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Guest Editorial

Correcting Iodine Deficiency Is More Than Just Spreading Around a Lot of Iodine

FROM A DISTANCE, it seems strange to make a big fuss about iodine deficiency. No one denies its importance: more than two billion people at risk, biggest cause of preventable mental retardation, extensive damage to pregnancies and their outcome, staggering economic losses, and other serious consequences (1,2). Still, the problem itself is straightforward—people need more iodine. The solution is also straightforward—give them iodine. So why not simply provide adequate iodine and move on?

As with many initiatives, the hard part comes in the execution. This is not news to anyone advising individuals or communities on health matters. Physicians often suggest appropriate treatments that patients take incorrectly or not at all, for reasons of cost, uncertainty, ignorance, unpalatability, or distrust. For example, smoking cessation is conceptually easy, but making it effective requires much more than simply telling people to stop.

So it is with correcting iodine deficiency. We are fortunate in having several good means for supplementing iodine, iodized salt being the best, but their existence does not guarantee successful application. A generation ago, many countries, particularly in Latin America, passed laws requiring that all salt be iodized (3). Usually this was done without providing a realistic foundation for implementing the law. Virtually all these programs failed. Key causes were limited consumer acceptance, tepid government interest, poor industry cooperation, and absent monitoring.

The effect of an iodization program on people is the best measure of its success. It is not enough, as some have suggested, to iodize salt and assume that the problem will correct itself. Iodized salt is the main method for correcting iodine deficiency, and it is clearly important that it contain the optimal amount of iodine. However, this does not guarantee that the consumer actually gets the right amount. Experience in many countries supports this statement. Some common problems are nonuniform amounts of iodine in iodized salt, losses between production and consumption, differences in amount of salt ingested, and varying intakes of iodine from other sources.

Ideal iodine nutrition must avoid iodine excess as well as deficiency. The most important consequence of iodine excess is hyperthyroidism, usually in older subjects with nodules (4). Other adverse effects are hypothyroidism and long-term increases in the incidences of autoimmune thyroid disease and probably of papillary thyroid cancer (5,6). While too much iodine in a community is far better than too little, neither is necessary, and programs should protect against both. Some countries with aggressive or poorly monitored iodized salt programs have ended up with undesirably high iodine intakes (7). Recognition of this excess has usually led to a lowering of iodine levels in salt and better quality control. Occasionally, influx of iodine from other sources may add to that in iodized salt to produce unacceptably high levels. In other cases, a decrease in salt consumption habits is recognized, prompting a decision to increase the amount of iodine added to salt.

How can we best monitor iodine nutrition? The International Council for the Control of Iodine Deficiency Disorders (ICCIDD), the World Health Organization (WHO), and the United Nations Children's Fund (UNICEF) have carefully reviewed available assessment techniques (8). They recommend the median concentration of iodine in representative casual urine samples as the best marker for community iodine nutrition, because more than 90% of iodine reaching the body eventually appears in the urine. The urinary iodine concentration reflects current iodine intake, while thyroid size, particularly when assessed by ultrasound, indicates chronic iodine nutrition, as does the serum thyroglobulin. Regular monitoring is now being emphasized in country programs as the best way to sustain optimal iodine nutrition. For example, an excellent program in China carries out assessments with urinary iodine and thyroid volume measurements every two years to provide a clear picture of iodine nutrition (9). The United States, concerned about a dramatic decrease in the median urinary iodine excretion during the past several decades (10), is now including urinary iodine measurements in its regular nutrition surveillance.

The topic of monitoring brings me to the ThyroMobil model, as exemplified in the excellent paper in this issue of *Thyroid* by Djokomoeljanto et al. Dr. Delange, one of the authors, has provided detailed descriptions elsewhere (11,12). The ThyroMobil is a small van that travels to selected spots in a country. It has an ultrasound and facilities for collecting and storing casual urine samples, to be analyzed later in a central referral laboratory. A trained physician performs the ultrasonography, supervises urine collections and storage, and coordinates activities with local medical and administrative authorities. Salt samples from the community are also collected for testing of iodine content. The results are presented to the national health authorities for their information and possible action. For example, Chile decreased the amounts of iodine in its salt after a ThyroMobil confirmed iodine excess in the sites it visited. A ThyroMobil van has traveled extensively through Europe, Latin America, and

West Africa, in addition to Indonesia. Further visits to other countries are now in progress or being planned.

One could ask whether the same information could not be gained simply by collecting urines, sending them to a central lab, and reviewing the results. Certainly, such routine collection of urine samples should be the bedrock for long-term monitoring of iodine nutrition. The ThyroMobil is not a replacement but rather an augmentation, like a referral lab, to offer quality control for biological monitoring. In this way, the ThyroMobil model has a very valuable role in assessing iodine nutrition. Its great strengths are as follows:

(1) it provides standardized data on urinary iodine concentration and thyroid size; these data can be related to age and body size, and compared both with previous information from the same population and also with international standards developed in populations with adequate iodine nutrition;

(2) it provides publicity and consumer education for the IDD elimination program; all physicians know that it is not enough to prescribe the correct medicine, we must convince the patient (or community) to take it; the ThyroMobil attracts attention from the community, the media, and politicians; it injects some excitement into the IDD control campaign, generating interest and support and contributing to its sustainability;

(3) it involves the private sector; in most of its travels, the ThyroMobil has had the financial support of Merck KGaA, a large European producer of thyroid-related preparations; Merck has provided much of the funding and helped with logistics, leaving ICCIDD, directed by Dr. Delange and his colleagues, to manage the scientific and professional aspects; this collaboration allows ICCIDD to carry out professional and competent surveys with standardized technology, and gives Merck the opportunity and visibility to contribute toward correction of a thyroid-related health issue—both groups gain, as do, of course, people of the affected country;

(4) it is independent; the ThyroMobil comes to a country at the government's invitation, but its findings are not controlled by the government or by other international agencies that assess iodine correction programs by their own approaches; the ThyroMobil does not typically provide a comprehensive survey but does offer sufficient spot checking of communities to assess the current status of iodine nutrition, and to complement other efforts by the government and international agencies; and

(5) the ThyroMobil project, under Dr. Delange, is organized by thyroidologists and allows them to focus on iodine nutrition without the occasionally competing demands of broader surveys; also it involves local thyroid experts in addressing major disorders in their own country.

In conclusion, effective monitoring is the key to sustaining optimal iodine nutrition. Iodization programs that do not assess their effects on people will ultimately fail (13). The ThyroMobil model is a valuable addition to monitoring efforts in countries. I commend Dr. Delange, his colleagues, and Merck for this innovative approach, and urge them to "keep on trucking" with the ThyroMobil.

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