries: Peru, Panama, Venezuela and Ecuador, although these activities have slowed down in Ecuador because its IDD control program is undergoing reorganization. As a result, all four countries have sustained optimal iodine nutrition for more than fifteen years.

e. Iodine nutrition and pregnancy

Recent data demonstrating an increased risk of iodine deficiency during pregnancy in various countries, including the Northwest of Argentina (NOA), have raised concern among the delegates. The need to further investigate the regional prevalence and methods of preventing this risk was put high on the agenda, before the need to reduce salt consumption during pregnancy, and the promotion of salt reduction policies in the general population, which are being adopted in some countries. In parallel, iodine excess in pregnant women was reported in Calama, Northern Chile, but its impact on fetal and newborn development warrants investigation.

f. Information, education and communication

The perception and awareness of the consequences of ID and the benefits of its prevention may be out of date among the general population and some officials. Goiter is still perceived as synonymous with iodine deficiency, whereas brain damage and cognitive impairment are much less likely to be associated with ID. Support for maternal and child health programs across the region has declined or stopped entirely, which has limited the general public’s participation in the overall efforts to attain IDD elimination. Optimal iodine nutrition needs to be accepted as a child’s fundamental right and USI as the most cost-effective tool to achieve it. USI messages need to be incorporated into formal and informal education programs, and vigilant advocacy is needed to maintain the awareness among the public, within the government, and among other key sectors that lend their support to IDD programs.
Lessons learned:

In the past, Uruguay implemented a strong educational campaign to eliminate and prevent goiter (a recognized indicator of ID at the time) by means of salt iodization. The messages were incorporated into textbooks for elementary schools. The campaign was very successful. However, once IDD was under control, the messages were withdrawn, and a recurrence of goiter was reported.

g. USI in the context of salt intake reduction policies

The emerging challenge of promoting salt iodization as the most cost-effective strategy to optimize iodine status while there is a parallel push to reduce sodium intake to prevent chronic cardiovascular disease was discussed at length.

Concern was expressed that programs to reduce dietary salt could adversely impact programs aimed at preventing IDD. However, iodine levels in salt can be adjusted up, to match the expected reduction in dietary salt intake to less than 5 g/day. It was stressed that tight coordination of both programs is essential. An integrated approach will be necessary to implement the reduction of salt intake while retaining USI as the main strategy for IDD elimination.

Some countries (Argentina, Brazil and Colombia) are already promoting the reduction of salt consumption, despite the fact that IDD elimination has not yet been achieved, and the methodology for simultaneous surveillance of iodine and sodium nutrition in the population is not yet well-established. Two case reports, from Mexico (Instituto de la Nutrición Salvador Zurbiran) and Guatemala (INCAP), demonstrated the feasibility of a double assay (measuring both I and Na) in a 24-hr urine sample. This method is difficult to use in the field, where the collection of spot urine samples is easier and is currently being used to monitor iodine status.

The representatives of the salt industry from the five Andean countries and Mexico made a group declaration, renewing their commitment to continued efforts to sustain the elimination of IDD in the Region. In their declaration, they also requested that campaigns advocating reduced salt consumption include fair and educational statements about iodine, avoiding stigmatization of dietary salt. This declaration was circulated among other industry representatives at the three workshops for approval.

VI. COUNTRY WORK PLANS

An important objective of the workshops was to encourage the countries to develop work plans (WP) based on their current IDD programs, the exchange of experiences, and the lessons learned, and to commit to their implementation. The WPs were presented at the end of the final session of each workshop, so that they could be discussed together with the experts. The WPs are to be presented to the health authorities in each country for implementation.

The common goals included in the WPs were as follows:

1. Revive and strengthen the political commitment to ensure continued support of efforts and strategies, including budget allocation, that attain the goal of USI and sustained elimination of IDD.

2. Improve the programs’ technical capacity, particularly with respect to surveillance and monitoring, paying attention to the most vulnerable population groups such as pregnant women and young children.

3. Provide appropriate technical assistance to the salt industry, to improve the QA of iodized salt produced by small- and medium-scale plants.

4. Regularly assess iodine nutrition status not only in SAC but also in pregnant women. In several countries,
work is underway to establish a standard protocol for the latter population.

5. Reinforce/reintroduce ECI (mother and child) programs; publish and disseminate the findings of new surveys of household consumption of iodized salt and UIC in order to generate and sustain interest and participation of the entire population in the activities geared towards IDD elimination.

6. Set up/reactivate an effective national coalition, incorporating into the team a representative of consumer protection agencies.

7. Make effort to standardize the legislation that sets the iodization levels of salt across all countries of the LAR.

8. Work towards real and effective integration of the USI and the reduction of salt consumption strategies in order to prevent the risk of recurrence of iodine deficiency.

In addition Argentina, Chile, Belize, and Guyana set out to implement an official IDD control program as their top priority. Chile additionally planned to investigate the persisting iodine excess. Colombia planned to re-implement the IDD program, which had been discontinued. Paraguay pledged to reinforce the control of illegal importation of iodized salt.

CONCLUSIONS

The workshops have been recognized as an outstanding opportunity to re-evaluate the current status of IDD control programs, USI, and iodine nutrition in all Latin American countries, to reignite the governments’ interest in IDD, and to reformulate the national strategies for reaching the goal of sustained elimination of IDD in the region. It was also an opportunity to discuss the benefits and requirements of introducing salt reduction measures.

Based on the data collected before the workshops and on the countries’ reports, the following can be concluded:

1. There has been significant progress in the elimination of IDD in the past decade. While in 2004 four countries were classified as iodine deficient based on the UIC in SAC, currently only Haiti remains iodine deficient. However, the risk of iodine deficiency during pregnancy has been signaled by focal studies in some countries.

2. The number of countries with iodine excess has increased to six, now including Costa Rica and Honduras.

3. The proportion of countries where more than 80% of households are consuming adequately iodized salt has increased from 76% in 2004 to 83% in 2013. On average the household coverage with adequately iodized salt across LAR is now approximately 91%.
4. Significant barriers to sustained elimination of IDD remain in all countries of the Region. They include declining government interest and support for local IDD control programs, undue complacency as a result of partial success, weak or non-existent monitoring in many countries, dependence on rudimentary iodization technology in half of the countries, and a decline in ECI programs.

5. There is a general consensus that USI remains the most cost-effective strategy to achieve optimal iodine nutrition in a population, even in the presence of salt reduction strategies to prevent CVD.

RECOMMENDATIONS

1. Advocate for political will and increased attention and resources for iodine programs in the context of the broader nutrition landscape.

2. Stress the importance of adequate iodine intake by pregnant and lactating women in national dietary guidelines.

3. Support and strengthen national programs and coalitions.

4. Work towards integrating salt intake reduction measures with those that support USI as the main strategy for IDD elimination. There is considerable need to coordinate salt reduction with salt iodization programs to prevent iodine deficiency.

5. Recommend and support the implementation of rotating funds to secure continued availability and access to the iodine compound used for salt iodization.

6. Recommend the use of only one iodine compound per country (KIO3 or KI, but preferably KIO3) to facilitate monitoring and QA of iodized salt.

7. Follow up on the implementation of the work plans developed by the delegates, with particular emphasis on Argentina, Bolivia, Colombia, Guatemala, the Dominican Republic, and Haiti.
Coalitions. The role of public-private partnerships in the monitoring and sustainability of health programs and optimization of iodine intake and reduction in sodium intake

Carolina Siu, Director; Ana Carolina Martínez, Analysis Center, Nutrition and Micronutrients Unit; Ana Victoria Román Trigo, Coordinator of Nutrition and Micronutrients Unit - INCAP

In Central America, the creation of public-private partnerships in food fortification has proved to be successful in public health initiatives for the prevention and control of micronutrient deficiency disorders, including iodine; such as the program of salt fortification with iodine and fluorine in some countries of the region.

This program dates back to the beginning of regional experiences in food fortification, and still requires efforts to harmonize aggregate levels and to promote its enhancement in some countries\(^1\). It is also required an approach to incorporate the adjustments proposed in the action plan for the implementation of the global strategy for the prevention of non communicable diseases, including the goal of reducing sodium intake\(^2\).

Since 1950, INCAP\(^3\) has provided technical assistance in the establishment of a permanent dialogue and agreement spaces at a national and regional level, and in the creation of alliances between public and private sectors, involving also the academia and research institutions, as well as the civil society, as a strategy needed for successful public health interventions to reduce and control micronutrient deficiencies, including iodine. As a result of these partnerships, the commitment of the identified sectors has been ensured through the establishment of legal frameworks promoting the sustainability of actions under the protection of state policies, favoring thus the achievement of the program’s objectives and goals. A factor that has favored the sustainability of the initiatives is the development of surveillance, monitoring and evaluation of interventions, that has allowed presenting evidence periodically for decision-making to all sectors involved in the improvement and maintenance of the iodine salt fortification program. The challenge is even greater when considering the effect of changing food intake patterns in the region\(^4\), which indicates

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1. Martínez , C .; Roman, AV, Food Fortification Program in Central America and Dominican Republic . Nutrition Institute Central America and Panama -INCAP- 2010 .
4. Menchú , MT ; Mendez H; Dary O. 2013. complementary to the secondary analysis of data from the national survey of living conditions of Guatemala (LSMS 2006) study.
the importance in the consumption of processed foods and the required commitment from the business sector to achieve a gradual reduction in the amount of sodium, and to meet the overall goal of reducing salt consumption to 30% by 2025. This requires an assessment of the salt fortification program to prepare proposals for adjustment of iodine levels in salt, if considered necessary.

Achievements obtained in Central America are the result of the efforts of countries and the intersectorial work coordinated by the National Commissions of Micronutrients and Fortified Foods, efforts that have been carried out at scale in a regional level, through the Regional Commission of Micronutrients and Fortified Foods of Central America and Dominican Republic—CORMAF—(by its acronym in SPANISH), approved by the Council of Ministers of Health of Central America and Dominican Republic. These discussion forums have facilitated the exchange of experiences, generation and discussion of the status of programs in each country, as well as formulation and implementation of research projects and impact assessments thereof.

The evidence documented on the status of programs of salt fortification with iodine, including that provided by the health sector and the social monitoring of programs; the current regulations; the health sector capacity to exercise the steering role in the control of micronutrient deficiencies; the empowerment of consumers; and the disclosure of the impact of programs are decisive aspects to achieve their sustainability. Evidence generation has allowed the consolidation of partnerships, which is shown in their own improvement, including making adjustments to micronutrient levels used in fortification, pursuant to the global strategies to reduce sodium intake.

Evidence has proved that when programs are conducted through effective public-private partnerships, they have the capacity to produce great benefits at very low costs, thus improving the health of populations; and represent a public good for the region.

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Communication for development as a strategy for the elimination of iodine deficiency in the population

Eduardo Gularte
Communication Specialist, UNICEF, Guatemala

For many years, communication strategies aimed at behavioral changes focused on the transfer of information from institutions to the general population. The premise was that if people were suffering a problem, this was because they did not have the information or did not know how to care for their health clearly. Institutional strategies worked campaigns, programs of mass dissemination of information, marketing, etc. However, with the passage of time, the results have shown that it is not enough to only transfer information to change health and nutrition.

Problems such as iodine deficiency in the population, have many causes. They are influenced by multiple factors, some of which depend directly on the individual, but others also its environment. United Nations has promoted the strategy of communication for development for several years, which promotes conscious changes in people, because they themselves have identified the problem, analyzed its causes, established how it affects them and their families, listened solution options and created new alternatives from their own culture and context.

The strategy of communication for development is based on the promotion of dialogue between those who are vulnerable, so they can make better decisions for their lives. In Guatemala, with support from UNICEF, a strategy has been implemented through the formation of local communications teams, comprising representatives from different institutions and sectors. This staff has been trained in diagnosing, planning, monitoring and evaluating participatory communication strategies. Local teams have created communicators networks in communities that become key partners to promote change in communities.

Importantly, the communication resources used in this strategy differs from traditional mass media. Local teams have created their own, with the main feature that are interactive: they promote it through the game, people look at the situation confronting the problem, make decisions, counseling, etc.

Evidence of the implementation of these strategies show that major changes happens when people feel part of the communication process of knowledge and healthy practices. The same can be exploited in programs for the elimination of iodine deficiency in the population, which is necessary to identify institutions that can work together as strategic partners, forming an intersectoral communication equipment, able to plan communication to promote dialogue among people about these issues.
Monitoring and surveillance: key factors to ensure sustainable elimination of iodine deficiency disorders (IDD)

Ana Maria Higa, National Coordinator of IGN in Peru
Luis Cordero Consultant IGN-Perua

In securing adequate iodine nutrition it’s important to keep the balance between the requirements of iodine and its supply through the diet. Adequate supply of iodine is an important public health issue. Both, iodine deficiency and iodine excess are harmful to health. It is necessary, therefore, the regular monitoring of the iodine nutrition status in the population.

The WHO-UNICEF-ICCIDD Expert Committee, 2007 defined epidemiological indicators to evaluate the iodine nutrition status based on iodine balance studies and urinary iodine excretion, and established reference values, which have been updated by WHO in 2014. The new guidelines have set up the following reference values: adequate iodine intake for adults 100-300 µg /day, children under 6 years 90 µg/day, older children and adolescents 150 µg/day, pregnant women 250 µg day.

In iodine deficient countries iodized salt is the vehicle of choice as a public health measure for the prevention and control of IDD. Since its use in the United States and Switzerland in the 1920s and throughout the twentieth century, the consumption of

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iodized salt has proven to be the most cost-effective intervention, as stated by economic experts.

Salt is an ingredient universally consumed daily in relatively constant amounts throughout the year; the average individual consumption varies between 5-15 g/day. This is one of the reasons for using salt as a vehicle for supplying iodine at the population level, as it allows a narrow range of iodine addition for iodization (20-60 ppm, mg I/kg salt), enough to cover the average daily iodine requirement. Furthermore, the process and technology for salt iodization are simple and inexpensive (2-9 cents/person/year), most countries have legislated mandatory iodization of salt for human consumption, and there are reliable methods for quality assurance at the production and consumption level. Likewise, it is feasible to assess the impact of iodized salt intake on the population by analyzing urinary iodine concentration (UIC) by means of a simple and well-standardized test.

In Figure 1 is diagrammed how the program indicators in place to ensure sustainability, are crucial for monitoring the process of salt iodization and monitoring of indicators of impact on the population, assuming compliance with the legislation, resource allocation, mobilization and education and systematization of information for appropriate use in the necessary corrective measures at any stage of the production, marketing and consumption.

In the following paragraphs it is shown the general schema of surveillance grouped into three types of indicators: i) indicators of the salt iodization process, ii) indicators of impact, iii) sustainability indicators.

1. Indicators of the salt iodization process

According to Allen et al. the components of the monitoring system in food fortification programs - which applies to salt iodization and control of DDI - includes, on the one hand, the internal control by the producer and, on the other hand, external monitoring by the government, at production and trade level to ensure the quality of the product offered to consumers, and also in the stage of consumption at households level to verify the access to the product and its final quality. This system must be accompanied by education and communication activities to install adequate consumer practices.

In the case of salt iodization, it is necessary the implementation of a quality assurance system to control all stages of the production chain, so as to ensure adequate levels of iodization as well as the sanitary conditions required by the Food Codex. Likewise, it is necessary the acquaintance with the existing legislation on fortification levels and sanitary standards for food handling (NaCl purity, humidity, presence of other trace minerals). The availability of the compounds used for iodization (preferably KIO3) must be ensured, possibly through a revolving fund to support small producers, while market conditions are established by the health administrative authorities.

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or local government: (a) Monitoring of quality at production plant. Fortification according to the levels established by the laws of each country must be ensured. The implementation of internal and external monitoring at this level is vital; (b) Monitoring at places of wholesale and retail. It guarantees the availability of adequately iodized salt for consumers. Instances of local government must include iodized salt in the food group permanent monitoring, given its preventive role in public health. In both cases, the methods used and the frequency should be established by the quality control standards of each country. Iodine analysis should be done by the quantitative method and results should be reported monthly or quarterly; (c) Monitoring at the household level. It allows to learn about the consumer access to iodized salt and eventually discover the consumption of non-iodized salt. This monitoring can be incorporated into other national surveys, this way the national and region representation is assured. At the local level it can be incorporated as a regular activity of home visits made by health staff. This strategy identifies population centers where there is not a permanent availability of iodized salt. The iodine analysis can qualitatively using kits, supplemented with quantitative analysis in a subsample, to define the percentage of adequately iodized salt (≥ 15 ppm).

To ensure effective monitoring, it is necessary to consider some elements to strengthen the institutional capacity to ensure the availability of adequately iodized salt, such as: (a) Implementation of a network of quality control. For a more effective control it is advisable to have a laboratory network throughout the country, whose quality, in turn, should be ensured through national or international interlaboratory tests; (b) Opportune dissemination of the monitoring results. It is important that the results be disseminated immediately and effectively, to issue recommendations and take corrective action; and, (c) Adjustments in the levels of salt iodization. The recent 2014 WHO guide suggests an average concentration of 39 mg of iodine per kg of salt to meet the iodine intake recommendations while reducing salt intake to 5 g / day. It is recommended that each country must determine in a representative study the iodine intake through iodized salt added to the daily diet and the contribution through consumption of industrialized high-salt foods. It is also important to ensure adequate intake of iodine in pregnant women.

2. Impact indicators

**Urinary Iodine**

The principal indicator of iodine nutrition is the urinary iodine concentration (UIC), which is worldwide measured in school children (SAC) and most recently recommended in pregnant women as well. More than 90% of daily iodine intake is excreted or in the urinary. Therefore, UIC is a good marker of very recent dietary iodine intake.

The methodology for the evaluation of urinary iodine depends on the existing national surveillance systems. If national surveys are selected, sampling frames should be listings of primary schools, generally provided by the Ministry of Education. For SAC surveys it is convenient a multistage stratified sampling stages and clusters to ensure better representation. The sampling technique should be proportional to population size or systematic. For the sample size is recommended to consider 30 clusters of 30 to 40 students each. UIC assessment should be conducted at least every three years and the results must be expressed in micrograms of iodine per liter of urine (µg L), calculating the median value for each region or country. The normal reference values in this population group are MUIC 100-300 µg/L. Reports on results must also include the number of processed samples and percentage of samples <50 µg/L and <100 µg/L. It should be noticed that this indicator is applicable only at the population level, not individually.

**Goiter**

The assessment of thyroid volume as an indicator of iodine nutrition is not useful to assess the impact of recent changes in iodine intake through salt iodization programs. Its usefulness is limited to the initial assessment of the severity of iodine deficiency and the long-term evaluation of
DDI control programs. In this case, it is recommended the use of ultrasound for more accurate measurement of the thyroid volume.

**Neonatal TSH**

The determination of neonatal TSH is a valuable indicator of iodine deficiency; the prevalence of infants with high levels of TSH indicates the severity or persistence of iodine deficiency in the population. This indicator can be incorporated as part of the newborn screening programs. Neonatal TSH surveys are a good indicator, provided they are universal and cover the entire population. Neonatal TSH analysis can be made on cord blood, or better on heel blood collected 24 hours after birth. Normal reference values are <3% of > 5 mIU / L.

**Thyroglobulin**

A detailed review of the indicators has been made by Zimmermann and Andersson⁴, suggesting the need for further analysis of the effectiveness and the projection of the use of biomarkers, whose values can better reflect thyroid function and help surveillance targeting (high risk groups such as pregnant women and young children). Recent studies have shown the validity of the determination of serum thyroglobulin and reference values for school children⁵. In turn, WHO guidelines recommend continuing research on the usefulness of thyroglobulin as a functional indicator of iodine nutrition, to complement the use of urinary iodine concentration as an indicator of intake.

### 3. Indicators to assess progress in the sustained elimination of IDD

The ICCIDD WHO-UNICEF Expert Committee has established the progress indicators to measure progress in the sustained elimination of IDD as a public health problem (Table 2), to be conducted by experts through external evaluations.

**Regarding salt iodization**

Availability and use of adequately iodized salt must be guaranteed (20-40 ppm) Production/importation of iodized salt in sufficient quantities to meet population demand. >95% of the salt at production or importation level must be iodized according to official standards. Weekly sampling and iodine analysis by titration is necessary. >90% of food-grade salt at household level should contain >15 ppm iodine. Sampling at least every two years. Analysis of iodine by kits and by titration in a sub-sample.

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Regarding the nutritional status of iodine in the population

1. The median urinary iodine in the general population should be between the range 100-300 µg /L
2. The median urinary iodine in the pregnant women population should be within the range 150-250 µg /L
   The most recent monitoring data should have been collected within the last 5 years
3. It is recommended an evaluation every three years

Compliance with at least 8 programmatic Indicators, related to political commitment of the government, resource management, laboratory infrastructure, periodical reports, discussion, and feedback.

The WHO Guide 2014, recognizes that strategies to reduce consumption of salt and universal salt iodization are compatible, but also notes that it is vital to strengthen monitoring and surveillance mechanisms on levels of salt intake and iodine, to ensure optimal iodine nutrition through the consumption of iodized salt like the strategy of most cost-effective if at the same time reducing salt intake is promoted.
Acknowledgements

To Michael Zimmermann, Executive Director of the Iodine Global Network, and Stefano Fedele, Regional Nutrition Specialist, UNICEF’s Latin America and Caribbean Regional Office, for their support in the organization and development of the STELA Project.
Registro de los participantes / Registration
Exhibición de posters / Posters review
Todos los asistentes están invitados a visitar los posters preparados por las delegaciones de los países participantes. Los posters serán exhibidos hasta el final de la reunión / The posters will be displayed through the end of the meeting.

SESION INAUGURAL / INAUGURATION SESSION
8:30 – 9:00
I. Palabras de bienvenida y comentarios, representantes de ICCIDD-GN, UNICEF, OPS/OMS / Welcome Address and Opening Remarks

9:00 – 9:45
II. Importancia de la deficiencia de yodo. Visión global de la situación en Latinoamérica / Importance of iodine deficiency and the situation overview in Latin America
Eduardo A Pretell, Coordinador Regional para América, ICCIDD-GN, Profesor Emérito de Medicina, Universidad Peruana Cayetano Heredia / Regional Coordinator for America, ICCIDD-GN, Emeritus Professor of Medicine, Cayetano Heredia Peruvian University

9:45 – 10:10
III. Visión global sobre el estado actual de las iniciativas para la reducción de la ingesta de sal en las Américas / Overview of the current status of sodium initiatives in the Americas
Branka Legetic, Asesora Regional OPS/OMS para la Prevención y Control de Enfermedades No Transmisibles / PAHO-WHO Regional Adviser for prevention and control of NCDs

10:10 – 10:25
Receso / Coffee break

PRESENTACIONES DE LA SITUACIÓN ACTUAL DESDE LA PERSPECTIVA DE LOS PAISES / COUNTRY PERSPECTIVE PRESENTATIONS
10:25 – 12:30
Cada país dispondrá de 15 minutos de presentación para exponer la situación actual de los programas de control de los DDI, la estrategia de la yodación universal de la sal, progresos y problemas, seguido de 10 minutos de un debate con los participantes y expertos / Each country will deliver a 15 minutes presentation of current IDD control program and the universal salt iodization strategy, progresses and problems, followed by 10 minutes discussion with participants and experts.

PRESENTACIONES TÉCNICAS / TECHNICAL PRESENTATIONS
15:15 – 15:45
I. La yodación universal de la sal como principal estrategia para la eliminación sostenible de la deficiencia de yodo. Compatibilidad y requerimientos para asegurar la eliminación sostenible de los DDI mediante la yodación de la sal y la reducción de la ingesta de sal. / The universal salt iodization as the main strategy for the sustainable elimination of iodine deficiency. Compatibility and requirements to ensure the sustainable elimination of IDD through salt iodization and reduction in salt intake
Omar Dary, Asociado/Científico Principal, Asesor en Nutrición, USAID / Principal Associate/Scientist - Nutrition Advisor
15:45 – 16:15  
**II. Aspectos críticos para asegurar la calidad en la industria de la sal y monitoreo del consumo de sal yodada en los hogares / Critical aspects in ensuring the quality of the salt industry and monitoring the household consumption of iodized salt**  
Ana María Higa, Director Escuela de Nutrición, Universidad Nacional Mayor de San Marcos, Coordinadora Nacional IGN / Director of the Nutrition School, San Marcos National University, and IGN National Coordinator, Peru

16:30 – 17:00  
**III. Vigilancia y monitoreo del estado nutricional de yodo / Surveillance and monitoring of nutritional status of iodine**  
Luis Cordero, Consultor IGN, Perú / Consultant IGN-Peru

18:00 – 19:00  
**Reporte de casos clínicos México y Guatemala. Experiencia sobre la evaluación simultánea de la ingesta y excreción de yodo y sodio / Case reports Mexico and Guatemala. Experience on the simultaneous evaluation of iodine and sodium intake and excretion.**  
Olynka Vega, Instituto Nacional de la Nutrición, Salvador Zubirán, México  
Ana Victoria Román, INCAP, Guatemala

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**DÍA 2 / DAY 1**

**SESIÓN 3:** 
**PRESENTACIONES TÉCNICAS (cont.) / TECHNICAL PRESENTATIONS (cont.)**

8:00 – 8:30  
**IV. Comunicaciones / Communications**  
Eduardo Gularte, Especialista en Comunicaciones, UNICEF, Guatemala / Communication specialist

9:30 – 10:00  
**VII. Rol de las coaliciones en el monitoreo y sostenibilidad de los programas de salud en general, y para optimizar la ingesta de yodo y la reducción del consumo de sodio en particular / The role of coalitions in monitoring and sustainability of health programs in general and for optimizing iodine intake and reducing sodium intake in particular.**  
Carolina Siu, Directora / Director  
Ana Carolina Martínez, Centro de Análisis, Unidad de Nutrición y Micronutrientes / Analysis Center  
Ana Victoria Román Trigo, Coordinadora, Unidad de Nutrición y Micronutrientes Instituto de Nutrición de Centro América y Panamá, INCAP / Nutrition and Micronutrients Coordinator, INCAP

Cada presentación técnica será seguida por un ejercicio de discusión y de intercambio de ideas en grupo, con la participación de los expertos como facilitadores / Each technical presentation will be followed by a Group discussion and brainstorming exercises, with the participation of the experts as facilitators

**SESIÓN 4:** 
**PRÓXIMOS PASOS / NEXT STEPS**

14:00 – 15:40  
**SESIÓN PLENARIA: Presentación de planes de trabajo de los países / PLENARY SESSION: Presentation of work plans of the countries**  
Cada país hará una presentación de 15 minutos, seguida de 10 minutos de discusión con los participantes y expertos .Cada país debe identificar los pasos a seguir en su país. / Each country will make a 15 minute presentation followed by 10 minutes of discussion with the participants and experts.

17:10 – 17:20  
**Conclusiones y recomendaciones finales / Conclusions and recommendations**

17:30  
**Ceremonia de clausura / Closing ceremony**
Producción de sal yodada en plantas pequeñas / *Iodized salt production in small plants.*
Movilización social promoviendo el consumo de sal yodada por las embarazadas para tener hijos saludables e inteligentes / Social mobilization promoting the pregnant women’s iodized salt consumption to have healthy and smart children.
## LISTA DE PARTICIPANTES / LIST OF PARTICIPANTS

<table>
<thead>
<tr>
<th>País / Country</th>
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Luis Cordero
Consultor en Estadística y Planificación, Experto invitado

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