INTERNATIONAL COUNCIL FOR CONTROL
OF IODINE DEFICIENCY DISORDERS

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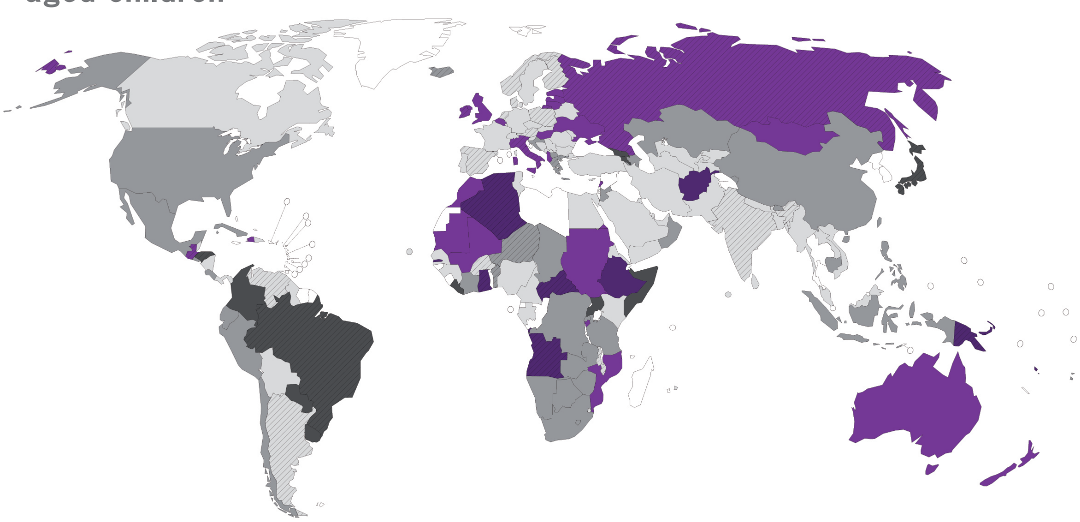
IN THIS ISSUE:

Global iodine nutrition: a remarkable leap forward in the past decade

Maria Andersson, Michael Zimmermann ICCIDD Executive Director's Office, Swiss Federal Institute of Technology, Zurich, Switzerland

National iodine status based on urinary iodine concentrations in school-aged children



- Moderate iodine deficiency (UIC 20-49 µg/L)
- Mild iodine deficiency (UIC 50-49 µg/L)
- Optimal iodine nutrition (UIC 100-199 µg/L)
- Risk of iodine induced hyperthyroidism (UIC 200-299 µg/L)
- Risk of adverse health consequences (UIC > 300 µg/L)
- Subnational data [a]
- No data

[a] The country estimates in the cross-hatched countries are based on subnational data. The national coverage of iodized salt in these countries is incomplete, there are large variations in the iodine intake and some regions likely remain deficient.

Source: Andersson M, Karumbunathan V, Zimmermann MB. Global iodine status in 2011 and trends over the past decade. J Nutr. 2012 Feb 29. [Epub ahead of print]

Introduction

Only a few countries – Switzerland, some of the Scandinavian countries, Australia, the United States and Canada – were completely iodine sufficient before 1990. Since then, there has been a major global effort to introduce salt iodization to ensure sufficient intake in deficient areas. Over two-thirds of the world's population is now covered by iodized salt (1).

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.

In 2005, the World Health Assembly (WHA) adopted a resolution that urged Member States to regularly monitor their iodine status (2). The prevalence of iodine deficiency was previously reviewed by WHO in 2007 (3). Since then, more than a third of countries worldwide have collected new data on the iodine status of their populations, including the first national studies in the U.K. and Canada.

Methods

This new global estimate of iodine status by ICCIDD includes the most recent country data on the 193 WHO Member States. Data were obtained from the WHO VMNIS Micronutrients Database (4), a thorough search of the published literature and, to identify data from on-going or unpublished surveys, iodine scientists around the world were contacted through the ICCIDD network of national focal points as well as through the offices of WHO, the Global Alliance for Improved Nutrition (GAIN), the Micronutrient Initiative (MI) and UNICEF.

The median urinary iodine concentration (UIC) in school-aged children is traditionally used as a proxy for iodine status in the general population because children are easy to reach through school-based surveys. Although more countries are carrying out studies in high-risk population groups such as women of reproductive age and pregnant women, data in these groups remains limited and the majority of countries still conduct iodine monitoring in children. Thus, UICs from school-aged children were used in this global estimate.

Surveys were included only if they had used a cross-sectional population-based sample frame, standard UIC assay techniques and reported at least one of the following criteria: a) median and/or mean UIC (µg/L); b) the prevalence of inadequate iodine intake, that is, the proportion (%) of the population with UIC < 100 µg/L; or c) the UIC distribution: the proportion (%) of the population within the categories < 20 µg/L, 20-49 µg/L, 50-99 µg/L, 100-199 µg/L, 200-299 µg/L, ≥ 300 µg/L (Table 1).

Table 1: **WHO criteria for assessing iodine nutrition in a population based on median/range of UIC in school-aged children.**

Median UIC (µg/L)	Iodine intake	Iodine status
< 20	Insufficient	Severe iodine deficiency
20-49	Insufficient	Moderate iodine deficiency
50-99	Insufficient	Mild iodine deficiency
100-199	Adequate	Optimal
200-299	More than adequate	Risk of iodine-induced hyperthyroidism
≥ 300	Excessive	Risk of adverse health consequences

If no national data were available, when two or more subnational surveys of the same administrative level were available from different locations, the surveys were pooled into a single weighted summary measure. For countries where no UIC data was available, no prevalence estimates were made. In countries where UIC distribution data was not available, regression analysis was done to derive the median from the mean and the percentage of the population (UIC < 20 µg/L, 20-49 µg/L, 50-99 µg/L and < 100 µg/L).

The median UIC obtained from the survey data was used to classify countries according to the threshold criteria of public health importance of iodine nutrition (Table 1). National, regional and global populations with inadequate iodine intakes were estimated based on each country's proportion of the population with UIC < 100 µg/L.

Results

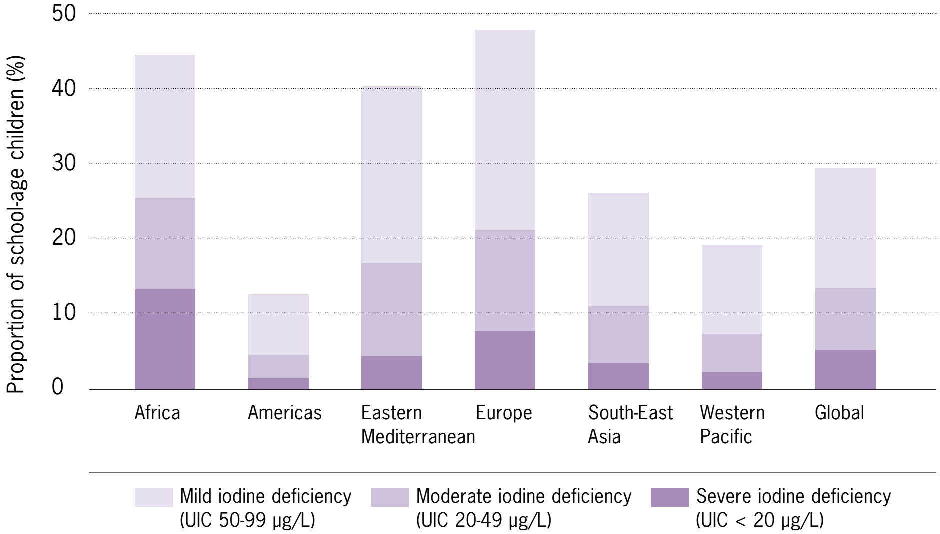
Nationally representative surveys were eligible for inclusion for 115 countries: 58 were newly reported since 2007. In Europe, 23 new national surveys have been carried out since 2007. Worldwide, 19 countries that had no data in 2007 now have UIC data. For 33 countries, subnational UIC surveys were used to make the estimates, because there were no national data.

There were no UIC data available for 45 countries. Although the majority of the countries with no data have small populations, larger countries still without adequate UIC survey data include North and South Korea, Israel, Syria and Thailand. However, available UIC data now cover an astonishing 96% of the world's population of children.

Table 2: **Number of countries, proportion and number of school-aged children (SAC) and the general population with insufficient iodine intake, by WHO region, 2011.**

	Insufficient iodine intake (urinary iodine < 100 µg/L)				
	SAC			General population	
WHO region	Countries *(n)*	Proportion *(%)*	Total *(millions)*	Proportion *(%)*	Total *(millions)*
Africa	10	39.3	57.9	40.0	321.1
Americas	2	13.7	14.6	13.7	125.7
South-East Asia	0	31.8	76.0	31.6	541.3
Europe	11	43.9	30.5	44.2	393.3
Eastern Mediterranean	4	38.6	30.7	37.4	199.2
Western Pacific	5	18.6	31.2	17.3	300.8
Global Total	**32**	**29.8**	**240.9**	**28.5**	**1881.2**

Figure 1: **Proportion (%) of school-aged children at risk for mild, moderate and severe iodine deficiency, by WHO region, 2011.**



The full report of this paper is available at: Andersson M et al. Global iodine status in 2011 and trends over the past decade. *J Nutr* Epub Feb 29, 2012.

Based on the current estimates, the iodine intake of 29.8%, or 240.9 million of children worldwide is insufficient (Table 2). Of these, 5.2% have iodine intakes that are severely deficient, 8.1% have iodine intakes that are moderately deficient and 15.9% have mildly deficient intakes (Figure 1).

Over half of the children with low intakes are in two regions: 76 million children in South-East Asia and 58 million children in Africa. The ten iodine-deficient countries (based on a national median UIC < 100 µg/L) with the greatest number of children with insufficient iodine intakes are shown in Figure 2.

The number and proportion of school-aged children by region with inadequate iodine intakes in 2011, 2007 and 2003 are shown in Figure 3. In 2011, the greatest proportions of children with inadequate iodine intake are in European (43.9%) and the African (39.3%) regions, while the smallest proportions are in the Americas (13.7%) and the Western Pacific (18.6%). Among the general population, 1.88 billion people globally have inadequate iodine intakes, a decrease since 2007 of 6.4%.

The global prevalence in children of low iodine intakes has fallen over the past decade, from 36.5% in 2003, to 31.5% in 2007 and to 29.8% in 2011 (Figure 3). Large decreases in prevalence between 2003 and 2011 occurred in Europe, the Eastern Mediterranean, South-East Asia, and in the Western Pacific. There has been a slight increase in prevalence in the Americas since 2003, and little progress in Africa.

At the national level, 22 countries that were iodine deficient in 2007 have improved to iodine sufficiency in 2011. Two countries deteriorated from optimal iodine intake to deficiency. On the cover page of this issue of the IDD Newsletter is the world map showing countries classified by iodine nutrition according to degree of public health importance based on the median UIC.

Figure 2: **The top ten iodine-deficient countries (based on national median UIC <100 µg/L) with the greatest numbers of school-age children with insufficient iodine intake in 2011.**

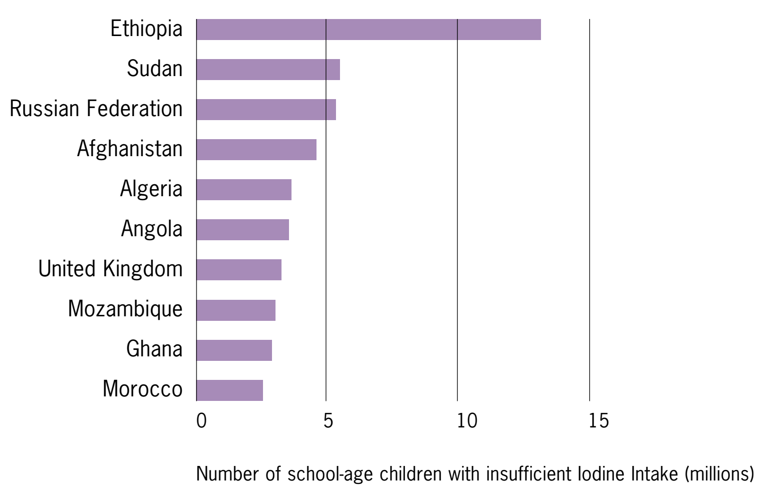
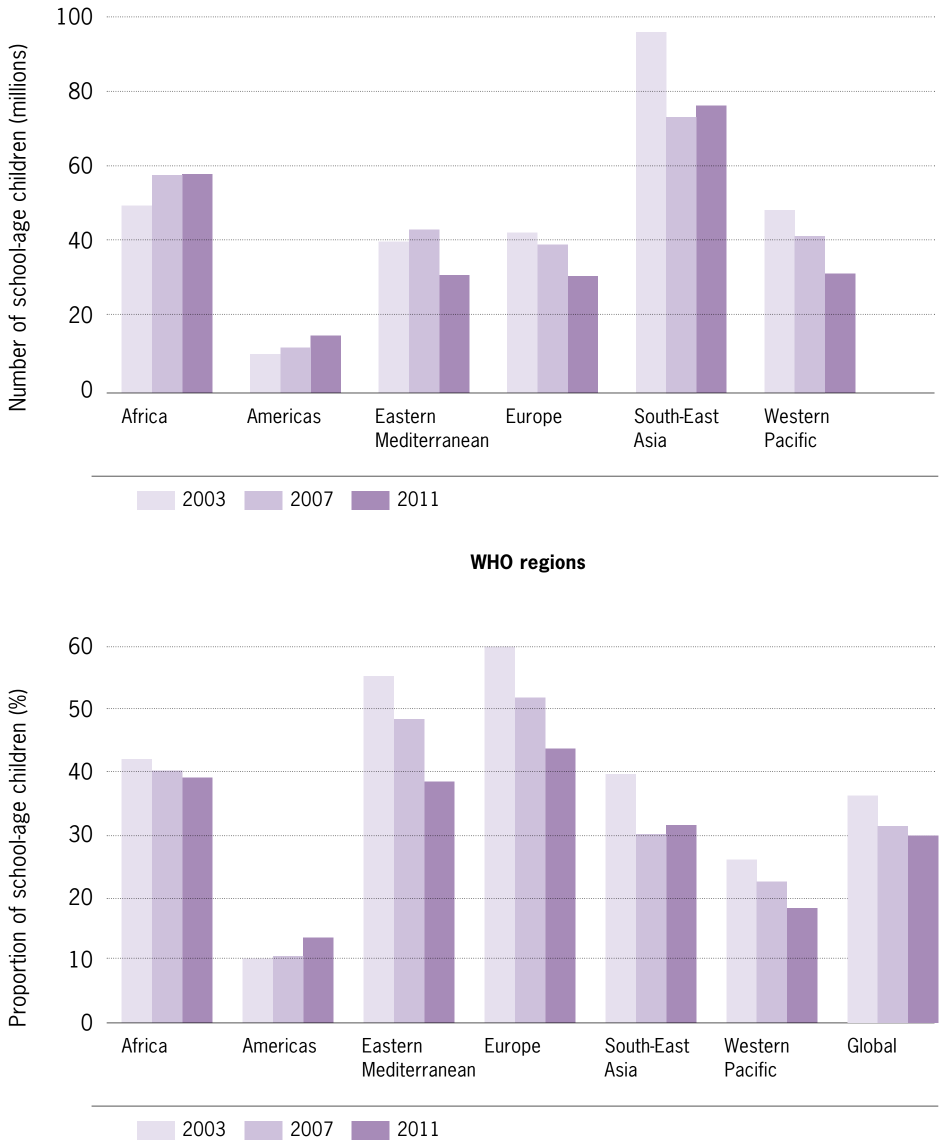


Figure 3: Number and proportion (%) of school-age children with insufficient iodine intake (UIC < 100 µg/L) in millions, by WHO region, in 2003, 2007 and 2011.



In 2011, iodine intake is inadequate in 32 countries, adequate in 69, more than adequate in 36, and excessive in 11 (Table 3). Of the 32 countries with iodine deficiency, nine are classified as moderately deficient and 23 as mildly deficient. No country is categorized as severely deficient. Since 2003 and 2007, the number of countries with insufficient intake has sharply decreased (Figure 4).

Discussion

There has been a remarkable improvement in global iodine status over the past decade, but with strong regional differences. There has been steady progress in Europe, the Eastern Mediterranean, South-East Asia and the Western Pacific regions, largely due to strengthened salt iodization programs and improved monitoring. But there has been negligible overall progress in Africa: Since 2003, although the prevalence of children with low iodine intake has hovered around 40%, because of population growth, the number of children with insufficient intakes has increased about 20%, from ca. 50 to 58 million.

The global prevalence of school-aged children with low iodine intake fell 5% from 2003 to 2007, but fell only 1.7% from 2007 to 2011. Thus, global progress may be slowing. However, this trend is not evident in the national classifications: 22 countries that were iodine deficient in 2007 have improved to iodine sufficiency in 2011.

The discrepancy between progress as judged by changes in prevalence of low intake compared to national classifications is only partially explained by the lack of substantial progress in a handful of countries with very large populations. The major reason for this discrepancy is a fundamental limitation of applying a population indicator (median UIC) to define the number of individuals affected. For example, a country with a median UIC of 100 µg/L would be classified as being nationally iodine sufficient, yet 50% of the population would be classified as having inadequate iodine intake. Even in iodine-sufficient countries, spot and 24-hr urine collections show high intra-individual variability, with a day-to-day CV of ca. 35% (5). Therefore, even in an individual whose average daily iodine intake is adequate to maintain thyroidal iodine stores, iodine intake will show wide daily variation that will result in many individual days when a UIC value will be less than adequate.

Thus, even countries with highly effective iodized salt programs will always have individuals classified with 'low iodine intakes' based on % UIC < 100 µg/L. This becomes clear in the 2011 prevalence estimate, where 74% of children classified as having low iodine intake are living in countries that are iodine sufficient, and only 26% are living in countries classified as insufficient. Thus, using current methods and UIC cut-offs, it is much easier to make progress against iodine deficiency based on national classification using the median UIC than on the percentage of individuals affected.

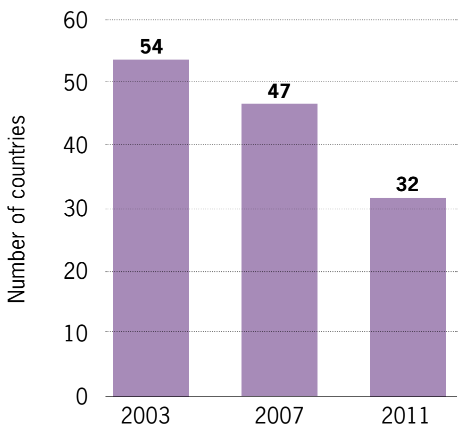
Table 3: Countries (number) by iodine status over the period 2003-2011.

Iodine intake	2003	2007	2011
Insufficient: Severe iodine deficiency	1	0	0
Insufficient: Moderate iodine deficiency	13	10	9
Insufficient: Mild iodine deficiency	40	37	23
Adequate	43	49	69
More than adequate	24	27	36
Excessive	5	7	11
Countries with data	126	130	148
Total number of countries	**192**	**193**	**193**

Only a limited number of countries have completed UIC surveys in pregnant women and women of reproductive age on the national or large subnational level. Thus, there are insufficient data to directly estimate the regional or global prevalence of low iodine intake in these important target groups. This is a major limitation of the current estimate because although the median UIC in children may be used to represent iodine status of most of the population, it should not be used as a proxy for iodine status in pregnant women (6).

In summary, global iodine nutrition has markedly improved over the past decade and the number of iodine deficient countries has decreased from 54 in 2003 to 32 in 2011. Yet despite remarkable progress, 1.88 billion of the global population, including 241 million school children, still have insufficient dietary iodine intakes. Thus, despite the remarkable leap forward, the global effort still has a way to go and needs to be reinvigorated, extended and sustained.

Figure 4: Number of iodine deficient countries in 2003, 2007 and 2011.



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Global Iodine Nutrition Scorecard

The data in the updated global scorecard shown below is taken from UNICEF report **'The State of the World's Children 2012'** *(http://www.unicef.org)* published February 28, 2012 and the recently published ICCIDD update of the global prevalence of iodine nutrition (Andersson et al. J Nutr Epub Feb 29, 2012).

Country	Annual no. births 2009 (000)	Households consuming iodized salt (%)	Median UIE (µg/L)	Proportion of population with UIE <100 µg/L (%)	General population		Infants
					Iodine deficiency protected population (000)	Iodine deficiency unprotected population (000)	Iodine deficiency protected (000)
Afghanistan	1'302	28	49	71.9	8'795	22'616	365
Albania	47	75.6	86	57.1	2'422	782	36
Algeria	723	60.7	27	87.0	21'529	13'939	439
Andorra	1	–	–	–	–	–	–
Angola	784	44.7	29	92.0	8'530	10'552	350
Antigua and Barbuda	1	–	–	–	–	–	–
Argentina	691	90	136	36.0	36'371	4'041	622
Armenia	48	97	313	6.3	2'999	93	47
Australia	270	–	96	46.3	–	–	–
Austria	76	–	191	21.4	–	–	–
Azerbaijan	169	53.8	204	13.3	4'943	4'245	91
Bahamas	6	–	–	–	–	–	–
Bahrain	14	–	213	16.2	–	–	–
Bangladesh	3'401	84.3	163	33.8	125'347	23'345	2'867
Barbados	3	–	–	–	–	–	–
Belarus	96	94	169	14.0	9'020	576	90
Belgium	120	–	80	66.9	–	–	–
Belize	7	90	184	23.1	280	31	6
Benin	349	67.2	289	0.7	5'947	2'903	235
Bhutan	15	96.2	217	13.5	698	28	14
Bolivia	262	88.8	191	21.4	8'818	1'112	233
Bosnia and Herzegovina	34	62	157	22.2	2'331	1'429	21
Botswana	48	65.8	219	15.0	1'321	686	32
Brazil	3'026	95.7	360	0.0	186'564	8'383	2'896
Brunei	8	–	–	–	—	–	–
Bulgaria	73	100	182	11.2	7'494	0	73
Burkina Faso	738	33.7	114	47.1	5'550	10'919	249
Burundi	283	98	70	60.5	8'215	168	277
Cambodia	367	82.7	222	21.7	11'692	2'446	304
Cameroon	711	49.1	190	29.6	9'623	9'976	349
Canada	358	–	174	26.0	–	–	–
Cape Verde	12	74.8	115	43.2	371	125	9
Central African Republic	154	62.3	21	87.0	2'742	1'659	96
Chad	508	55.8	213	29.4	6'265	4'962	283
Chile	252	100	252	8.0	17'114	0	252
China	18'294	96.6	246	15.7	1'295'730	45'605	17'672
Colombia	917	92	415	0.0	42'591	3'704	844
Comoros	22	82.3	–	–	605	130	18
Congo	126	82	–	–	3'315	728	103
Cook Islands	0	–	–	–	–	–	–
Costa Rica	76	92	233	8.9	4'286	373	70
Côte d'Ivoire	729	84.4	203	27.6	16'659	3'079	615
Croatia	42	90	248	22.3	3'963	440	38
Cuba	116	88	247	9.0	9'907	1'351	102
Cyprus	10	–	120	41.3	–	–	–
Czech Republic	111	–	163	13.4	–	–	–
DPR Korea	327	24.5	–	–	5'965	18'381	80
Democratic Republic of the Congo	2'930	58.6	249	1.5	38'656	27'310	1'717
Denmark	62	–	101	48.1	–	–	–
Djibouti	24	0.4	–	–	4	885	0
Dominica	1	–	–	–	–	–	–
Dominican Republic	224	18.5	139	35.3	1'837	8'091	41
Ecuador	279	99	262	6.0	14'320	145	276
Egypt	2'029	78.7	187	15.7	63'842	17'279	1'597
El Salvador	125	62	200	19.3	3'840	2'353	78
Equatorial Guinea	26	33.3	–	–	233	467	9
Eritrea	185	68	175	25.3	3'572	1'681	126
Estonia	16	–	65	67.0	–	–	–
Ethiopia	3'132	19.9	25	83.0	16'507	66'443	623
Fiji	18	31	237	11.1	267	594	6

Country	Annual no. births 2009 (000)	Households consuming iodized salt (%)	Median UIE (µg/L)	Proportion of population with UIE <100 µg/L (%)	General population: Iodine deficiency protected population (000)	General population: Iodine deficiency unprotected population (000)	Infants: Iodine deficiency protected (000)
Finland	59	–	164	28.3	–	–	–
France	745	–	136	33.2	–	–	–
Gabon	40	36	190	30.5	542	963	14
Gambia	62	21.1	42	87.0	365	1'364	13
Georgia	52	99.9	321	4.4	4'348	4	52
Germany	659	–	122	38.8	–	–	–
Ghana	766	32.4	33	71.0	7'903	16'489	248
Greece	106	–	202	0.0	–	–	–
Grenada	2	–	–	–	–	–	–
Guatemala	456	76	72	61.2	10'936	3'453	347
Guinea	397	41.1	139	32.4	4'102	5'879	163
Guinea-Bissau	66	11.7	–	–	177	1'338	8
Guyana	13	10.5	169	26.9	79	675	1
Haiti	274	3.1	84	58.9	310	9'683	8
Holy See	–	–	–	–	–	–	–
Honduras	202	80	356	9.3	6'080	1'520	162
Hungary	99	–	80	57.2	–	–	–
Iceland	5	–	200	19.0	–	–	–
India	26'787	51.1	154	34.4	625'778	598'836	13'688
Indonesia	4'174	62.3	229	16.3	149'440	90'431	2'600
Iran	1'390	98.7	141	35.1	73'012	962	1'372
Iraq	949	28.4	–	–	8'995	22'677	270
Ireland	70	–	82	56.2	–	–	–
Israel	140	–	–	–	–	–	–
Italy	543	–	96	50.2	–	–	–
Jamaica	52	100	–	–	2'741	0	52
Japan	1'014	–	504	0.0	–	–	–
Jordan	158	88.3	203	19.0	5'463	724	140
Kazakhstan	308	92	250	13.6	14'744	1'282	283
Kenya	1'530	97.6	118	36.8	39'540	972	1'493
Kiribati	2	–	–	–	–	–	–
Kuwait	52	–	147	34.4	–	–	–
Kyrgyzstan	122	76.1	114	38.0	4'059	1'275	93
Lao PDR	172	83.8	169	26.9	5'196	1'005	144
Latvia	23	–	59	76.8	–	–	–
Lebanon	66	92	95	50.7	3'889	338	61
Lesotho	59	84.4	215	21.5	1'833	339	50
Liberia	149	–	321	3.5	–	–	–
Libya	148	90	–	–	5'720	636	133
Liechtenstein	0	–	–	–	–	–	–
Lithuania	32	–	75	59.7	–	–	–
Luxembourg	6	–	148	32.7	–	–	–
Madagascar	695	52.6	–	–	10'895	9'818	366
Malawi	608	49.7	140	35.0	7'406	7'495	302
Malaysia	550	17.6	109	48.2	4'999	23'402	97
Maldives	6	44	115	43.1	139	177	3
Mali	551	78.9	69	68.3	12'127	3'243	435
Malta	4	–	–	–	–	–	–
Marshall Islands	1	–	–	–	–	–	–
Mauritania	109	22.6	58	69.8	744	2'547	25
Mauritius	18	0	160	4.4	0	1'288	0
Mexico	2'021	91	235	11.5	99'745	9'865	1'839
Micronesia	3	–	–	–	–	–	–
Monaco	0	–	–	–	–	–	–
Mongolia	50	83.1	97	52.8	2'290	466	42
Montenegro	8	70.7	174	16.7	446	185	6
Morocco	651	21.2	69	63.0	6'774	25'178	138
Mozambique	877	25.1	60	68.1	5'871	17'520	220
Myanmar	1'016	92.9	124	34.3	44'558	3'405	944
Namibia	59	62.9	216	28.7	1'436	847	37
Nauru	0	–	–	–	–	–	–
Nepal	730	62.6	188	27.4	18'755	11'205	457
Netherlands	183	–	154	30.9	–	–	–
New Zealand	59	83	66	79.7	3'626	743	49
Nicaragua	140	96.8	196	20.2	5'603	185	136
Niger	815	32	270	4.4	4'964	10'548	261
Nigeria	6'081	97.3	130	40.4	154'146	4'277	5'917
Niue	0	–	–	–	–	–	–
Norway	58	–	104	47.1	–	–	–
Palestinian Territory	150	85.7	–	–	3'665	612	129

Country	Annual no. births 2009 (000)	Households consuming iodized salt (%)	Median UIE (µg/L)	Proportion of population with UIE <100 µg/L (%)	General population: Iodine deficiency protected population (000)	General population: Iodine deficiency unprotected population (000)	Infants: Iodine deficiency protected (000)
Oman	62	68.5	223	17.0	1'906	876	42
Pakistan	5'403	17	124	36.7	29'511	144'083	919
Palau	0	–	–	–	–	–	–
Panama	70	94.6	198	19.8	3'327	190	66
Papua New Guinea	208	91.9	48	74.7	6'303	556	191
Paraguay	154	94.4	437	0.0	6'093	361	145
Peru	605	91.2	266	5.2	26'518	2'559	552
Philippines	2'245	44.5	201	23.8	41'501	51'760	999
Poland	375	–	112	55.0	–	–	–
Portugal	103	–	106	46.9	–	–	–
Qatar	16	–	158	30.0	–	–	–
Republic of Korea	450	–	–	–	–	–	–
Republic of Moldova	45	59.8	165	27.0	2'137	1'436	27
Romania	212	74	102	46.9	15'900	5'586	157
Russian Federation	1'559	35	78	58.1	50'035	92'923	546
Rwanda	413	87.8	298	0.0	9'328	1'296	363
Saint Kitts and Nevis	0	100	–	–	52	0	0
Saint Lucia	3	–	–	–	–	–	–
Saint Vincent and Grenadines	2	–	–	–	–	–	–
Samoa	4	–	–	–	–	–	–
San Marino	0	–	–	–	–	–	–
Sao Tome and Principe	5	85.6	–	–	142	24	4
Saudi Arabia	593	–	180	23.0	–	–	–
Senegal	476	41.3	104	47.8	5'135	7'299	197
Serbia	114	32.2	195	9.4	3'174	6'683	37
Seychelles	3	–	–	–	–	–	–
Sierra Leone	227	58.2	–	–	3'415	2'453	132
Singapore	37	–	–	–	–	–	–
Slovakia	56	–	183	15.0	–	–	–
Slovenia	20	–	140	23.5	–	–	–
Solomon Islands	16	–	–	–	–	–	–
Somalia	402	1.2	417	10.0	112	9'219	5
South Africa	1'085	62.4	215	19.2	31'283	18'850	677
Spain	499	–	141	34.8	–	–	–
Sri Lanka	364	92.4	153	30.0	19'275	1'585	336
Sudan	1'300	11	66	70.8	4'791	38'761	143
Suriname	10	–	–	–	–	–	–
Swaziland	35	51.6	120	41.4	612	574	18
Sweden	108	–	125	30.0	–	–	–
Switzerland	73	–	120	36.0	–	–	–
Syria	596	79.3	–	–	16'186	4'225	473
Tajikistan	195	61.9	108	59.2	4'258	2'621	121
Thailand	977	47.2	–	–	32'626	36'497	461
Macedonia	22	94	241	10.2	1'937	124	21
Timor-Leste	46	59.9	–	–	673	451	28
Togo	215	31.6	171	6.2	1'905	4'123	68
Tonga	3	–	–	–	–	–	–
Trinidad and Tobago	20	27.8	–	–	373	969	6
Tunisia	165	96.65	171	26.4	10'130	351	159
Turkey	1'346	68.9	107	47.1	50'126	22'626	927
Turkmenistan	111	86.5	170	18.7	4'420	690	96
Tuvalu	0	–	–	–	–	–	–
Uganda	1'502	95.8	464	3.9	32'021	1'404	1'439
Ukraine	468	18.3	90	56.2	8'317	37'131	86
United Arab Emirates	63	–	162	21.0	–	–	–
United Kingdom	749	–	80	68.8	–	–	–
Tanzania	1'812	58.5	204	25.0	26'232	18'609	1'060
United States	4'413	–	215	17.0	–	–	–
Uruguay	50	–	310	0.0	–	–	–
Uzbekistan	558	53.1	141	39.8	14'573	12'872	296
Vanuatu	7	22.9	49	72.0	55	185	2
Venezuela	600	90	175	25.4	26'082	2'898	540
Viet Nam	1'485	93.2	139	32.9	81'875	5'974	1'384
Yemen	861	29.5	173	25.9	7'095	16'957	254
Zambia	549	77.4	246	12.7	10'131	2'958	425
Zimbabwe	379	90.9	245	14.8	11'427	1'144	345

The Venezuelan iodized salt program provides just the right amount of iodine for both children and pregnant women in Trujillo state

L. Caballero Coordinator of the IDD Control Program, National Institute of Nutrition, Division of Public Health, Caracas, Venezuela

Iodized salt contributes to healthy babies in Venezuela

Historically, IDD was a severe public health problem in the mountains of Venezuela, as it was throughout the Andean Region (1). Venezuela has a centralized IDD Control Program that focuses on salt iodization, and includes activities of investigation and monitoring, control and vigilance, as well as communication and education (2).

Previous monitoring studies in the Andean Region of Venezuela had demonstrated an increase in the median urinary iodine (UI) in schoolchildren from 133 µg/L in 1993-1996 to 187 µg/L in 1999. During this same period, the proportion of children with a UI less than 50 µg/L fell from 16.5% to 2.4% (2). However, to date, there have been no studies of the iodine status of pregnant women.

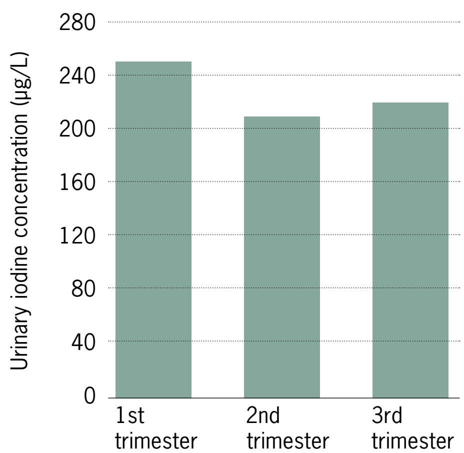
Urinary iodine excretion is a useful and important indicator of the iodine status of a population. The World Health Organization (WHO) recommends that the median urinary iodine concentration in a population of pregnant women should range between 150 and 249 µg/L and in a population of school children it should range between 100 and 200 µg/L.

To determine the prevalence of iodine deficiency in school children and pregnant women of Trujillo State, in the Andean region of Venezuela, Dr. Caballero, the Coordinator of the Venezuelan IDD Control Program, did a cross-sectional survey of 400 school children aged 7-14 years and 300 pregnant women. Spot urine samples were collected and analyzed for urinary iodine by the Sandell-Kolthoff reaction. The criteria suggested by WHO/ICCIDD/UNICEF to indicate iodine deficiency were applied.

The results showed the median urinary iodine for school children was 175 µg/L and only 6% of children had urinary iodine concentrations below 50 µg/L. Importantly, the median urinary iodine for pregnant women was 228 µg/L (Figure 1) and only 25% in pregnant women had urinary iodine concentrations below 150 µg/L. The author concluded that on the basis of these findings, iodine intake in school children and pregnant women is optimal in Trujillo State, Venezuela.

For a complete report of this study (in Spanish) please see: Rev Argent Endocrinol Metab 48: 206-211, 2011.

Figure 1: Median urinary iodine concentration in pregnant women in Trujillo state, Venezuela, by trimester



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Kraft Foods to use iodized salt in processed foods in Egypt

Date: 23 November 2011
http://www.gainhealth.org/country-stories/kraft-foods-makes-socially-responsible-decision-use-iodized-salt-processed-foods

Kraft Foods in Egypt has decided to use iodized salt in processed foods. The decision should improve iodine intake for millions of Egyptians. Insufficient iodine in diets causes irreversible mental and physical impairment. Iodized salt is the main way people consume their daily iodine, and many people get most of their salt from processed foods. A food company that chooses iodized salt over non-iodized salt is socially-responsible and contributes to the nutrition of consumers.

The GAIN-UNICEF Universal Salt Iodization Partnership Project works with food producers in several countries to support them in replacing non-iodized salt with iodized salt in their recipes.

GAIN spoke with Mr. Gawad Abaza, Managing Director at Kraft Foods, Mashreq Region, about Kraft Foods Egypt's decision to use iodized salt in their entire product range. Kraft recently became a member of the GAIN Business Alliance, a global partnership to explore new business models, best practices and sustainable approaches in the fight against malnutrition.

Global Alliance for Improved Nutrition (GAIN): *Why does your company choose to use iodized salt?*
Gawad Abaza (GA): Consumer health is central to Kraft Food Egypt's decision making. Our company policy ensures that our products are made of the best ingredients for the consumer's interest. Iodized salt contributes to the required intake of this essential mineral and helps to prevent deficiencies.

GAIN: *What is the cost of iodized salt versus non-iodized salt?*
GA: There is no issue of cost differential as we only go through our certified suppliers who provide us with top quality ingredients.

GAIN: *How does iodized salt compare with non-iodized salt in the taste and quality of your products?*
GA: To my knowledge, there is no difference. At Kraft Foods we did not conduct research to prove that. However, ingredients go through the R&D center where they are tested and certified. Product changes go through consumer preference tests to ensure we always meet consumer needs.

GAIN: *What lessons have you learned about communicating the importance of iodized salt?*
GA: At Kraft Foods we feel that the consumer has to be educated and informed on all the contents of food items. We ensure that all information and ingredients are clearly indicated on the packaging in order to ensure that product ingredients are well represented and labels are compliant with regulatory requirements.

GAIN: *What kind of information do you feel is needed to encourage companies to utilize iodized salt in their products?*
GA: Companies should always have the consumers' best interest at heart. This should be the point from which they operate and make their decisions. Consumer awareness of iodine deficiency is vital to enable people to understand why they need a certain intake of iodine per day. They also need to be aware of the sources of iodine intake, for example iodized salt.

Mr. Gawad Abaza, Kraft Foods, Egypt

Benin closes in on USI

Théophile Ntambwe, Louis Koudjrohede, Anne-Sophie Le Dain, Roland Kupka. ICCIDD; Direction de l'Alimentation et de la Nutrition Appliquée DANA-Benin; UNICEF Benin Country Office and UNICEF Regional Office for West and Central Africa

Background

The Republic of Benin is a narrow, north-south strip of land in West Africa, bordered by Togo to the west, Burkina Faso and Niger to the north, and Nigeria to the east. The majority of the population of approximately 9 million lives on its small coastline on the Bight of Benin. IDD were historically endemic in the Republic of Benin. In 1994, the baseline survey on IDD reported a total goiter rate of 19% at national level and a median urinary iodine concentration (UIC) of 40µg/L, indicating clear iodine deficiency. In the same year, the government made the iodization of salt for human and animal consumption mandatory at 60-100 parts per million (ppm) of iodine at production, 50-60 ppm at importation, and 30-50 ppm at the market level.

Based on calculations assuming the average per capita salt intake is 10 g/day, Benin requires an estimated 32,000 metric tons (MT) of salt per year. About 85% of the salt is currently imported, primarily from Senegal and Nigeria. National salt requirements not covered by imports are met by over 1600 small-scale salt producers located in 39 villages in southern Benin. The local salt production is estimated at 4800 MT/year and this salt is mainly sold in southern Benin.

In 2000 (1), a national survey documented that 76.8% of households had iodized salt; titration analyses showed that 56% of households were using adequately iodized salt (defined as iodine concentrations > 15 ppm). Among children, the goiter prevalence was 3.7%, and the median UIC was 424 µg/L, indicating that iodine intake was excessive. National estimates were updated in 2008, when the National Food Security and Nutrition Survey showed that 67% of households were consuming adequately iodized salt as determined by rapid test kits (2).

In February 2009, the national salt legislation was updated and the required iodine concentration was lowered to 30-40 ppm at production, importation and sale levels, and 15-40 ppm at the household level.
In 2011, stakeholders felt that new data should be obtained to measure progress towards achieving universal salt iodization (USI) (defined as at least 90 per cent of households consuming adequately iodized salt) and ensuring optimum population iodine status.

Women who make a living producing salt in the village of Djebadji, Benin

2011 national survey

A national survey was carried out in May to June 2011. The study, funded by UNICEF and coordinated by the national nutrition agency (DANA), was led by ICCIDD Senior Advisor, Dr Théophile Ntambwe.

A cross-sectional survey, using multistage "proportionate to population size" (PPS) cluster sampling, was conducted in 30 Health Zones (clusters), covering all the 12 provinces of the country. The survey was school-based and was designed to provide representative data on the main IDD indicators at the national level. Children were asked to bring salt samples to their schools from their homes for analysis. Overall, 12,764 salt samples were collected and analyzed at the schools for iodine detection using the rapid test kit; from those samples, 809 were collected for subsequent iodine titration analyses in a laboratory.
A total of 3239 children aged 6-12 years were examined by palpation for goiter prevalence; from those, 798 urine samples were collected to determine UIC. Based on the survey design, it was not possible to link the UICs to the iodine levels of the household salt. The salt and urine samples were analyzed in Yaoundé, Cameroon in the laboratory managed by Prof. Daniel Lantum (ICCIDD), which participates in the International Resource Laboratories for Iodine Network.

Results

Of 12,764 salt samples analyzed using the rapid test kits, 83.9% contained iodine. The quantitative analysis of 809 salt samples measured by titration showed 86% were adequately iodized, that is, they contained at least 15 ppm of iodine. However, the analyses showed that 40.8% of samples contained ≥60 ppm of iodine (Table 1), potentially higher than necessary to ensure optimal iodine status. The analysis of 798 urine samples showed a median UIC of 318 μg/L. In all, 12.5% of children had UIC < 100 μg/L, the cutoff for sufficiency, and 52.4% ≥ 300 μg/L, indicating excess (Table 2) (3). Palpation analyses showed that the prevalence of goiter was 3.5% among 3239 children aged 6-12 years.

Conclusions

The 2011 survey provided updated information on salt concentrations at the household level nationwide. Although 86.0% of households have access to salt iodized with at least 15 ppm iodine, this coverage does not yet qualify the country to have reached USI, judged as coverage of ≥90%. However, there appears to be continued improvement in the coverage of iodized salt as judged against previous surveys. It appears that the salt harvested by small-scale producers, whose salt is generally not iodized and is popular in the southern part of the country, including Cotonou, the biggest city, is a key limiting factor towards achieving USI in Benin.

Table 1: Coverage with iodized salt at the household level, Benin 2011

Salt iodine concentrations (ppm)	Percent
< 15	14.0
15-60	45.2
61-100	32.4
> 100	8.4

Table 2: Urinary iodine concentrations among children aged 6-12 years, Benin 2011

Urinary iodine concentrations (μg/L)	Percent
< 50	4.5
50-99	8.0
100-199	20.7
200-299	14.4
≥ 300	52.4

The survey also demonstrated that the median UIC (318 μg/L) is higher than the recommended range of 100-199 μg/L (3), but is nevertheless lower that the median UIC of 424 μg/L recorded in 2000. In populations with long-standing iodine deficiency and who experience a rapid increase in iodine intakes, excess iodine may increase the risk of iodine-induced hyperthyroidism within the first 5 to 10 years after the start of the iodization program (3). In Benin, because iodine intakes have been ample and the prevalence of iodine deficiency has been low over the last 10 years, and the potential risk of these excess intakes is reduced.

The prevalence of goiter of 3.5% indicates that goiter is a sporadic, rather than an endemic problem. This low prevalence of goiter is a substantial reduction from the prevalence of 19% recorded in the mid-1990s.

Recommendations

The results of the 2011 survey are encouraging and show Benin is moving toward USI. However, important issues remain to be solved in order to implement a national program that can sustainably and reliably ensure adequate iodine status of the Beninese population.

To this end, a national stakeholder meeting organized after the survey results became available developed the following recommendations:

- Strengthen quality controls at the main entry points of salt imported to the country
- Support the local producers to iodize their salt
- Implement a strong communication program, targeting especially regions where there is a low proportion of iodized salt consumption
- Monitor and evaluate regularly the USI indicators towards IDD elimination
- Contribute to the sub-regional harmonization of salt trade by updating national salt iodization standards in line with sub-regional standards (4)

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New popular song promotes iodized salt in Senegal

Isabel Pike World Food Program, published on-line, 20 February 2012

DAKAR - Senegalese artist Ismael Lo is writing a song for World Food Program (WFP) Senegal on the importance of consuming iodized salt as part of a month-long campaign to combat iodine deficiency in the country.

"Despite the best efforts of WFP and its partners, only 36% of households are consuming adequately iodized salt in Senegal," said WFP Senegal Program Officer Isabelle Dia.

Iodine deficiency has serious health consequences. It is the number one cause of goiter and increases a woman's chances of having a child who is mentally or physically handicapped.

"We have decided to organize a one-month salt iodization campaign and thought that a song could be a powerful way to reach as many people as possible with our message," said Dia.

During the campaign, the song will play several times a day on local radio stations and its lyrics will be in Wolof, the most widely spoken language in Senegal.

In order to understand WFP's salt-iodization activities and write the song, Ismael Lo visited Lac Rose, a salt lake near Dakar named after its pink hue. In 2011, 4,000 tons of salt were produced at Lac Rose, then iodized with a WFP-supplied salt-iodization machine.

Ismael Lo holds up a sack of WFP iodized salt

"Before entering into this partnership, I didn't know much about the benefits of iodized salt," said Lo. "But now I know that it is essential to the health of everyone, especially young children and pregnant women."

Those who work in the salt business at the lake were pleasantly surprised to receive a visit from the famous Lo.

"It motivates us to see him," said Dame Gueye, who has been working at Lac Rose for 12 years.

"It is very good that he is telling people in Senegal to cook with iodized salt. Before there was iodized salt here, people here used to get many illnesses like goiter. Some couldn't even swallow because of it," he said as he dug for salt in the lake with a metal-tipped stick, the salt water keeping his body afloat.

Maguette Ndiour, the Secretary General of the Management Committee at Lac Rose, is sure the song will have an impact: "People will say, 'If Ismael Lo says we should eat iodized salt, then we will eat it."


Salt production in Senegal

The United Arab Emirates lead the way in the fight against IDD in the Gulf States

Emirates New Agency (WAM) Dubai, 21st Dec. 2011

Dr. Mahmoud Fikri of the UAE Ministry of Health awarded the ICCIDD Award for Distinguished International Achievement

Gerald Burrow, ICCIDD Chair, (third from right) presents the ICCIDD Award for Distinguished International Achievement to Dr. Mahmoud Fikri. Dr. Fikri (center) is holding the award with Abdul Rahman Al Owais, Minister of Health (right) and Dr. Izzeldin H. Al Sharief, ICCIDD Regional Coordinator (left).

Experts from ICCIDD emphasized that the UAE has achieved excellent results over the previous decade and is now qualified to apply for a declaration that the country is free of IDD. This was announced during a seminar organized by the health policies sector in the Ministry under the patronage of Abdul Rahman Al Owais, Minister of Culture, Youth and Community Development, and acting Minister of Health.

The seminar took place in the Al Bustan Rotana Hotel in Dubai, and reviewed the activities of the national program for the control of IDD. The seminar was attended by Dr. Gerald Burrow, Chair of ICCIDD, Dr. Michael Zimmermann, Executive Director of ICCIDD, Daniel Levac, Treasurer of ICCIDD, and Dr. Izzeldin H. Al Sharief, ICCIDD Regional Coordinator for the Gulf Region.

Dr. Mahmoud Fikri speaking at the ICCIDD Seminar in Dubai

The seminar was attended by representatives from the federal ministries, related authorities, universities, colleges of medicine and health sciences and international organizations such as WHO, UNICEF and UNDP.

Dr. Mahmoud Fikri, Assistant Undersecretary for Health Policies at the Ministry of Health, delivered a speech on behalf of the Health Minister, Al Owais, in which he stated that the UAE adopted clear strategic plans aimed at human health as they represent the cornerstone of the nation's development and progress.

This places health services at the forefront of the national plan and programs under the wise leadership of His Highness Sheikh Khalifa Bin Zayed Al Nahyan, UAE President, and the support of His Highness Sheikh Mohammed Bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai.

Dr. Fikri emphasized that the Ministry of Health sought to continue its efforts to take necessary measures to protect the community from diseases and provide appropriate healthcare services for all categories. He then pointed out that over the past years, the UAE has achieved significant progress in eliminating polio and other childhood diseases, and has gained a declaration that the UAE is malaria-free.

„Today, we are gathered here to review the efforts of the Ministry of Health in cooperation with ICCIDD which qualify the UAE to be declared as free of iodine deficiency. The ICCIDD assures the successful steps of the Ministry of Health over the past years to achieve this goal in the near future."

„This outstanding effort embodies the great cooperation between all related parties such as the Ministry of Education, Municipalities, Universities, Health Authorities, the National Committee to Control IDD and all supporting institutes for their roles in the health research and surveys that contributed to this goal. Additionally, we also appreciate the efforts of ICCIDD chaired by Dr. Burrow and all experts from the council, World Health Organization and UNICEF for their presence today and participation with the Ministry of Health", he concluded.

Professor Gerald Burrow, Chair of the ICCIDD, honored the UAE for its efforts in the prevention of IDD and specifically recognized the contribution of Dr. Fikri, who was awarded the ICCIDD Award for Distinguished International Achievement for his sustained and successful efforts against IDD in the UAE and the Eastern Mediterranean region. Dr Burrow, in conferring the award, stated it was given to Dr. Fikri for "his extensive efforts to direct health education activities to promote positive behavior change of populations especially in iodine deficiency disorders control through universal salt iodization. We will suggest a team to review the latest documentation available in UAE and in a short period, they can report to the Iodine Network for a declaration that the country is free of IDD."

ICCIDD also discussed with the Ministry of Health the details for a new ICCIDD regional office to be established at the premises of the ministry. The ICCIDD delegation visited the Rashid Center for Diabetes and Research in Ajman to discuss the possibilities of establishing a regional reference laboratory for iodine and other micronutrients.

Iodine excess or not in China? Analysis on the necessity of reducing the iodine content in edible salt based on the national monitoring results

Sumei Li, Qingsi Zheng, Jing Xu, Jonathan Gorstein, Haiyan Wang, Huijie Dong National Training and Technical Support Team for IDD, Institute for Communicable Disease Control and Prevention, Chinese Center for Disease Control and Prevention, Beijing, China; University of Washington, Seattle, WA, USA. *Asia Pac J Clin Nutr 2011;20 (4):501-506.*

Editor's note: China introduced a USI policy in 1995 with all edible salt iodized according to a national standard, currently 35 ppm. In 2010, household coverage of adequately iodized salt exceeded 95%, and was below 80% in only 33 of China's 2831 counties, most of them in western provinces. The following article is an abridged version of the recent paper ***"Iodine excess or not: analysis on the necessity of reducing the iodine content in edible salt based on the national monitoring results"*** published in the Asian Pacific Journal of Clinical Nutrition by Sumei Li and colleagues. This important paper reviews and analyzes experiences over the past fifteen years with regard to salt iodization and iodine status in China (1995-2009) and points out the value of understanding other potential sources of iodine in the Chinese diet, such as drinking water and processed foods.

Since 1995, China has implemented a policy of USI in which it has been mandatory for all edible salt in the country to be iodized according to national standards, and the coverage of iodized salt throughout the country has been closely monitored by a comprehensive monitoring system. The results of five national IDD surveys carried out between 1995-2005 indicate that the household coverage of iodized salt increased from 80.2% in 1995 to 94.9% in 2005. The median iodine content in household salt increased from 16.2 mg/kg in 1995 to 42.3 mg/kg in 1999, which led to an adjustment on the iodine content in iodized salt and the level subsequently declined to 30.8 mg/kg by 2005. The annual county-level salt monitoring data has been in place since 2004 and shows that the national coverage of

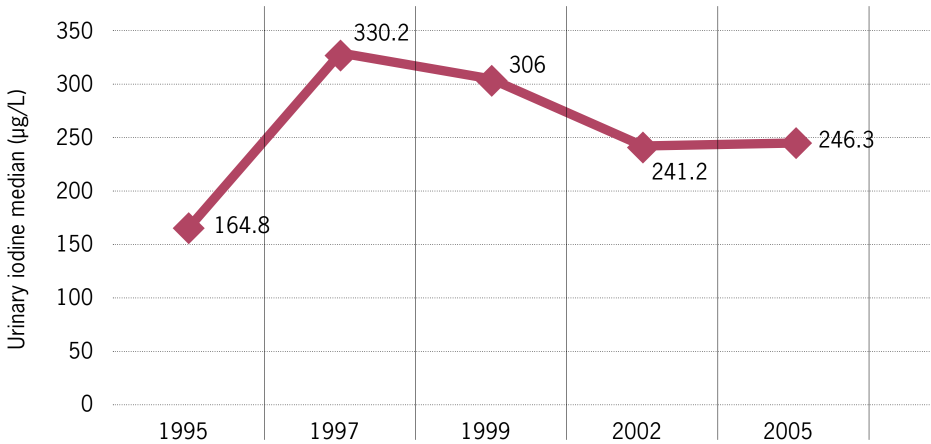
The USI program in China is a public health triumph ensuring millions of Chinese children can learn well at school

iodized salt at the household level has been higher than 95%, while the coverage of qualified iodized salt has been sustained above 90%. The median iodine level in salt assessed through the county level monitoring has consistently been around 30 mg/kg.

National IDD survey results from 1995 noted that the median urinary iodine (UI) of schoolchildren aged 8-10 was 164.8 µg/L, reflecting an adequate level of iodine, but the percentage of low UI values (<100 µg/L) was 37.4%. The median UI in 1997 and 1999 had risen to over 300 µg/L for the country as a whole, and the percentage of low UI values (<100 µg/L) had declined to 16.8% by 1999. However, at that same time, the percentage of 'excessive' UI values (>300 µg/L) had rapidly risen to 44.3%. These data prompted a reduction in the upper limit of the standard for iodized salt (from 60 to 50 mg/kg).

Subsequent data showed that the median UI declined to 241 µg/L and 246 µg/L in 2002 and 2005, respectively (Figure 1). The median UI of five provinces was still above 300 µg/L in 2005, indicating that there was a sustained risk of excessive iodine intake. At the national level, the frequency distribution of UI in 2005 showed 15.7% of the population had low values (<100 µg/L) and 30.6% had elevated levels (>300 µg/L).

Figure 1: Urinary iodine in Chinese school-aged children at the national level, 1995 to 2005.



Over time, an analysis of the IDD monitoring data suggested that there were additional sources of iodine in the diet beyond that being provided exclusively from iodized table salt. This conclusion was based on the observation of excessive UI levels in spite of the fact that the level of iodine in salt was well within the range of what was deemed 'acceptable', and the salt consumption patterns would not have explained that iodized salt in the diet was the sole determinant of the population iodine status. As a result, the Ministry of Health (MOH) embarked on an ambitious effort to identify other sources of iodine, primarily in the water supply and local foods during 2005-2009. This led to the identification of iodine excess areas in 11 provinces (districts, cities) of China, involving some 122 counties. In these areas, considered to have 'high iodine intake', the government and the National Salt Corporation decided to limit the distribution and availability of iodized salt to households.

The current standard for "qualified iodized salt" of 35 ± 15 mg/kg has been consistently applied by all major salt producers in China, following three adjustments resulting from ongoing surveillance of the iodine status of the population. It has become evident that through the intensive efforts of many partners, universal salt iodization in China has been effective in improving the iodine status of the population. However, as the program matured, there has been increasing concerns on problems of excessive iodine intake. The IDD program monitoring results provide evidence that excessive iodine intake among populations has existed in some areas for many years, including those with naturally occurring iodine. Taken together, monitoring data suggest that the iodine content in edible salt could be lowered and adapted to local specific conditions to reduce the risk of excessive iodine intake, rather than adopting a single, "one size fits all" standard.

Meetings and Announcements

SUN shines at the Annual General Meeting of the World Economic Forum

Stephan Tanda DSM. Posted on the Business Fights Poverty Blog, January 25, 2012

"Davos" – the shorthand moniker for the Annual General Meeting of the World Economic Forum in Switzerland – takes place in what is normally a picturesque but rather sleepy, Swiss Alpine village. Yet, every year in late January, it is overrun by heads-of-state, royalty, rock stars, captains-of-industry and powers-that-be.

There are plenty of people who roll their eyes and question the utility of this high-altitude global confab, but I am not one of them. As a somewhat veteran observer, I can tell you that Davos gets at least one thing right – nurturing cross-cutting partnerships to address global challenges. One partnership featured this year that is already reaping benefits and is undoubtedly innovative and cost effective is the Scaling Up Nutrition (SUN) Movement. DSM is a proud and committed partner of the SUN Movement. Launched in 2010, SUN brings together more than 100 partners worldwide, 24 of which are national governments that have all signed on to a proven road map for improving maternal and child nutrition. SUN puts a special focus on the "1,000 day" critical window of opportunity from pregnancy until the child is two years old, during which optimal nutrition can prevent irreversible and long-term limitations to health and cognitive and physical development.

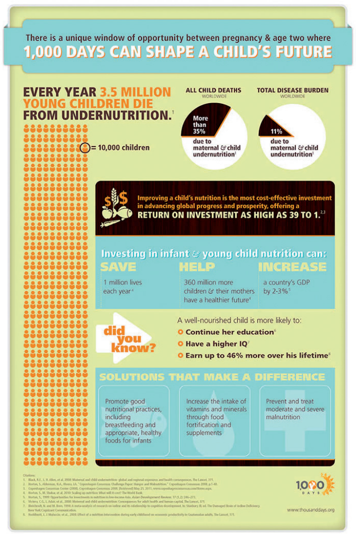


Figure 1: ***The benefits of adequate nutrition in the first 1000 days***

While often overlooked, undernutrition is a global issue that affects billions. Today, about one billion people suffer from long-term hunger—or the inability to access enough nutritious food to lead a healthy life—and one-third of young children, 171 million, are chronically undernourished.

Every year, undernutrition contributes to millions of preventable deaths of children under the age of five. It impairs intellectual and physical development, increases the risk that illnesses become fatal, and heightens the risk of non-communicable diseases in adulthood. And, yet, there are proven, cost-effective solutions that, if implemented at scale, can help combat this problem.

As Figure 1 makes clear, tackling malnutrition is one of the most cost effective investments we can make to ensure the prosperity of future generations, with a rate of return on investment that would spark the interest of any Davos delegate – as high as 39 to 1. Moreover, it has been estimated that investing in nutrition can increase a country's GDP by at least 2-3 percent annually. Improving nutrition for today's infants and young children supports the growth and development of the next generation of citizens that will ultimately drive a nation's long-term progress. Its hard to find a sounder investment than that.

As a businessman, I find these figures hard to resist – simple, cost effective inputs that yield an extraordinarily high rate of return. As one of the thousands of the delegates of Davos trudging the snowy streets of Davos, I look for those like-minded investors who know a good deal when they see it. And I hope that next year, when WEF rolls around again, we'll be able to collectively report on our progress towards addressing malnutrition. We must, the time is now.

Price of potassium iodate soars and action is needed to ensure smooth continuation of global universal salt iodization programs

11 October 2011, GAIN website

Potassium iodate (KIO_3) is the main fortificant used for salt iodization. In recent months, the price of KIO_3 has soared to reach an all-time high of $55-60 per kg, which may impact the ability of salt producers to afford KIO_3 to iodize their salt. The increase in price is due to a combination of market factors driven by an increase in industrial demand for raw iodine, exacerbated by the March 2011 earthquake and tsunami in Japan leading to an increase in demand for potassium iodide to protect against radiation exposure.

In cooperation with the Iodine Network the GAIN-UNICEF Partnership investigated the iodine market situation and summarized findings in a reference note for program managers and donors which includes a description of recent developments and the future outlook of the prices and market forces that determine global supply and price of KIO_3. Given that the current high price for KIO_3 is expected to persist for the next 12 months, program managers need to consider the impact on their programs and devise interim solutions to allow salt iodization programs to continue. This situation calls for action in order to avoid putting universal salt iodization targets in jeopardy.

Board Meeting of the Iodine Network

Lucie Bohac Coordinator, Network for Sustained Elimination of Iodine Deficiency

The Meeting of the Board of the Network for Sustained Elimination of Iodine Deficiency was hosted by EU Salt in Brussels, Belgium on December 14 and 15, 2011. The Board discussed trends and challenges to universal salt iodization in Europe. A key challenge in Europe is the lack of a regulatory framework to set salt as a carrier of iodine and to harmonize levels for iodine fortification.

Guest speaker Franz Gotzfried of SUDSALZ (Germany) noted that this lack of harmonization has resulted in a decrease in the use of iodized salt in processed foods in some countries as iodization regulations vary between countries thus creating a trade barrier. He noted, however, that there is a regulation that harmonizes the iodine content in animal feed, though manufacturing practices often do not take advantage of the maximum levels approved. Gotzfried called for a dialogue and roundtables among partners to promote the development of a common approach regarding salt iodization in Europe.

The Network Board also discussed challenges facing iodine programs as donor priorities change. On the global stage, nutrition has received a great deal of attention but the approach to donors is an integrated one rather than micronutrient specific, yet it is important that iodine is included in the nutrition platform. In this context, the Network is faced with rallying support for iodine and ensuring that the progress made thus far in addressing iodine deficiency is sustainable.

Attendees at the Board Meeting of the Iodine Network

Michael Zimmermann from ICCIDD gave the Board a preview of the latest global IDD prevalence data that show overall substantial progress towards IDD elimination but the pace has slowed, particularly in Africa, and that IDD is re-emerging in certain industrialized countries including the UK. Other issues which the Network is tracking include: the price and availability of potassium iodate, the fluctuations in household iodized salt coverage in Nigeria and the Supreme Court challenge to the ban on the sale of non-iodized salt for human consumption in India.

GAIN: Improving nutrition and iodized salt coverage in India

Date: **16 February 2012**

The first week of February marked a milestone in the Global Alliance for Improved Nutrition's (GAIN) activities in India. Jay Naidoo and Marc Van Ameringen participated in the launch of partnerships and projects that will improve the nutrition of millions of people. In partnership with the Government of Rajasthan, GAIN has developed a comprehensive project for improving the nutritional quality of commonly consumed food products such as wheat flour, milk, oil and lentils. The nutritious foods will be available through open market channels and will also reach vulnerable populations through public distribution systems such as the Mid-Day-Meal program. GAIN visited one of the 80,000 schools that are running the Mid-Day-Meal program in Rajasthan. Thanks to the partnership with the Government and the Institute of Health Management and Research, children will now receive, with their meals, fortified dal analogue containing essential nutrients they need to grow strong and healthy.

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A parallel effort in partnership with the UN Children's Fund (UNICEF), Micronutrient Initiative (MI) and the Indian Coalition for Control of Iodine Deficiency Disorders (ICCIDD) under the aegis of the Indian Salt Department, Ministry of Industries, Government of India, saw the unveiling of a web-based management information system. The tool will enable the Salt Department to better track and coordinate production, quality control and distribution of edible iodized salt across the country.

Jay Naidoo of GAIN with the women running the Child and Mother Nutrition Centre in Rajasthan, India

Abstracts

Low iodine content in the diets of hospitalized preterm infants

The aim of the study was to measure the iodine content of enteral and parenteral nutrition products commonly used for hospitalized preterm infants and estimate the daily iodine intake for a hypothetical 1-kg infant. The authors used mass spectrometry to measure the iodine concentration of seven preterm infant formulas, 10 samples of pooled donor human milk, two human milk fortifiers (HMF) and other enteral supplements, and a parenteral amino acid solution and soy-based lipid emulsion. They calculated the iodine provided by typical diets based on 150 ml/kg/d of formula, donor human milk with or without HMF, and parenteral nutrition. Preterm formula provided 16.4-28.5 µg/d of iodine, whereas unfortified donor human milk provided only 5.0-17.6 µg/d. Adding two servings (six packets) of Similac HMF to human milk increased iodine intake by 11.7 µg/d, whereas adding two servings of Enfamil HMF increased iodine intake by only 0.9 µg/d. The other enteral supplements contained almost no iodine, nor did a parenteral nutrition-based diet. The authors concluded that typical enteral diets for hospitalized preterm infants, particularly those based on donor human milk, provide less than the recommended 30 µg/d of iodine, and parenteral nutrition provides almost no iodine. Additional iodine fortification should be considered.

Belfort MB et al. J Clin Endocrinol Metab. 2012 Feb 15. [Epub ahead of print]

Dietary iodine and thyroid cancer risk in French Polynesia

French Polynesia has one of the world's highest thyroid cancer incidence rates. Iodine is suspected to play a role in this high incidence. The objective of this study was to assess whether low dietary iodine is related to a higher risk of thyroid cancer in the French Polynesian population. A case-control study was performed among native residents of French Polynesia. It included 229 cases of differentiated thyroid cancer diagnosed between 1979 and 2004 (203 women, 26 men) matched with 371 population controls (324 women, 47 men) on the date of birth. The current study focused on dietary iodine intake and fish consumption (food rich in iodine). Daily dietary iodine intake was insufficient (<150 µg/day) in 60% of both cases and controls. A decreased risk of thyroid cancer was observed with a higher consumption of fish and shellfish, and also with a higher dietary iodine intake. There was no significant interaction between the effects of the thyroid radiation dose and the dietary iodine intake. The authors concluded that French Polynesia is a mild iodine deficiency area in which a higher consumption of food from the sea and a higher dietary iodine intake are significantly associated with a decreased risk of thyroid cancer.

Cléro E et al. Thyroid. 2012 Jan 26. [Epub ahead of print]

Exploration of the safe upper level of iodine intake in Chinese adults

Little is known about the possible adverse health effects in people with high iodine intake and the safe daily intake upper limit in the Chinese population. The objective of this study was to explore the safe upper level of total daily iodine intake among adults in China. A 4-wk, double-blind, placebo-controlled, randomized controlled trial was conducted in 256 euthyroid adults. Participants were randomly assigned to 12 intervention groups with various iodine supplement doses ranging from 0 to 2000 µg/d. Total iodine intake included iodine from both supplements and diet. The mean iodine intake from the diets and salt intake of the participants were 105 ± 25 and 258 ± 101 µg/d, respectively. In comparison with the placebo group, all iodide-supplemented groups responded with significant increases in median urinary iodine concentrations and in thyroid-stimulating hormone concentration. Thyroid volume decreased after 4 wk in the high-iodine intervention groups (1500-2000 µg). Subclinical hypothyroidism appeared in the groups that received 400 µg I (5%) and 500-2000 µg I (15-47%). This study showed that subclinical hypothyroidism appeared in the participants who took the 400-µg I supplement, which provided a total iodine intake of 800 µg/d. Thus, the authors cautioned against a total daily iodine intake that exceeds 800 µg/d in China.

Sang Z et al. Am J Clin Nutr. 2012;95(2):367-73

Effects of iodine intake and teat-dipping practices on milk iodine concentrations in dairy cows

Two studies were conducted to determine the effects of dietary iodine and teat-dipping practices on iodine concentrations in milk. In the first study, 63 cows in mid lactation were assigned to a 3×3 factorial design in which the main effects were dietary iodine levels (0.3, 0.6, and 0.9 mg of dietary I/kg of dry matter) and 3 different postdip managements (chlorhexidine with dip cup, 1% iodine dip cup, and 1% iodine by manual spray). During the pre-experimental period, the levels of milk iodine averaged 241.2±5.8 µg/kg. Milk iodine concentrations increased linearly with iodine intake. Although teat dipping with 1% iodine had no effect on milk iodine concentration, the same solution applied by spraying greatly increased milk iodine levels. The second study was conducted to determine the effects of udder preparation before milking on milk iodine concentrations. Thirty-two lactating cows were assigned to 4 treatments: no predip (Con); predip with a predip solution containing 0.5% iodine+complete cleaning (Comp); predip with a postdip solution containing 1% iodine+complete cleaning (Post); and predip with a predip solution containing 0.5% iodine+incomplete cleaning (Inc). During the last week of treatment, milk iodine averaged 164, 189, 218, and 252±9.8 µg/kg for Con, Comp, Post, and Inc, respectively. The results of the first experiment confirm that, to preserve milk safety, iodine should not be fed above requirements. Spraying iodine-based teat-dipping solutions results in large increases in milk iodine content and should be avoided. Predipping teats with an iodine-based sanitizer is an acceptable practice, but must be performed with the appropriate product and completely wiped off before milking.

Castro SI et al. J Dairy Sci. 2012;95(1):213-20.

Iodine deficiency influences thyroid autoimmunity in old age

The aim of this study was to assess thyroid autoimmunity among elderly people living in an area with low iodine intake compared to the sustained recommended iodine intake from a natural source, and to estimate the importance of migration. Iodine content of drinking water is highly different in the Danish towns Randers and Skagen. We collected blood and spot urine samples from 430 long-term Randers and Skagen dwellers aged 75-80 years, who filled in a questionnaire. Iodine deficiency prevailed in Randers while Skagen dwellers were iodine replete (median urinary iodine 74 µg/24h vs. 184 µg/24h, p<0.001). Thyroid antibodies were more frequent in Randers than in Skagen residents (42% vs. 32%; p=0.006) and more likely with iodine excretion <50 µg/24h (OR, 95%CI: 1.9, 1.1-3.4). Differences between towns increased with longer duration of residence as trends in the occurrence of TGAb and TPOAb were opposite (p<0.001; p=0.007). The authors concluded that thyroid autoantibodies are common in old age, influenced by the iodine intake level, and the lowest frequency was found at the recommended iodine intake level.

Andersen S et al. Maturitas. 2012;71(1):39-43.

Estimating the impact of mandatory fortification of bread with iodine in Australian women

The impact of iodine fortification of bread on women's iodine intake was evaluated by reproductive status using 2003 Australian Longitudinal Study on Women's Health (ALSWH) food frequency data and projected onto 1995 National Nutrition Survey (NNS) daily food consumption data for women of child-bearing age. Recent iodine analyses of Australian foods were combined with reported intakes of key foods to estimate iodine intake before and after fortification for 665 pregnant, 432 zero to 6 months postpartum, 467 seven to 12 months postpartum and 7324 non-pregnant women. Differences in mean iodine intake between these groups were projected onto NNS estimates of total iodine intake for women of child-bearing age. Pregnant and postpartum women reported eating more bread than did non-pregnant women. Mean iodine intakes (µg/day before; and after fortification) from key foods were higher in pregnant (78;124), 0-6 months postpartum (75;123) and 7-12 months postpartum (71;117) than in non-pregnant women (65;103). Projecting ALSWH results onto the NNS yields total mean iodine intakes of 167, 167, 160 and 146 for the same groups. The authors concluded that current iodine intakes are well below dietary recommendations. The impact of iodine fortification of bread would be greater for pregnant and postpartum women than has been previously estimated using general population intakes, but additional strategies to increase intakes by these groups are still needed.

Mackerras D et al. J Epidemiol Community Health. 2011;65(12):1118-22.

Iodine status of pregnant and postpartum Japanese women

The aim of the study was to characterize the gestational change of urinary iodine excretion in Japanese women and to assess the effects of iodine status on thyroid function in mother and infant. A total of 934 Japanese women and their 722 newborn infants were enrolled in the study. Iodine and creatinine concentrations were determined in spot urine samples in the three trimesters of pregnancy and the postpartum period at 34 d after delivery. Serum thyroperoxidase antibody and thyroglobulin antibody, TSH, and free T(4) were measured in each trimester, and neonatal TSH was measured on postnatal d 4. The overall median urinary iodine concentration (UIC) during pregnancy was 219.0 µg/liter, higher than that in postpartum women (135.0 µg/liter). The prevalence of pregnant women with low UIC less than 100 µg/liter or high UIC greater than 500 µg/liter was 16.1 and 22.2%, respectively. Urinary iodine excretion increased from 220.0 µg/liter in the first trimester to 258.0 µg/liter in the second trimester, decreased to 195.0 µg/liter in the third trimester, and then remained at 137.0 µg/liter postpartum. The maternal UIC correlated positively with serum TSH during pregnancy. There was no significant difference in UIC between subjects with positive thyroid autoantibodies and those with negative antibodies. Iodine intake assessed by UIC in Japanese pregnant women is regarded as sufficient. Although the data are local, the results provide additional information on the reference range for UIC throughout gestation in iodine-sufficient areas.

Fuse Y et al. J Clin Endocrinol Metab. 2011;96(12):3846-54

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For further details about the IDD Newsletter, please contact:
Michael B. Zimmermann, M.D., the editor of the Newsletter, at the Human Nutrition Laboratory, Swiss Federal Institute of Technology Zürich, ETH Zentrum, Schmelzbergstrasse 7, LFW E19, CH-8092 Zürich, Switzerland, phone: +41 44 632 8657, fax: +41 44 632 1470, iccidd.newsletter@ilw.agrl.ethz.ch.

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