



IDD NEWSLETTER

VOLUME 20 ■ NUMBER 3 ■ AUGUST 2004

Towards USI: A Salt Industry Perspective

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Humanity as well as economics demands that we achieve our global public health goal of ensuring adequate iodine nutrition through universal salt iodization (USI). To avoid condemning millions of newborn infants each year to lives of mental deficiency requires a preventive strategy that is as simple technologically as it is affordable. In fact, we cannot afford not to fulfill the priority commitment of the 1990 World Summit for Children to virtually eliminate iodine deficiency disorders (IDD) throughout the world.

Many health challenges are manifest due to variations in genetics, prosperity, geography or other factors largely beyond our control. These health conditions vary from individual to individual. They are medical problems.

Iodine deficiency is different. Iodine is an essential nutrient. The body does not produce iodine; it must be ingested. Every human needs supplemental iodine. Eliminating iodine deficiency is a classic public health opportunity. Where diets are iodine deficient, providing supplemental iodine can be achieved most effectively on a population basis.

Fortification is the answer

Fortifying foods has been an efficient mechanism to combat nutritional deficiencies. We consume fortified foods every day: Vitamin D in milk; thiamin, niacin, riboflavin, iron and folic acid in cereals and

bread; calcium in orange juice; Vitamin A in margarine. The list of fortified foods is long. We have been fortifying salt with iodine for eighty years. It has been the huge success in iodizing salt that led to the widespread use of food fortification today.

But why iodize salt? Surely there are other candidate foods. Cooking oils and drinking water have been iodized successfully and may be a preferred solution in certain locales. Salt is a superior food for iodization because it is also the least expensive option for fortifying a food. Iodide and iodate compounds are inexpensive. The process requires minimal capital investment and imposes low operating expense. Neither oil nor water can be iodized so cheaply. The preferred choice of salt, however, is for more reasons than the fact that it is the least expensive delivery mechanism.

Humans require iodine within a certain “safe and adequate” intake range, as is the case for virtually every nutrient. Thus, the choice of which food should be iodized assumes even greater significance. If food manufacturers were to indiscriminately fortify their products with all manner of “good” nutrients like iodine, ensuring micronutrient adequacy while avoiding excess consumption would be complicated. With salt, that problem disappears.

Every day every person everywhere in the world eats salt. All societies except a few remote and primi-

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tive ones have access to salt. Once traded ounce for ounce for gold, salt production using modern technology and transportation has made salt abundant and inexpensive.

Humans consume salt in a predictable 6–12 grams/day range. Except in a few societies like northern China and Japan, salt intakes are relatively predictable with 80–90% of the population clustered together. Medical studies have confirmed the stability of salt intakes within populations and over time. They are unchanged over the century since we discovered how to measure urinary sodium accurately.

Nor should this be at all surprising. Every species of livestock and poultry consumes salt in predictable amounts which is the basis for common use of salt as a carrier for trace minerals and medications to ensure animals' health. Not insignificantly, iodine is among the most commonly used trace element to fortify animal salt.

Since intake levels are predictable, metering nutrient fortificants in salt is a simple mathematical exercise. Besides iodine, food salt is often fortified with fluoride in areas where drinking water is not fluoridated and with iron to combat anemia. Animal salt is fortified with still other micronutrients: cobalt, copper, manganese, molybdenum, selenium, iron, zinc, magnesium and sulfur. Salt is also used as a carrier to meter medications to livestock and poultry.

Unsurprisingly, public health agencies are in total consensus that iodizing salt ensures an achievable, affordable and, most importantly, predictable intake of iodine.

Iodizing salt is a simple technology

Adding iodine to salt is not “rocket science.” To dry salt is added either a dry mix or liquid drip or spray of potassium iodate or potassium iodide, with the addition of stabilizing additives, where needed. Obtaining the iodide or iodate is likely to be more difficult for salt manufacturers than actually applying it to the salt. Often, as well, it is a greater challenge to change product packaging to protect the iodate or iodide from humidity and other environmental degradation than to actually produce iodized salt. Any salt producer capable of delivering clean salt to consumers has the technical capability to iodize that salt.

Around the world, the majority of salt is produced in huge salt refineries or scientifically managed solar

saltworks. But most salt makers are very small businesses; though numerous, they collectively produce only a minority of the 210 million tons of salt consumed each year for a myriad of purposes. Globally, the vast majority of producers use primitive technologies. These businesses don't prepare business plans or use spreadsheets to manage their operations. Often they operate at a scale sufficient to support a single family. These small salt makers are relatively unsophisticated; many have never heard of iodine or its role in preventing brain-damaged children.

That salt can be produced using technologies available for millennia imposes special challenges to achieving USI. Were salt an expensive man-made chemical rather than an inexpensive natural mineral, the relatively few, and highly sophisticated, producers would be easy to identify and educate (or compel) to iodize salt. That is not the world in which we live. Salt is not expensive. Salt producers need no sophisticated understanding of geology, chemistry or meteorology. Barriers to entry into these subsistent operations of salt production are low. If the climate is conducive to salt making, anyone with a beach or frontage of a saline lake can make salt with minimal capital outlay. This type of producer is common and just as commonly unable to make high quality salt, unable to make significant quantities and usually unable (or uninterested) to market their product in protective packaging. But they do put salt in commerce, competing with the cleaner, iodized and packaged salt. For these small companies, cleaning and drying this crude salt and packaging it into small plastic bags is often more challenging than actually adding volatilized potassium iodate to the salt.

As a national salt industry modernizes, accompanied by effective government regulations for food safety and increased consumer demand for purer iodized salt, these smaller, less sophisticated operations either modernize or are closed. Thus modernization is intertwined in the very process of implementing and sustaining USI. Pursuing this modernization process depends on all three “partners”: the salt companies themselves, but also government regulators and the consuming public.

Partners needed to achieve USI

The world's organized salt industry has entered into partnership with government public health

USI means iodizing all salt, for all human and animal consumption for all time in all of the countries.

agencies, committed medical and nutrition experts and civic organizations like Kiwanis International to focus energy and attention on the virtual elimination of iodine deficiency disorders. Many smaller salt producers in IDD-challenged nations are also banding together to become full partners in the campaign for USI. Support from public health regulators and civil society has made possible enormous strides in educating and supporting salt producers to advance towards USI. In many countries with endemic IDD, national coalitions have been created; more are being organized — and many more will need to be organized in order to achieve and sustain our goal. These coalitions can assist the salt industry deliver the needed iodized salt. But their role should not be limited to the most common task to date as providers of technical assistance to salt makers. Rather, the need is for governments and civil society to create an educated public demanding iodized salt and creating a competitive commercial marketplace where iodized salt can compete fairly.

Salt companies are like any other business: they thrive when they satisfy a consumer need; they disappear when they don't. If consumers are unaware that iodized salt is healthy for them and their children, the lack of demand undermines the quest for USI. If consumers are unaware that iodized salt is available or can be made available, they won't know to insist on buying the fortified product. These problems can be addressed through public education to create a demand-pull for iodized salt.

If consumers are unaware that the salt they buy is iodized because ineffective regulations of food quality render label declarations meaningless, they will lose faith in a package that declares itself containing fortified salt. If a properly labeled package of iodized salt bears too high a price premium because imported potassium iodate faces high import tariffs and multiple taxes, consumers may conclude that the theoretical health benefits for their families are outweighed by the very real burden on their family food budgets.

If, on the other hand, consumers demand “healthy” iodized salt, packages clearly and reliably distinguish between iodized salt and non-iodized salt, and governments cooperate by not burdening iodized salt with taxes that create a significant price differential, then, and only then, will we be able to realize our goal of universal salt iodization and, with it, the end of the scourge of iodine deficiency disorders.

In North America, fortifying salt with iodine costs about 5¢ per person annually. Costs will vary since

there are only a few worldwide suppliers of potassium iodate, but the price premium for iodized salt can and should be trivial. Price should not become a barrier to consumer acceptance. On the other hand, imposition of salt taxes has a rich legacy. Salt is an easy target to tax and, thus, a reliable revenue source because everyone needs it. But excessive tax levies, like the notorious gabelle in France, can produce serious consequences like the French Revolution.

A program outline for national coalitions

Balance is the key to building an effective partnership to achieve USI. Energy is needed; that's certain. Someone must take the lead, but success demands collaboration with every partner making a unique contribution. If the enterprise is unbalanced, it can behave like an automobile engine with cylinders misfiring, or a car with a flat tire, or even worse, with a locked wheel, going around in circles. There's not enough energy to risk wasting it in a go-it-alone campaign for USI.

A balanced program must address the three major elements: the technology to produce iodized salt, the consumer demand for iodized salt and a marketplace that ensures iodized salt can compete fairly.

Salt producers

Producers, to restate the point, exist when they satisfy their customers and would-be customers. Customers always want to pay the least amount possible for the product they want. If they do not distinguish a quality difference among available salt products, they will likely choose the least costly product. So the challenge is to instill in consumers an appreciation of the health benefits of consuming iodized salt. That should be an easy case to make. The benefits are compelling. The costs of iodine deficiency are visible (goiters and cretinism); more importantly, they are well documented in terms of mental impairment, the massive loss of potential IQ and the sacrifice of economic productivity. Often, iodized salt is also a “white” salt compared to its less pure competitors; the purity is an obvious selling point. And iodized salt must be packaged to protect the potassium iodate; those packages are attractive and can contain important consumer education messages. Producers must:

1. Have access to technical assistance on simple process improvements to iodize salt (and package their product if they are not already doing it).

2. Make a commitment themselves to invest in these improvements (in some cases, perhaps, governments could assist in encouraging cooperative ventures by smaller producers or subsidizing loans for the improvements).
3. Make a firm commitment to complying with government requirements with regard to providing iodized food salt.

Concerned citizens

Concerned citizens — medical and nutrition specialists, educators, civic groups and every other conceivable community organization — should take the lead in creating consumer demand. Schools need to teach students the debilitation of iodine deficiency, perhaps equipping their charges with test kits to use at home (which will educate their parents). In India, the Boy Scouts have also mobilized youth. Endocrinologists, dietitians and nutrition experts need to add their credible voices in a rising chorus hailing the benefit of iodized salt. Food manufacturers, marketers and retailers; restaurants and cafeterias need to proclaim, truthfully, their use of iodized salt. The media should provide public service advertisements and special news programming to highlight the benefits of dietary iodine and its source, iodized salt. Housewives and other food customers should be made to feel that access to properly iodized salt is not only possible, but it is healthier for themselves and their families to consume only iodized salt and to seek out retailers who will provide it to them. In short, marketplace dynamics and incentives need to be considered and harnessed. We need carrots more than sticks. Concerned citizens must:

1. Demand iodized salt in the marketplace and refuse to purchase non-iodized salt.
2. Insist on government enforcement of regulations against those who cannot or will not provide it.
3. Food manufacturers will need to reformulate any products whose aesthetic appeal may be compromised by use of potassium iodate (and/or work with governments for narrow exemptions for such products as dill pickles which may be impacted but whose exemption would represent an insignificant contribution to the entire diet).

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exemption would represent an insignificant contribution to the entire diet.

Governments

Government must play its role too. Government must lead the effort. A major part of government's role is to provide "sticks" to supplement the carrots of consumer demand for iodized salt. This is not as straightforward as many believe. In the past, some governments have assumed that salt produced within their borders was "theirs," ignoring the fact that the salt is actually owned by the salt makers who only produce it to satisfy market demands. Respecting this distinction is crucial. But just because governments do not "own" the salt, they cannot ignore their very real responsibilities as the rule-enforcers that enable salt makers to provide consumers with iodized salt.

Governments can aid in technology transfer for producers. Governments can contribute to consumer education. Both are good. Neither is enough.

The unique and central role for governments is to police the marketplace, to ensure that iodized salt can compete. This sounds elementary and we may think it a simple task. It is neither. Creating an effective food regulatory program, of which enforcement of iodized salt regulations is a small subset, is a complex challenge. It requires political courage. It won't be easy. But it is essential.

Governments must convince salt producers they intend to level the playing field of the salt marketplace. With the promise that he faces likely penalties for his failure to produce iodized salt to meet legal requirements — and a conviction that his competitors face that same likelihood — producers are much more likely to do the right thing, confident they are not putting their businesses at risk. Businessmen want to be good citizens. But their livelihoods are at stake. Perhaps a government can survive if food regulations are insufficient or enforcement ineffective; producers know their businesses cannot survive.

Some salt businesses won't survive anyway. Some smaller, less sophisticated producers may be unable or unwilling to make the process improvements required. A decision to close down non-complying producers entails political cost and risks for the government; all partners need to recognize that fact. The far greater good is achieved with universal salt iodization, but politics can often be local and the one disadvantaged individual will be vocal. Government regulators need courage — and vocal support from concerned citizens and the salt industry (see above).

Governments, then, must:

1. Assume the leadership in forging a national coalition of producers and concerned citizens to partner with it in achieving USI. Too often, however, governments mistake their role in organizing the coalition and mistakenly treat their partners as less than equal.
2. Enact legislation and regulations specifying minimum standards of food salt quality (some countries will include animal salt as well, since it can be substituted for human salt). This must include a standard concentration in the salt iodization (e.g. 30 ppm \pm 10 ppm), and specifying standards for packaging and labeling. If a country imports salt, the regulations need to consider harmonization with its salt trading partners.
3. Ensure enforcement of these laws and regulations. This may require establishing new bureaucracies or investing significantly in strengthening existing agencies to inspect salt production facilities and monitor the retail trade in salt. The integrity of this enforcement mechanism will determine whether the marketplace will be hospitable to the sale of iodized salt (and, thus, to its manufacture).
4. Arrange, often with support from international agencies, for transitional technology transfer assistance to producers willing but otherwise unable to understand the necessity and type of process improvements that will be required.
5. Consider possible tax credits or other subsidy mechanisms for producers to invest in process improvements.

6. Eliminate tariffs and discriminatory taxes on potassium iodate to minimize the added costs of producing and marketing iodized salt.

Towards USI

Pulling together, societies can achieve miracles. Iodizing salt isn't that hard. It won't take a miracle. It will take pulling together in a balanced team effort. A balanced coalition effort can produce surprisingly quick results. But a fast start is not all that is required.

Achieving iodine sufficiency will require more than a sprint. It's even more than a marathon. Consider it, rather, a lifestyle change. It means daily exercise, not a burst of well publicized effort followed by a "return to normalcy." We must establish conditions for sustainable USI.

The above steps, fine-tuned and localized by national coalitions of equal partners respecting and supporting each other, will produce a sustainable elimination of iodine deficiency. The salt industry desperately wants to be such an equal partner. We pledge to do our share: to produce a quality iodized salt product to meet consumer demand and in conformity with a regulated marketplace. This will be a "lifestyle change" for many companies. Some won't survive. We accept that, knowing that those who can and will be able to produce iodized salt will contribute to a national "lifestyle change" of enhanced health and productivity that will lift our communities and our countries. Help us make it happen. ■

Measure of Progress in Myanmar

BY DAVID P. HAXTON, MEMBER, ICCIDD BOARD OF DIRECTORS

This is a summary of "Report on Progress Toward USI and Virtual Elimination of IDD in Myanmar" by David P. Haxton after a visit there in February 2003.

Background

Myanmar is governed by the State Peace and Development Council (SPDC) in which all executive and legislative authority resides. Most of the country is now open to foreign travelers which have helped to

improve oversight of universal salt iodization (USI) operations in most places. The economy is agrarian with agriculture, forestry and fishing accounting for about 60% of GDP during 1997–1998, and two thirds of all employment. A wide range of products for domestic consumption and export includes rice, fish, cotton, rubber, pulses, teak, vegetables and edible oils. The industrial sector accounts for 11 percent of current price GDP. Foreign assistance for social and economic development is limited. No new for-

eign investment has been approved except for oil and gas. (1)

The Government and other authorities express serious commitment to achievement of USI and are proud of the ways in which they have been able to undertake the work with the limited physical and financial resources available. That said, the report concludes that there are elements of the national effort that demand priority attention and investment. These were brought to the attention of the Government at Ministerial level and to the management of UNICEF. Reports reviewed are of good quality and express what has been accomplished. However, they do not reveal completely the fragile infrastructure of the endeavor.

All resources for the activities come from the Government or from UNICEF. The latter provides the major portion at present in the form of technical assistance, reimbursable procurement, supplies and cash grants for travel, supervision and oversight. Most of the resources from UNICEF are a grant to it from KIWANIS International. ICCIDD Regional Coordinator has visited the country at regular intervals.

After many discussions with Government authorities at the Ministerial and field levels, and with UNICEF Officials; a review of the existing reports and documents; visits to processors, village markets, and field laboratories; the following are the conclusions and recommendations. They are in the general order of the guidelines in the ICCIDD, UNICEF, and WHO Assessment Guide (2).

Regarding the Product

General Comments

The supply of salt is sufficient to satisfy predictable national demand for the foreseeable future, based on population projections and potential to adjust to increased production needs. All salt is from the sea and salt beds and processing facilities are on or near a river which is a major form of transport in the country. Transport of salt is mostly by barge; some by rail; less by truck. The processed salt is distributed to wholesalers in strategic locations to supply the retail market.

There are 1600 salt bed operations in the country, mostly in the South along the large coastline and some in the West. They range from small family plots to larger holdings and are classified by size. All are private. It is reported that 80% of these small salt producers provide their salt to 110 salt refineries, all

of which must have a license to operate and to produce iodized salt. All but 10 of the refineries are said to be in private hands. Some small salt pan owners sell to chemical plants; some of the product is boiled for home use; a good bit is what is called 'border trade' in the informal cross border exchanges with Bangladesh.

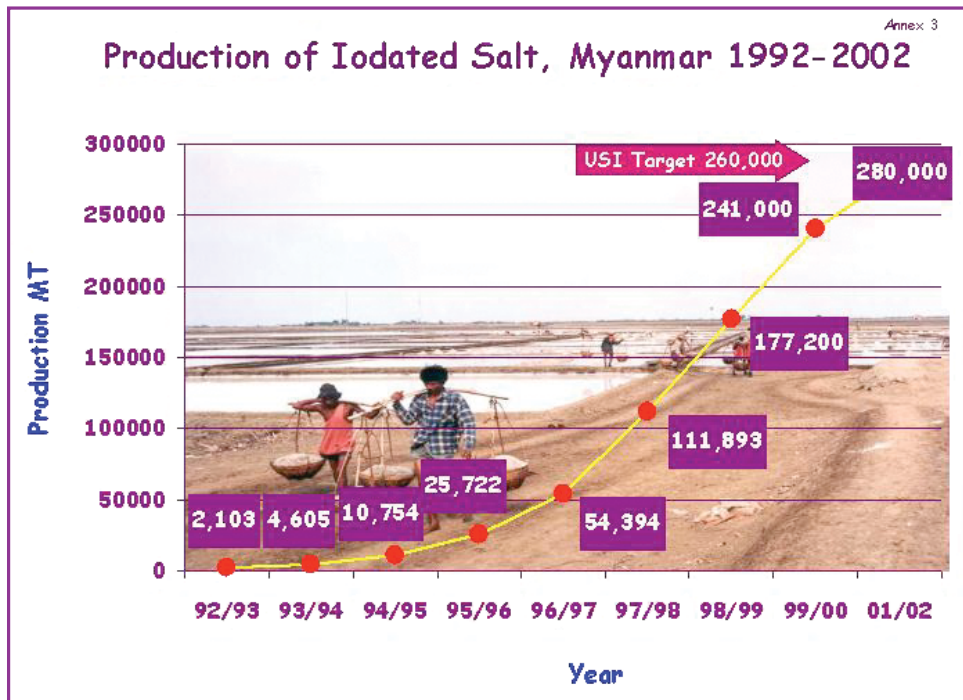
Together these are said to produce 280,000 tons of salt for a stated demand of 398,000 tons. Reports indicate that testing is regular, but the quality of testing needs verification by improved oversight and by comparison with a quality control standard. At present the quality of testing is not verified against a quality control standard. Increased oversight is an evident need.

Quality checks to assure compliance with standards are routine in the plants. Samples are collected and sent daily or weekly (depending upon the size and location of the plant) for quality assurance checks by local authorities. Iodization processes are primitive and lab facilities minimal and tenuous. The personnel are from the Myanmar Salt and Marine Chemicals Enterprise, an arm of the Ministry of Mines. These persons are supported by UNICEF with allowance for their travel and expenses. No plan to have this incorporated into the government budget is prepared as yet.

USI standards announced in Myanmar require the salt be iodized in the plant at 40–60 ppm. Household inspections are expected to find salt iodized at 15–30 ppm. The most recent household survey of year 2000 revealed that an average of 57% of households had salt that contained at least 15 ppm. Myanmar follows the guidelines for UIE of WHO, ICCIDD and UNICEF. Myanmar does not have a standard for the quality of salt. Laboratory equipment at factory sites and warehouse sites are minimal.

Salt harvesting, iodization and packaging use elemental and simple methods. Raw material is delivered to the processor by boat and off loaded by hand labor. Iodization of salt takes place in all plants by spraying with a manually operated sprayer during drying by motor driven centrifugal force. Loss of potassium iodate in the runoff is inevitable. It is reported that a study is under review to capture iodate in the runoff.

Bagging of salt is by hand labor. The product is then sealed into small (0.8 kilo) plastic bags, also using hand labor for sealing. Salt in the small sealed plastic bags are in turn shipped in larger polyethylene bags for shipment mostly by boat. Labels on the bags



Production of iodized salt has increased at a remarkable rate from 1998 to now as a result of joint efforts of UN agencies, national authorities and private salt producers. Iodized salt production reached a total of 241,000 metric tons in March 2000, which covers 80% of household consumption of iodized salt and children's dietary iodine intake. Visible goiter rate has significantly decreased as well as the risk of cretinism and mental retardation.

include the name of the processor, the fact that the product is iodized and the official logo.

However, it was observed that retailers in market places often empty the larger bags of iodized salt to repack the product into smaller unlabeled packages.

It is reported that 30,000 test kits are produced in Myanmar each year at the central Production Unit. This may not be sufficient for the massive testing required. More important, the test kit has never been evaluated against a quality control standard.

Recommendations

Progress in Myanmar is steady under very difficult and primitive conditions. The Ministry of Mines and UNICEF have brought ingenuity to the national effort. Greater vigor is needed to meet the best compromise between (a) the need for adequate personnel and facilities over time and (b) the need to support all of them with national resources. And the national investment is needed soon.

Myanmar can reach the level of appropriate salt iodization of 95% production for human consumption by the end of 2004, but urgent change is needed in quality monitoring and support to infrastructure.

The absence of a law regulating salt iodization may be a reason for absence of standards for salt. A law

would protect the consumer and the producer and underscore the priority to prevent brain damage to children. The law would help establish standard quality assurance through the system.

The practice of repacking salt from sealed and labeled bags at retailer site should be stopped.

To meet the goal, the salt actually reaching households needs to be iodized at appropriate levels.

Laboratory processes and results need comparison for quality control with a recognized laboratory. Laboratory facilities and operations at production sites and wholesale outlets are bare minimum. No plan to replace equipment was evident. Plans for replacement of reagents is said to be in place.

Iodizing all salt is suggested. USI means all salt, for all human and animal consumption for all time in all of the country.

So far, producers, processors, wholesalers and retailers have not been enrolled as allies to take on efforts of advertising and public education. Myanmar has a long history of community collaboration and perhaps this important social asset can be found to be helpful.

Regarding the Processes

Comments

There is regular stated political commitment in many ways, but commitment to financial security of the national effort is precarious. The work of the staff in the Ministry of Health and the Ministry of Mines is solid and persistent. In addition, there is support from the Myanmar Medical Association. The salt producers and processors met were dedicated to elimination of iodine deficiency in the country.

There is a national committee, which is reported to meet regularly. The Minister of Health is Chairman and the Deputy Minister of Mines is Vice Chairman. With expansion of its membership to include educators, agriculturists, economists, communicators,

producers and non-governmental organizations, additional efforts toward sustained iodine nutrition can be undertaken.

The Ministry of Mines operates a “Revolving Fund” created by UNDP, UNICEF and the Government of Myanmar with a grant from UNDP to initiate it. The idea was to purchase potassium iodate, import it, and sell it to producers with licenses to iodize salt, replenish the account accordingly, and subsequently, import potassium iodate in perpetuity.

The agreement stated that the Fund would sell potassium iodate to licensed producers at an established price. In practice the transaction is at an exchange rate lower than the price paid by UNDP (or UNICEF). It is said that this arrangement was to last for a short, interim period. It is not clear just how the Fund would be replenished to the original level unless the Ministry of Mines created a budget line to cover the difference. The price charged is what is called the official rate of exchange for national currency to US Dollars. The UNDP rate, attuned to market conditions and long used by UN agencies, meets with opposition from the Government, which has its own exchange rate. At present the Fund has an estimated shortfall of about 36% of needed capital.

Recommendations were made of alternative ways to correct this situation. That recommendation and others were proposed to be reviewed by the National Committee later in the year.

The financial support to the program is from development agencies, mostly from UNICEF. This is a national endeavor for the most part supported by the consumers when they buy iodized salt, but there are overhead costs of the government in oversight and quality assurance which need to be supported by a government commitment to do so. Inspectors, monitors, and laboratory workers need security and to work effectively require travel resources and support from national commitments. A revised investment plan was proposed.

An analysis of reporting over the past two years shows that delays are minimal and remedial actions are generally swift. This is due to the skill and dedication of the staff and the ability to travel and work, but the latter is supported from foreign sources and, thus, is not as secure as it ought to be.

Producers seem motivated and collaborative. It is important that officials cooperate to make things happen at the production and marketing level instead of expecting others to do the collaborating. Of the 1693 producers of salt, 1680 are in private hands, a

very high percentage of which sell only to licensed processors. Of the processors, 100 are private and only 2 in public hands. The technical and operational details are similar, but the motivation is different and this needs to be taken into account in planning.

The national venture is seen as a “campaign” in the public information literature. An outside review of the communications efforts concluded that the communications were well planned and effective. It is evident that the message was regular, persistent and directed. That said, there is over emphasis on “goiter as the main problem” and “eliminate the deficiency” with under statement of the need to protect developing brains from nutritional insult. The emphasis is on elimination more than on sustained prevention.

It is important to reach farmers and others with domestic animals in order that they recognize the need for iodine nutrition for their animals and perceive the benefits to be derived. In addition, the food processing industry should be enrolled as an ally with insistence that iodized salt be used in the processing of foods.

The ICCIDD/UNICEF/WHO Guidelines suggest a minimum of ten programmatic indicators of which at least eight must be at a high level of performance to suggest sustainable good iodine nutrition. The Myanmar national effort is advanced on some of these.

Recommendations

The political commitment needs translation into a law protecting the population from the dietary deficiency. This law would protect the population; codify standards; and provide the necessary regulatory procedures.

It is vital that priority action be taken to assure national financial support to the operations of the endeavor, to the oversight responsibilities, and to the management and operation of the Revolving Fund.

The National Committee is a positive element of the endeavor. However, it is noted that elements of society are not represented, among whom: agriculture and food processors; educations and learning systems; information and communication channels; religious and other non-governmental organizations.

The Revolving Fund needs an audit and reorganization to remain viable. Subsidies might be considered for a period to offset current operating costs. However, the subsidies should be those of the government, perhaps, supplemented by a change in sales prices. Once on a sound financial footing, the Fund might consider financing other needed activities like replenishment of supplies and equipment for

laboratories, foreign travel for national orientation.

It is important that the communications effort be redesigned to focus on the protection of brains not the mere elimination of goiter. In addition, plans are needed to incorporate public education into the venture. Penetration of the education system is needed to assure a generational transfer of knowledge of the dangers of IDD and the values of iodine sufficiency.

USI achievement requires iodization of all salt for human and animal consumption. The food processors need to become full partners in the endeavor.

Progress in Human Nutrition

Observations

The Ministry of Health through its outreach network and the National Nutrition Center are in charge of monitoring the network of small but effective laboratories and the dedicated staffs are assets. The MOH undertakes surveys and reports regularly. Laboratory facilities are an established national network; they are not elaborate, but functional. That said, however, the reviewer concludes that the situation is tenuous since it is almost totally dependent upon foreign assistance and it was difficult to find plans to replace the foreign support once it concludes. The laboratories are basic and lack plans for replacement parts and supplies except as provided from abroad.

The Ministry of Mines is active in oversight and management. The technical support of its professionals is significant.

Regular surveys to date show steady progress in median urinary concentration. Additional surveys at regular intervals are said to be planned. The Government would welcome additional support for surveys for the next few years.

Recommendations

In short, the national effort is remarkable given the circumstances. It has accomplished much for the protection of the people. The ingenuity of the workers and the dedication to the task are inspiring. However, the financial commitments of the government to this effort need urgent and high level attention. In the long run, the effort will be financed from sales of iodized salt with modest government investment for oversight and analysis. The published standards need to be checked against a quality control standard from abroad. The Government should consider seeking technical collaboration from abroad for (a) improving quality assurance processes and standards, (b) confirming procedures against quality control standards and (c) information exchange on 'state of the art' laboratory management. ■

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14	Guide line for the training course of production, quality assurance and potassium iodate revolving fund.
15	User manual on Instant iodine Tester
16	User manual on Volume Timer Control equipment

Towards IDD Elimination in Tibet — Then and Now

BY MU LI, M.D. AND CRESWELL J. EASTMAN, M.D.

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Background and Introduction

Over the past two decades China has made significant progress in its efforts to eliminate IDD. The goal of elimination, established as part of China's National IDD Elimination Program (NIDDEP), is largely achievable within the allocated timeframe. The 1997 Chinese National Surveillance Study revealed impressive provincial aggregate figures for both iodized salt coverage, as well as satisfactory urinary iodine levels throughout the country. However, control of IDD in Tibet was clearly lagging behind the efforts and achievements of most other Provinces in the People's Republic of China (PRC). While iodine supplementation in Tibet had been initiated, many years ago, on a small scale through iodized oil supplements and the establishment of a "Tea Brick Factory" to iodize tea, the results were poor. The Qualified Iodized Salt Coverage Rate was only 6.2 per cent (6.2%), and other indicators available for Tibet were 29% for palpable goiter, and 55 ug/L for the median urinary iodine level for school children when this project commenced.

A request for support in the effort to eliminate IDD in Tibet was submitted to WHO by the Tibet Bureau of Public Health (TBPH) in June 1998. WHO responded positively by asking Professor Cres Eastman to convene a workshop in Beijing in November 1998 to develop a plan for this project. The major elements of the proposed plan were: conducting an IDD epidemiological survey to obtain baseline data, developing a health education and social mobilization program, strengthening laboratory monitoring capability and facilities, implementing an iodized oil supplementation program, and providing training for health personnel from county to provincial level. Each element of the proposal has been examined in detail and a plan developed and agreed upon.

A feasibility study was conducted in Tibet in May 1999, by a multi-disciplinary team representing all stakeholders and led by Professor Cres Eastman, to independently confirm the magnitude and severity of the IDD problem in Tibet and to better define the support to be provided for the IDD elimination project.

At the conclusion of this mission the Feasibility



Iodized salt production in Lhasa Salt Factory, Tibet

Study Report presented to WHO confirmed the vast dimensions of the IDD problem in Tibet and recommended the immediate implementation of a scripted intervention strategy. This Report, and all of the recommendations contained therein, were accepted by the WHO/WPRO in Manila.

The Report stated: *"Considering the status of the IDD control program and current prevalence of IDD in Tibet it is accepted that the target of elimination of IDD by the year 2000, the proposed achievable goal in most parts of China, cannot be achieved in Tibet. An achievable goal, with more realistic targets and timeframe, is by the year 2003 (in 4 years time) 85% of the population of Tibet will consume qualified iodised salt and will have satisfactory levels of UIE, being a median level >10 ug L. To achieve these targets it will be necessary to commence immediately an oral iodised oil supplementation program directed to the most vulnerable segments of the population. This supplementation program can be scaled down over the next five years as the iodized salt production, distribution and uptake is scaled up and reaches the target of at least 85% population coverage. The ultimate long-term solution for control of IDD is through universal salt iodisation"*.

The Australian Government, through AusAID, provided in excess of A \$2,000,000 to fund the Iodine Deficiency Disorders (IDD) Elimination Project in Tibet. The project has been managed by WHO/WPRO and implemented by the Institute of Clinical Pathology and Medical Research (ICPMR) from Westmead Hospital in Sydney, Australia. The project was overseen by three committees. The Project Management Committee in Tibet was

chaired by the Vice Governor of the Tibet Autonomous Region (TAR) Government responsible for culture, education and health. The Scientific Advisory Committee was co-chaired by Professor Chen Zupei, the ICCIDD Regional Coordinator for China and East Asia and the head of the Chinese IDD Expert Group and Professor Cres Eastman, the ICCIDD Regional Coordinator for Asia Pacific Region and the International Adviser for the China National IDD Elimination Program. Professor Eastman was also the chairperson of the Project Coordinating Committee, based at ICPMR. Dr. Mu Li has coordinated these management inputs and has largely overseen the project implementation in Tibet.

The Goals and Outcomes of the Project

The Project aimed at providing a sustainable solution, through Universal Salt Iodization (USI), for the elimination of IDD in Tibet. The short to medium term goal of the project has been to provide iodine to the most vulnerable groups in the community, namely, women of childbearing age (WCBA) and children less than 2 years of age. This transitional strategy is being achieved largely through a targeted distribution program of iodized oil capsule (IOC). The long term goal of the project is the provision of iodine to the whole Tibetan population through the implementation of USI. This strategy is in keeping with the national policy of the Peoples Republic of China for IDD elimination. The project commenced with an official launching ceremony in Lhasa on 18th May 2000.



Drs. Mu Li and Creswell Eastman assessing goiter in Tibetan school children

The project consists of five major components addressing demand, supply and monitoring of iodine uptake by the community. These components are:

- Multi-sectoral health education and health promotion to create demand for iodized salt within the Tibetan population
- Distribution of iodized oil capsules to target populations, such as women of childbearing age and infants for short to medium term iodine supplementation
- Provision of affordable and qualified iodized salt to the whole of the Tibetan population
- Setting up a quality assurance system and training of personnel
- Establishing and implementing effective project coordination, monitoring and management systems to provide an infrastructure for continuation of this work long after the foreign assistance has departed from Tibet

The project has delivered all of the components outlined in the Project Design Document (PDD), except for the establishment of the Yanjing salt iodization plant in Eastern Tibet due to contamination of locally produced raw salt by heavy metals.

The deliverables have been:

1. Development, production and distribution of materials for health education and health promotion: including video and radio programs, school health education textbooks and posters for different target audiences.
2. IOC delivered to WCBA and infants: in total 1,826,000 WCBA and 292,000 infants have received IOC cumulatively in the 4 years. We estimated 170,000 newborns have been protected from brain damage by iodine deficiency.
3. Support has been provided for the Lhasa Salt Factory (LSF) and the pilot program for an iodized salt distribution network in six counties within two prefectures. The original proposal for a salt plant in Yanjing was deleted due to heavy metal contamination of the raw salt. Instead the funds for establishing the salt plant have been allocated to set up a distribution network of iodized salt in Lhasa and Shannan Prefectures. A trial

program is yet to be completed, but it is already recognized as a very successful initiative and will now be expanded.

4. Quality assurance programs of iodized salt have been established at production, retail and household levels.
5. Office equipment and vehicles have been provided to ensure the development of a project management office for the life of the project and beyond.
6. Over 1,200 people from different sectors have received various forms of training with project funds.

Year	TGR (%)	UIE (ug/L)		HHIS (%)
	8–10 yrs	8–10 yrs	WCBA	
1999	29.0	55.4	-	-
2000	22.1	58.8	39.0	29.9
2001	16.7	152.4	98.7	34.8*
2002	13.9	93.7	51.3	31.4*
2003	12.2	125.8	96.1	34.1* (54%)

Table 1. The project outcomes by three of the major indicators.

The outcome indicators (Table 1) show that the thyroid goitre rate (TGR) has fallen from 29% to 12%; the median urinary iodine excretion levels (UIE) in school children have risen to 125 ug/L and in WCBA to 96 ug/L. The major shortcoming has been the inability to increase the household consumption of qualified iodized salt to the target level. The household data of iodized salt (HHIS) coverage presented in Table 1 were collected from surveillance of 35 counties, which were selected by their geographical location of east, west, north, south or central of each prefecture and they are located almost exclusively in the rural areas, where the coverage of iodized salt tends to be the lowest. Whereas very high iodized salt coverage has been achieved in urban and peri-urban areas. Up to 90% of the people living in the urban and peri-urban areas are now using iodized salt, by estimation, the covered population numbering 486,000. In addition, all students in boarding schools use iodized salt through school canteens; the estimated number of students covered is 350,000. Therefore, the current estimation of iodized salt coverage rate in Tibet is approximately 54%, ie, 1.45 million out of the total 2.7 million Tibetan people are now covered by qualified iodized salt. The calculations are derived as follow:

486,000 (90% of the people living in urban and peri-urban areas)
 + 350,000 (number of students in boarding schools)
 + 615,000 (34% of people living in rural areas, which accounts for 80% of all Tibetans)

1,451,000 (54% of all people living in Tibet, currently estimated at 2,700,000)

The above calculation shows that the coverage of iodised salt has doubled after 4 years of the AusAID and WHO supported program, from about 29% to about 54%. The major issues we are continuously confronted with are the ready availability of raw salt in the market and the high transportation costs of delivering iodized salt to remote rural communities.

Resolutions of the Final Project Review

During the recent final project review and end of project workshop in May 2004, five resolutions were agreed among the participants from relevant sectors of all 7 prefectures:

1. Continue to provide iodized oil capsules to women of childbearing age and young children (0–2 year old) in areas where iodized salt has not reached
2. Conduct feasibility studies of iodizing raw salt in 4 salt producing prefectures, namely, Naqu, Ali, Rikeze and Changdu to address the issue of iodizing raw salt for human and animal consumption
3. Strengthening communication and coordination among international agencies and collaborating sectors
4. Surveillance data to be reported at county level to identify problem areas where special support is needed



Drs. Mu Li (right), Creswell Eastman (left) and a colleague (center) hold up a plaque of “Iodized Salt Retailing Post” which is displayed in every site of the iodized salt distribution network in Tibet.

- Continue the high level coordination and support of health promotion and advocacy activities, and provide further training to personnel in health education and health promotion

It is clear that the project has been very successful even though we have not met all of our targets. However, the project has built new ways of thinking, a platform for the future and developed new systems for addressing the huge challenge of IDD in the Tibet Autonomous Region. The project has also been successful in that it has generated further attention from

both central PRC and TAR governments to sustain the IDD elimination efforts in Tibet. It is pleasing to hear that the MOH of China and China National Salt Industry Cooperation (CNSIC) are looking at coordinated strategies to support sustainable IDD elimination in the 3 Western provinces/autonomous regions, namely Qinghai, Tibet and Xinjing, where efforts have lagged behind the rest of the country. We have committed to continue to support the IDD elimination program in Tibet as much as yet remain to be done to achieve sustainability. ■

The National IDD Day of Thailand and an Award to Her Royal Highness the Princess

The Nutrition Division of the Thai Department of Health held its Third National IDD Seminar during August 19–20, 2004 in Lumlukka, Pathumthani province to promote awareness of Iodine Deficiency Disorders (IDD) in the Thai society. It emphasized the influence of IDD to distort the development of brain and intelligence in young children. There were 187 seminar participants including governors (43), provincial chief medical officers and representatives from Ministry of Public Health (64), staff from universities (9), salt producers (16), Office of Basic Education, mass media (13), private foundations, representatives from WHO, UNICEF (8), representatives from Ministry of Interior, Ministry of Education, Ministry of Commerce, Ministry of Industry, Thai Red-Cross Volunteer Office, and the Association of Thai Community Development Women Leaders (15).

The seminar program had speeches and workshops. Professor Arun Pausawasdi, the advisor to the Minister of Public Health, inaugurated the meeting with a speech on “Eliminating Brain Damage due to Iodine Deficiency”. A lecture on “IDD Control Program in Thailand” was given by Dr. Sophon Mekthon, the Deputy Director-General of the Department of Health. Professor Creswell J. Eastman, a member of the ICCIDD Board of Directors and the Coordinator of Asia-Pacific Region was the guest speaker giving a review on “Global Strategies on Sustainable IDD Elimination”.

There was also a panel discussion among the representatives from four main Ministries; Ministry of Education, Ministry of Industry, Ministry of Commerce, and Ministry of Interior, on their experiences and the intersectional collaboration on IDD Control Program,

At the end of the symposium, Professor Creswell J. Eastman, representing ICCIDD, presented a Plaque of Honor and a Citation to Her Royal Highness the Princess Maha Chakri Sirindhorn for her dedication and outstanding leadership in the program of sustainable elimination of iodine deficiency disorders in Thailand. The ceremony of presentation took place at Chitralada Palace at 3:30 p.m. on 19 August 2004 in the presence of:

Mrs. Sudarat Keyuraphan, *Public Health Minister*

Mr. Anutin Charnvirakul, *Deputy Public Health Minister*

Dr. Vichai Tienthavorn, *Director-General of Department of Health*

Dr. Kanchana Kanchanasith, *Deputy Director-General of Department of Health*

Dr. Sophon Mekthon, *Deputy Director-General of Department of Health*

Professor Pichit Suvanprakorn, M.D., *Chairman, Committee to Promote the Consumption of Iodine Fortified Salt, Thai Red Cross*

Dr. Sangsom Sinawat, *Director of Nutrition Division, Department of Health* ■

Citation to Her Royal Highness Princess Maha Chakri Sirindhorn in Recognition of HRH Princess' Guidance and Support to the National IDD Control Program in Thailand

Thailand ranks high in the third world countries that have made remarkable progress in control of iodine deficiency disorders (IDD). This becomes possible because of the commitment and direction given by HRH Princess Maha Chakri Sirindhorn.

Iodine deficiency leads to abortions and stillbirths. It also contributes to higher infant mortality rates. The other manifestations include cretinism, psycho-motor under-development, stunting, speech and learning defects. IDD also cause impaired development of the brain and central nervous system in the early fetal life in humans. These changes are irreversible. Children in an iodine deficiency environment, on an average, have 13 IQ points less than those living in iodine sufficient areas. This problem adversely affects the learning ability of children, increasing repeated failures and school dropouts, thereby denying them the opportunity of attaining their full potential. Consequently, it deprives the country of fully developed human resource which is essential for development and modernization through economical, social and cultural growth.

His Majesty the King Bhumibol Adulyadej has already captured the problem and given many innovative directions. For example, study the 'salt route' to understand the production of iodized salt and its distribution, development of appropriate iodization technology for small salt producers, and development

of medium scale iodization machines. These machines are currently in operation throughout Thailand and are also exported to the neighboring countries.

From the beginning, the Princess noticed IDD as a serious public health problem. Thailand has been pursuing for over forty years to control and prevent this public health challenge. The Princess was quick to take stock of the problem comprehensively and made plans for its sustainable elimination.

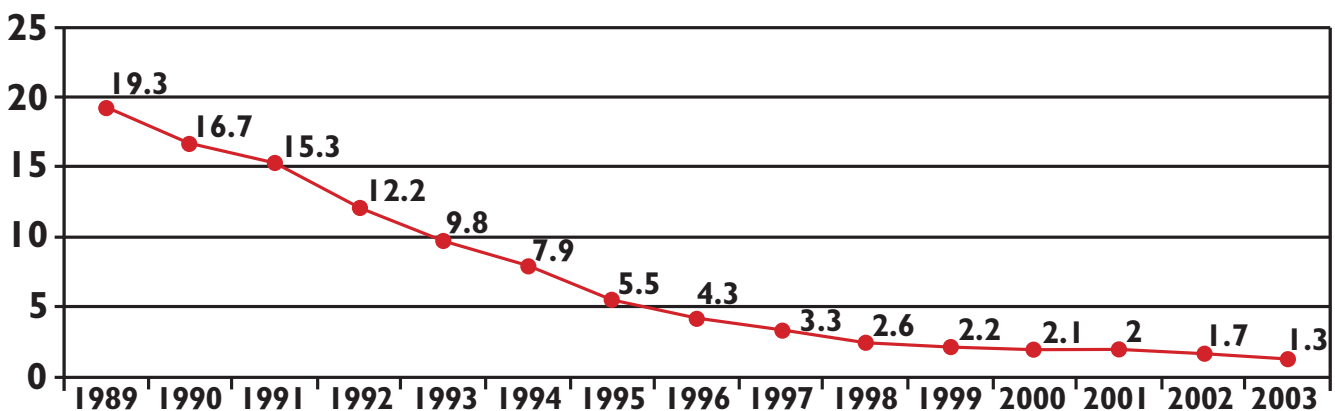
In countries where a sizable section of the population is still poor, universal salt iodization is the best remedial measure to combat this age old scourge of mankind. Salt has been chosen as a vehicle because all sections of the people — rich or poor, urban or rural, men or women — consume salt in a fixed quantity on a daily basis.

The National IDD Control Program was established May, 1989 after it was approved by the Cabinet. The Princess graciously agreed to preside as president of the National IDD Control Committee to help solve the IDD problem. The Princess holds a deep interest in any issue that will better the lives of the people of Thailand. She is a symbol of love and caring and a unifying force for the country. It was auspicious that HRH Princess agreed to help coordinate the work of the relevant ministries to support the IDD program. HRH is known for her concern for the well-being of the Thai people.

To overcome the problem of IDD, the program

IDD Situation In Thailand, 1989–2003

% of goiter rate



encourages consumption of iodized salt and iodized drinking water among school children and community members, as well as provides proper nutrition education. At present, the prevalence rate of Iodine Deficiency Disorders in remote areas is being held at 1.3 per cent. Indeed, a remarkable progress.

The Princess learnt that the problem of IDD is endemic in many remote villages in Thailand, especially in the Northern and North-eastern regions where soil does not contain iodine and villagers do not regularly eat seafood. To effectively implement the IDD control program, The Princess used her basic principles of development: (1) capacity building — building capabilities and increasing participation of people in all activities of development so that the people become self-reliant and, (2) coordination — establishing and promoting inter-agency collaboration and coordination of efforts and resource sharing.

In 1990, the Princess established IDD Control Program in 190 Border Patrol Police Schools, which are distributed along the frontier border in the four regions of Thailand. The students in these schools are poor and have fewer opportunities living in these remote areas. Besides Border Patrol Police Schools, “Mae Fah Luang” Community Learning Centers have also been implementing IDD Control Program in 237 of its centers in Northern Thailand. The sustainability of these programs is maintained. This can be rightly called the important milestone of the program for control of IDD in Thailand, initiated by the Princess.

The Princess understands that the problem of IDD can reappear in case of complacency. Therefore, a well-defined monitoring and implementation strategy is in place to ensure continuity and sustainability. In her capacity as Vice Chairperson of the Red Cross, the Princess advises provincial Red Cross Organizations to co-operate and coordinate implementation programs of IDD elimination through its nationwide network. The Princess is also concerned about the need for production and distribution of sufficient quantity of adequately iodized salt for human and livestock consumption. Another area of concern is how iodized salt reaches all sections of the people.

The Princess has provided dedicated leadership to the program. The following examples illustrate this:

1. Devoting much time and effort in the country's IDD control programs.

2. The Princess chaired the National IDD Committee in 1991. This gesture has generated widespread multi-sectoral involvement and coordination in the country.
3. The Princess presided over the opening ceremony of the First National IDD Seminar in March 1992. The theme of the seminar was “IDD Control in Thailand”. In her address, the Princess expressed concern that if the problem of IDD were not properly and immediately addressed, the quality of life of millions of Thai people would deteriorate and obstruct the country's social and economic development and national security.
4. The Princess chaired the opening ceremony of the Second National IDD Seminar. The theme was “Towards the Elimination of IDD in Thailand”. She made a special presentation on “Concepts and Experiences of the IDD Control Program.”
5. The Princess presided over the grand ceremony of the 1996 National Campaign to Eliminate IDD to commemorate the 50th Anniversary of His Majesty the King's ascension to the Throne. The King's salt was distributed to about 12 million households nationwide to encourage iodized salt consumption among Thai people.
6. The Princess pays yearly visits to the Border Patrol Police Schools to personally evaluate the progress and status of the IDD programs.

All these bring to prominence the eminent leadership displayed by the Princess and the right direction shown by her. More importantly, the Princess acknowledged the role of IDD elimination in the national development and security through better development of human resources. The grass-root contacts that she cultivated have helped the IDD control program in Thailand to reach the present level of success. The Princess carries with her the learning experiences, from exposure at a tender age, to the realities of people's lives.

International Council for Control of Iodine Deficiency Disorders (ICCIDD) takes pleasure in recognizing the superior role played by Her Royal Highness the Princess Maha Chakri Sirindhorn towards sustainable elimination of Iodine Deficiency Disorders in Thailand. ■

Letters on Iodized Salt in Cambodia

In late November 2003, Dr. Chandrakant S. Pandav, the ICCIDD Regional Coordinator of South Asia, forwarded several e-mail letters from two agency staffs who tried without success to provide iodized salt to the people of Cambodia. The letters give an intimate understanding of the obstacles in the field that is not transmitted by reports.

February 11, 2003

“The latest information is that all four salt iodizing machines donated by UNICEF to the private producers are broken...I am not particularly optimistic.”

— From L.

November 03, 2003

“The American Red Cross/Cambodia is interested in starting a pilot project with Cambodian Red Cross to socially market iodized salt to Cambodian families. Findings from the 2000 Cambodia Demographic and Health Survey clearly show that less than ten percent of Cambodian households consume iodized salt in most provinces in Cambodia. The only provinces that show higher iodized salt consumption are Ratanakiri and Modulkiri, an anomaly because these provinces rank at the bottom of all other health statistics. I have canvassed small shopkeepers in these two provinces, and their iodized salt comes from Vietnam. The destination of the lion’s share of domestically produced iodized salt appears to be Phnom Penh.”

— From L.

November 04, 2003

“Iodine deficiency disorders were first identified as a serious public health problem when Dr. Mean Chhi Vun (now Deputy Director General of Health and National HIV/AIDS Coordinator) did a goiter survey in Rattanakiri in 1989...There also was a UNICEF sponsored survey in all the provinces except Kg. Cham and Koh Konag that found IDD to be a problem in almost all the provinces. Dr. Nicolas Cohen, WHO-Geneva visited Cambodia in 1993 stated something urgent must be done. HKI lobbied hard with UNICEF and USAID to start salt iodization...4,500 iodized oil capsules were given to HKI and MOH to distribute in Rattanakiri and Kg Cham. Later HKI purchased a few small scale salt iodization machines to

start local production. UNICEF had a very good consultant Dr. Pan Varghese who assessed the salt iodization potential in May 1995. UNICEF commissioned PSI to do a feasibility study to market iodized salt in Cambodia. The study was done but no follow-up with PSI happened.

Later UNICEF did purchase the iodization machines and set them up with the salt cooperative in Kampot. However, the salt producers who have high government connection never were committed to iodizing a significant amount of salt, afraid of losing profits if they had to raise the price of salt. In the late 1990’s HKI started helping with promotion of iodized “magic salt”. The Nutrition program was urged to reinstate iodized oil capsule distribution again in the northeastern provinces and 78,000 women of child bearing age received these capsules during the National Immunization Program’s 2001 supplementary measles immunization activities. There were also plans to distribute iodized oil capsules in 2003 in the same areas.

In fairness to UNICEF there has been poor government cooperation and lack of coordination. The Ministry of Planning is the lead agency for the iodine program due to a quirk of the 1995 National Food and Nutrition Policy that has been further superseded by another national nutrition investment policy.”

— From F.

November 05, 2003

“Thank you very much for your detailed and highly informative e-mail. I am now working on other commitments and won’t be able to focus on iodized salt until mid-December.... I realized that iodized salt has a long history in Cambodia, but the fact is that over 80 percent of Cambodian households still do not have access to the product.”

— From L.

November 25, 2003

“Dear Dr. Pandav,

It was good to meet you again at the National Micronutrient Workshop this week. I am sending you some previous correspondence I have had. Ultimately the problem lies with the government which does not really understand the importance of the issue thus has not made much of a political com-

mitment to salt iodization. There are some decrees about iodized salt but legislation does not carry any weight in terms of enforcement. The reasons Cambodia has not made significant progress on salt iodization can be summed up:

1. Lack of political support, placing the salt industry's perceived priorities over public health.
2. Lack of awareness and right approach to salt industry to influence them to see that their benefits can be served as well by upgrading their product.
3. Lack of technical oversight to ensure that iodized salt production can be adequate to meet the demand created by social marketing.
4. Lack of trained staff with technical skills to support the operation and maintenance of salt iodization equipment.
5. Need to have more intensified communications strategy but this can only take place when the production problems are resolved.
6. International commitment/advocacy needs to be stronger to address this issue. It seems relevant now that the World Bank wants to make more advances in nutrition in Cambodia a priority. Salt iodization should be a natural step to ensure development of the country.

That is all. Take care and please contact me again when you have time.”

— From F.

November 26, 2003

“Dear Dr. Pandav.

The iodized salt situation in Cambodia is calamitous. Only 14% of households in the country consume iodized salt — this in contrast to 76% in Laos, 74% in Thailand, and 40% in Vietnam. One problem is political; there is no national salt law and no enforcement of existing regulations. On the production side, the salt iodizing machines donated by UNICEF are in constant disrepair. On the distribution side, few villages have any supply at all of iodized salt...I analyzed the national and provincial requirements of iodized salt and actual salt consumption. The findings of the analysis are clear. Only two of Cambodia's 24 provinces have adequate salt consumption levels, and those two provinces obtain their supply from cross-border trade with Vietnam.

Attached also is an email...detailing that Vietnam has been dumping non-iodized salt on local markets and that a case can be made to the highest authorities to iodize salt on the grounds of national security.

The entire system — policy, domestic production, foreign importation, quality assurance, distribution, and marketing — is weak and bears investigation. In addition, we need good data on IDD through UIE or ultrasound tests. Would it be possible for the ThyroMobil to conduct tests in Cambodia? Also would it be possible for you or another representative to visit Cambodia in the near future to make a rapid assessment of the situation and make recommendations on follow-up actions?

Thank you for your consideration- and please feel free to exchange thoughts and ideas. The important thing, however, is to take concrete steps to change the current abysmal situation.”

— From L.

November 28, 2003

“Dear L,

Much appreciation for sharing the status of IDD in Cambodia. It is rather timely in the sense, a large number of ICCIDD Executive Committee members will be meeting at Singapore from 1st to 3rd December. I am sharing this correspondence with them. Shall get back to you after our interaction, we are in it together.

Thank you again,”

— From C. Pandav

Subsequently a brief unsigned article appeared in IDD Newsletter. (February 2004; 20: 5).

Cambodia

“Currently, some 20 iodization units have been purchased, with the combined capacity to iodize almost all the salt in Kampot province, the principal source, with potassium iodate at 50 ppm iodine. The country has 2 large scale and 27 small scale producers of iodized salt. ■

On Iodizing Salt in Cambodia

Cambodia was known to have significant iodine deficiency disorders (IDD) for decades and Cambodia still has significant IDD throughout much of the country with limited access to iodized salt today.

Once non-iodized salt was produced by a number of domestic producers and it was also imported from Vietnam across the borders. A national goiter survey was conducted in year 1997 which reported goiter rates of 12 to 39% (UNICEF 1997). Legislation for universal salt iodization (USI) and commercial salt iodization followed during 1998-1999 with the assistance of WHO and UNICEF. However more recent data of household coverage with adequately iodized salt suggest Cambodia has made only modest progress towards USI in recent years (Karen Codling, EAPRO, UNICEF, cited by Eastman in Hetzel, 2004). Despite on-going public education and advocacy programs to promote USI by the Cambodian Ministry of Health and limited use of iodized oil capsules, Cambodia has lower household coverage of iodized salt than Laos or Vietnam.

Cambodia is a small but ancient monarchy, recovering from years of war nearby and horrific social and political chaos within. The Western nations have pressed it to seek justice for the dead but seemingly less aware of the widespread suffering among the survivors.

Cambodia seems remote from the outside world, which has witnessed the virtual eradication of smallpox, polio and IDD. The salt industry has taken on a significant role to achieve USI. The call for partnership has brought together international agencies, government and non-government organizations, private foundations, businesses, communities and individuals to provide consultation, workshops, technical assistance and monitoring among them, International Council for Control of Iodine Deficiency Disorders (ICCIDD) and International Resource Laboratories for Iodine (IRLI) Network. Kiwanis International's Worldwide Project for Virtual Elimination of IDD donated large sums through UNICEF to launch country programs for USI.

Then did we, so intent on reaching USI by the year 2005, march on without noticing that small and poor Cambodia was left behind without iodized

salt? No, the world did not forget Cambodia. Between 1994 through 2002, Kiwanis International donated a total of US \$1,008,806 through UNICEF to eliminate and prevent IDD in Cambodia, a country with a population of 13 million and with a government described as weak, divided and unstable. Perhaps IDD and iodized salt were not priority national issues among the numerous competing needs. A regulation passed by the National Sub-Committee for Control of IDD was not fully enforced. The large salt producers were not committed to USI. In the end, the ample Kiwanis money did not translate into USI in Cambodia. An opportunity for USI slipped away while some of the money went to purchase iodized oil capsules.

It is reported in the Newsletter that "currently, some 20 iodization units have been purchased, with the combined capacity to iodize almost all the salt in Kampot province, the principal source, with potassium iodate at 50 ppm iodine. The country has 2 large scale and 27 small scale producers of iodized salt...Financial support has come from international donors, not the government," (IDD Newsletter, February 2004; 20:1.5). There is no recent information of urinary iodine values. The status of current iodine nutrition in Cambodia remains unclear.

The frustrating but obstinate efforts of a few agency workers to iodize salt described in the previous article, "Letters on Iodized Salt in Cambodia" turned out to have a promising ending. Their story led ICCIDD and UNICEF to respond and come to the aid of Cambodia promptly, supported by another contribution of nearly half a million dollars from Kiwanis International. Cambodia is moving ahead again towards the goal of universal salt iodization. The story affirms our faith that the conscience of a few good men can move a mountain.

— Editor. ■

WHO Regional Committee for South East Asia

Report of the Fifty-seventh Session

Kurumba, Maldives, 7–9 September 2004 (Reproduced in parts)

Review of Iodine Deficiency Disorders in the South-East Asia Region (*Agenda item 11.1, document SEA/RC57/Inf.3 Rev.1*)

The Committee was informed that the subject had been discussed at the Ninth Meeting of Health Secretaries in July 2004, and that the summary of the discussion was available in the report of that meeting.

The Committee noted that Iodine Deficiency Disorders (IDD) programmes were at various states of development in countries of the Region. While some countries were close to achieving IDD elimination by the end of 2005, others were far from the goal. Although sufficient salt was being produced for consumption in some countries, all of it was not being adequately iodized. Apart from the visible effect of IDD, in the form of goiter, its other alarming effects on human brain development including cognitive losses were not generally known. While noting the commitment of Member States to the prevention of IDD, the Committee stressed the urgent need to strengthen prevention and control programmes in order to achieve the goal of IDD elimination.

The Committee recognized IDD as a serious public health problem and although aware of the various effects, confirmed the need for further research. Stringent quality control measures to ensure adequate iodization of salt needed to be put in place, and monitored closely. It was essential to enhance community awareness at all levels, using electronic and print media such as posters and leaflets translated into local languages. Social marketing campaigns, particularly at the district level, would help in raising community awareness about the health benefits of using iodized salt. Involvement of schoolchildren in educational campaigns on the advantages of iodized salt would also be useful. Regulatory mechanisms were necessary to ensure adequate availability of iodized salt. Member States should also ensure community involvement in the control of IDD.

The Committee was informed that Member States had developed national strategic plans for control of iodine deficiency disorders. Efforts were ongoing to integrate iodine deficiency disorders and universal salt

iodization into health curricula. Similarly, control of other micro-nutrient deficiencies such as anaemia and developing national strategies on infant and young child feeding also merited attention.

The Committee expressed satisfaction that, in addition to the IDD control programme, Member States were also according importance to nutrition and maternal and child health care programmes.

The Committee was informed that while iodization of salt had generally been adequate, optimum household coverage as per the WHO recommendations had not been achieved due to inequitable distribution. The Committee, therefore, stressed the need to ensure sustainable and uniform availability of iodized salt in all countries.

The Committee emphasized the need to have a built-in monitoring and evaluation system for assessing the use of iodized salt as well as the progress achieved towards meeting the targets set for 2005.

The Committee also noted that steps needed to be taken to prevent loss of iodine at the manufacturing stage and during transportation, for which appropriate logistic arrangements should be made.

It was recognized that active multi-sectoral collaboration was essential for the success of the IDD prevention and control programme.

The Committee noted with satisfaction the efforts being made by Member States but emphasized that in order to achieve the target of IDD elimination by 2005 they needed to be further accelerated. WHO would be willing to assist Member States in enhancing advocacy and awareness measures in this regard. As requested by the Health Secretaries in their last meeting held in July 2004, WHO would establish a Regional Technical Group to provide technical guidance to Member States on IDD elimination programmes.

The Committee endorsed the recommendations made by the Ninth Meeting of Health Secretaries and adopted a resolution on the subject (SEA/RC57/R4). ■

Review of Iodine Deficiency Disorders in the South-East Region

**Ninth Meeting of Health Secretaries of Countries of SEAR/SEARO
New Delhi, 22–23 July 2004 (Reproduced in parts)**

The global target now is for the elimination of IDD by 2005, as set in the United Nation General Assembly Special Session (UNGASS) on Children, held in 2002. So far, only Bhutan has achieved this goal. In other SEAR countries, however, progress towards achieving this goal seems to have slowed down. There are several reasons, important amongst them being complacency and a false sense of having achieved USI with a decrease in visible signs of iodine deficiency, e.g. goitre. The focus of this paper, therefore, is on the status of IDD control programmes in the South-East Asia (SEA) Region and the areas which would need urgent attention if the goal of IDD elimination is to be attained.

Magnitude of the Problem and Situation Analysis

Across the world, countries are trying to increase the coverage of iodized salt. The position of South Asia in this respect is shown in Figure 1.

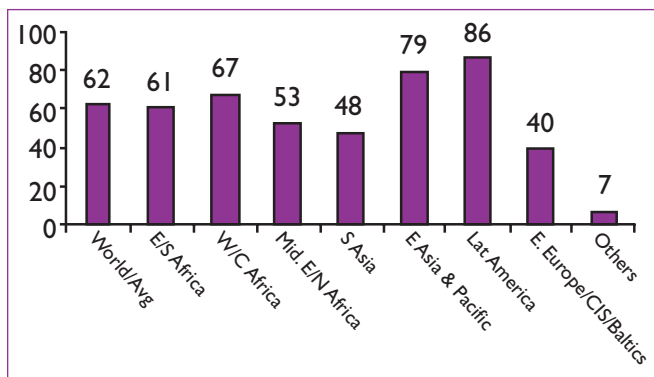


Figure 1. Worldwide consumption of iodized salt
Source: UNICEF End Decade Database, Feb 2004

Current estimates show that there are 172 million people with goitre in the SEA Region and another 600 million are at risk. Nearly 20 million newborns are unprotected, constituting nearly 35% of the world's unprotected newborns. (The number of unprotected newborns is derived from the number of pregnant women who do not consume adequately iodized salt).

Progress Towards Sustainable Elimination of IDD in the SEA Region

Goitre rates have decreased remarkably over the last two decades. However, goitres may persist even though current iodine status is optimal. Therefore, information collected on goitre prevalence requires careful interpretation. Urinary iodine excretion, on the other hand, provides a better picture of the current iodine intake of an individual. However, it is equally important to carry out regular monitoring of iodized salt at the production level and periodic monitoring at the household level.

The sustainable elimination of IDD requires that the following WHO/UNICEF/ICCIDD indicators are met. Details are provided in Annex 2.

- Proportions of households using adequately iodized salt (with an iodine content of 15 parts per million (ppm) or more — coverage should be more than 90%.
- Median urinary iodine excretion (UIE) should be at least 100 ug/l with less than 20% of values below 50 ug/l.
- Programmatic indicators — At least 8 out of the 10 specified indicators should be met.

In addition to eliminating IDD, acceptable iodine nutrition will be sustained in the population if the median urinary iodine is maintained within the range of 100–300 ug/l.

Most countries in the Region have attempted to implement effective IDD elimination programmes over the past few years. Because of the large population in this Region, success here will contribute significantly to the global elimination of IDD.

Nine of the 11 Member States are operating universal salt iodization programmes and have most key programme components in place. Many countries have national action plans for IDD control. While eight countries have a national inter-sectoral coordinating body, seven have salt iodization legislation in place as well as laboratory facilities for salt quality and programme monitoring.

The requirement of iodized salt in the 11 countries

is about 8.5 million metric tons. This includes the requirement for livestock. With the exception of India and Thailand, all other countries import salt. Bhutan, Nepal and Maldives do not produce any salt and depend totally on imports. In this Region, nearly 60% of households have access to iodized salt but only Bhutan has reached over 90% coverage. Figure 2 shows the percentage of households in each of these countries that consume adequately iodized salt.

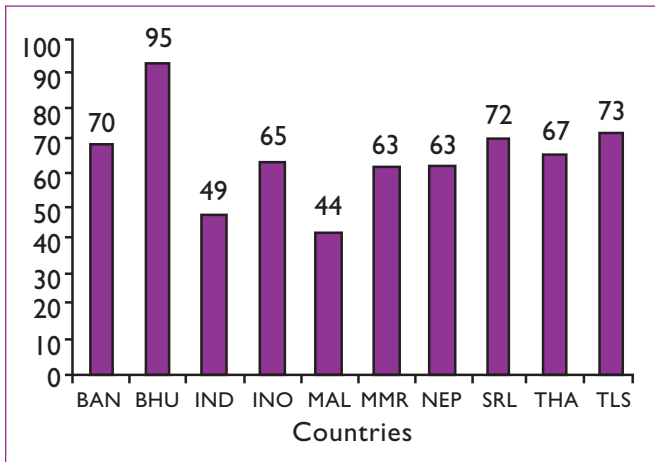


Figure 2. Adequately iodized salt coverage in the SEA Region
 Source: UNICEF End Decade Database, Feb 2004, and country reports (No information is available on DPR Korea).

However, if some areas do not have sufficient access to iodized salt, or iodine deficiency is severe, supplementation with iodized oil may be required (as was being done recently in the case of pregnant women in parts of Indonesia, Myanmar and Nepal). Also, in many parts of Thailand, condiments such as fish sauce are used commonly for flavouring, and initiatives to iodize fish sauce have been taken. More studies would be required, however, to show whether this would be feasible (with regard to quality control and monitoring) and cost-effective before it can be considered as a possible complement to iodized salt in some countries.

The most recently reported figures for urinary iodine

excretion data are shown in Figure 3. Although the median values are within the acceptable range, what is worrying is that the proportion of population with urinary iodine excretion below 100 microgram/l range from about one quarter to two thirds.

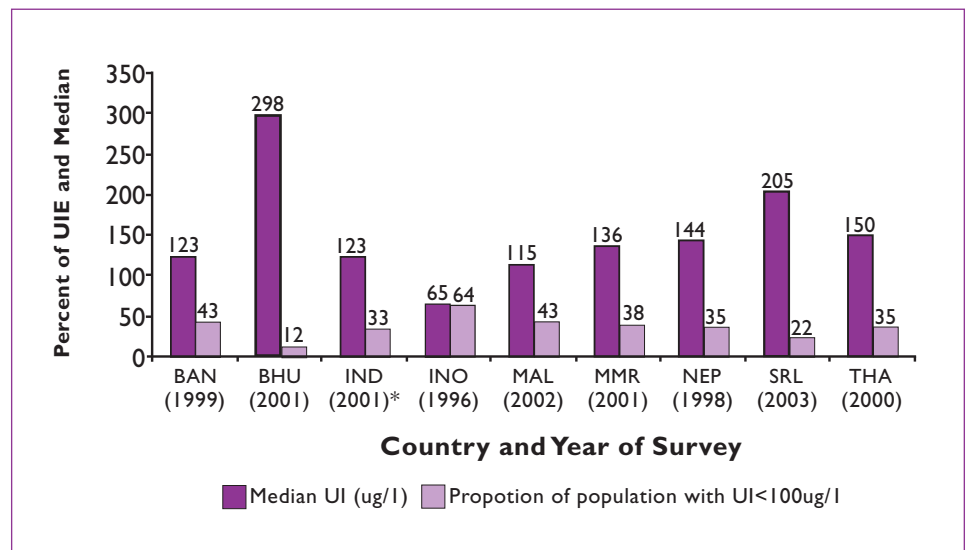
Way Forward

Unlike some diseases (smallpox), IDD cannot be eradicated, and may recur if iodine intake becomes inadequate. Continuous efforts will thus be required to ensure the effective functioning of IDD control programmes. As mentioned earlier, universal salt iodization has been identified as the simplest way to achieve optimal iodine nutrition.

Although considerable progress has been made in improving the availability and accessibility of iodized salt, about 66% of the households in the Region are currently using adequately iodized salt. The infrastructure to produce the required quantity of iodized salt exists in most countries, so the proportion of population consuming iodized salt could reach or exceed 90%. To achieve this, accelerated efforts are needed. Some of the areas which need attention in the countries are given below:

- Policy formulation and programme management
- Universal Salt iodization (USI)
- Health information, communication and community participation
- Quality assurance and monitoring progress

Figure 3. Urinary iodine excretion in the SEA Region
 Source: Country survey data. Data from DPR Korea and Timor-Leste are not available *Data from Kerala



Policy Formulation and Programme Management

Although all countries in the Region are committed to eliminating IDD, the decrease in goitre rates has led to a false sense of complacency. IDD programmes will need to be revitalised if the goal of sustainable IDD elimination is to be reached. In this context, the following actions may be considered.

- Increasing the importance and priority given to IDD prevention on the national health and development agenda.
- Developing or revising the strategy for IDD prevention and optimal iodine nutrition, linked to the national plan.
- Establishment of an inter-sectoral technical working group with clearly-defined goals, authority and responsibilities for implementation of the strategy.
- Prioritization of reproductive age women to ensure that their newborn babies — the future generation — are protected from IDD.
- Usage of data from monitoring surveys on UIE to re-prioritise and track the IDD programme.
- Strengthening existing legislation to cover all salt for human and animal consumption (including for food processing) and defining upper and lower limits for iodine content. Legislation should have implementing guidelines (e.g. monitoring the iodine content at production and import sites), and be legally enforceable.

Universal Salt Iodization (USI)

The production and marketing of adequately iodized salt needs to be accelerated until all households and individuals have access to it. Inadequate coverage of iodized salt could be ascribed to a variety of factors, the important ones being: (a) absence of appropriate legislation, (b) lack of national IDD committee or coalition, (c) inadequate salt iodization, (d) insufficient knowledge of IDD among salt producers, (e) small informal rural salt production, (f) household use of non-iodized salt meant for other purposes, (g) informal repackaging, (h) lack of monitoring, (i) price differential between iodized and non-iodized salt, and (j) lack of awareness of the implications of IDD among consumers and health providers.

It would thus be important to:

- work with the salt industry and the ministry of industries;
- develop/review the action plans for salt iodization, and
- support small producers to form cooperatives to

enable them to compete, iodize their salt production, and meet standards.

Health Information, Communication and Community Participation

Consumption of iodized salt should become the norm. For this to occur, the focus has to shift to the consumer so that the problem and the solution can be reappraised in terms of consumer perceptions and attitudes.

The focus of the consequences of iodine deficiency also needs to shift from goitre to its damaging effect on brain development and cognitive losses.

Development of a communication strategy to expand and sustain consumer awareness and demand for iodized salt would be very useful. All channels available should be used to disseminate the benefits of eating iodized salt. For social mobilization, salt testing kits could be used as a tool in schools and communities. Nongovernmental organizations and the community would need to get involved in this process.

Quality Assurance and Monitoring Progress

The objective of assessment of iodine status is not only to iodize the salt, but to ensure that the population has a normal iodine status, and normal thyroid function. Monitoring iodized salt production is thus an essential requirement for eliminating and preventing IDD. Producers must implement a system of internal monitoring and quality control to consistently achieve the required iodine concentration in their salt. An effective internal monitoring system, coupled with external independent monitoring, increases the chances of successfully eliminating IDD. In this context, networking of laboratories, with quality assurance protocols, would be helpful for the countries. For this reason, the International Resource Laboratory for Iodine Network has been set up by the Center for Disease Control (CDC) Atlanta, WHO, UNICEF, the International Council for Control of Iodine Deficiency Disorders (ICCIDD) and the Micronutrient Initiative (MI).

In the SEA Region, Bhutan, Indonesia and Myanmar have strong monitoring systems with inbuilt mechanisms for problem solving. The Bhutan and Indonesian models have complex plans and involve many small laboratories. They are also expensive and the high cost of implementation reduces sustainability. Therefore there is a need to establish reference laboratories, and develop and implement simple sampling systems that are effective and pro-

vide producer and consumer protection. Potassium iodate availability (and cost), and facilitating easy procurement for small producers, are issues which would require further discussion.

Most countries in the Region import salt. In these countries regular monitoring should be done at the entry point to ensure that only salt iodized according to the prescribed specifications is imported. There is an urgent need to harmonize the iodine content standards across the Region. India exports salt to Nepal and Bhutan, but as the standards in these countries are quite different, there are cost implications for the importing country as they have to add additional iodine for their consumers.

WHO Efforts in the Elimination of IDD

WHO is working with countries and its partners for IDD elimination and in sustaining optimal iodine nutrition. The focus will be mainly on the following areas:

- Advocacy for Policy and Programme Development
- Setting Norms
- Capacity Building
- Measuring Progress

WHO is working with countries and partners for country-specific surveillance including indicators on IDD, improving the quality of data collection, analysis and monitoring capacity, and their utilization for measuring progress and programme planning. Feedback from the Member States will help to maintain the database on regional progress in the IDD, facilitate sharing of information and reporting to governing bodies.

Along with UN partners and other agencies (UNICEF, MI, ICCIDD), WHO is organizing and undertaking reviews of IDD control programmes in Member States. This is to determine the status of the programmes and to provide positive feedback for improvement, as well as for assessing whether they have achieved optimal iodine nutrition for their populations. ■

REVIEWS

Optimal iodine nutrition during pregnancy, lactation and the neonatal period

BY FRANCOIS DELANGE

International Journal of Endocrinology and Metabolism 2004; 2:1–12.

Professor Francois Delange has spent much of his professional life studying the iodine requirements of pregnant and lactating women and neonates, and the effects of sub-optimal iodine nutrition on the neonatal brain development. This paper is a review of the extensive literature on these topics in existence and a reevaluation of the author's own experience.

Pregnancy increases T₄ requirement due to the transfer of thyroxine and iodide from mother to fetus and to possible increase of renal clearance of iodide. The author estimates that the iodine requirement in a pregnant woman is in the range of 250–300 mcg/day. The loss of iodine from the milk of an iodine deficient mother is in the range of 75–200 mcg/day during the first six months of postpartum period. Thus the author estimates the iodine requirement in a lactating mother to be 225–350 mcg/day. Based on reports, a full term neonate requires iodine intake of 30 mcg/kg/day to remain in positive iodine balance. Thus the estimated iodine requirement in neonates and young infants is around 90 mcg/day.

When the above findings are recalculated using urinary iodine level as the index of iodine nutrition, the author recommends the urinary iodine level be maintained at 150–230 mcg/L in women during pregnancy and during lactation, and maintained at 180–225 mcg/L in the neonates. Some of the values recommended in this paper are slightly higher than those recommended by the international agencies.

IQ+Jagriti

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IQ + Jagriti 2004: 2:3. Figure 1: Countries ranked by percentage of households consuming iodized salt, 2000–2003, (extracted from Vitamin & Mineral Deficiency-A Global Progress Report by Micronutrient Initiative, Ottawa and UNICEF, New York).

Country	Estimated % of households using iodized salt
SOUTH ASIA	
Bhutan	95
Bangladesh	70
Nepal	63
India	50
Pakistan	17
Afghanistan	15
EAST ASIA AND PACIFIC	
China	93
Viet Nam	77
Lao PDR	75
Thailand	74
Indonesia	65
Myanmar	48
Mongolia	45
Philippines	24
Cambodia	14

SOUTH ASIA

Bhutan	95
Bangladesh	70
Nepal	63
India	50
Pakistan	17
Afghanistan	15

EAST ASIA AND PACIFIC

China	93
Viet Nam	77
Lao PDR	75
Thailand	74
Indonesia	65
Myanmar	48
Mongolia	45
Philippines	24
Cambodia	14



INTERNATIONAL COUNCIL FOR CONTROL OF IODINE DEFICIENCY DISORDERS

THE INTERNATIONAL COUNCIL FOR CONTROL OF IODINE DEFICIENCY DISORDERS (ICCIDD) gratefully acknowledges the support of UNICEF for the IDD Newsletter.

ICCIDD is a nonprofit, nongovernmental organization dedicated to sustained optimal iodine nutrition and the elimination of iodine deficiency throughout the world. Its activities are supported by the international aid programs of Australia, Canada, Netherlands, USA, and also by funds from UNICEF, the World Bank and others.

THE IDD NEWSLETTER (copyright 2004 by ICCIDD) is published quarterly by ICCIDD and distributed free of charge in

bulk by international agencies and by individual mailing. The Newsletter also appears on ICCIDD's website in both text files and PDF. The Newsletter welcomes comments, new information, and relevant manuscripts on all aspects of iodine nutrition, as well as human interest stories on IDD elimination in countries.

For further details about the IDD Newsletter, please consult the website (www.iccidd.org) or contact Constance S. Pittman, M.D., the interim editor of the Newsletter, at cpittman@uba.edu or at Div. of Endocrinology and Metabolism, University of Alabama at Birmingham, University Station, Birmingham, AL 35294-0012, USA.

ICCIDD gratefully acknowledges the support of UNICEF for the IDD Newsletter.