Round Table

Eliminating iodine deficiency disorders — the role of the International Council in the global partnership

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Abstract Iodine deficiency is the most common preventable cause of brain damage. WHO estimates that some 2.2 billion people are at risk from iodine deficiency in 130 countries. A programme of universal salt iodization was established in 1994 with the aim of eliminating the problem by 2000. This paper reports progress in this field, with particular reference to the primarily scientific role of the International Council for Control of Iodine Deficiency Disorders, a nongovernmental organization founded in 1986. It is now a multidisciplinary network of 600 professionals in 100 countries.

Keywords Iodine/deficiency; Deficiency diseases/prevention and control; Nongovernmental organizations; International cooperation (*source: MeSH, NLM*).

Mots clés Iode/déficit; Carences nutritionnelles/prévention et contrôle; Organisations non gouvernementales; Coopération internationale (*source: MeSH, INSERM*).

Palabras clave Yodo/deficiencia; Enfermedades carenciales/prevención y control; Organizaciones no gubernamentales; Cooperación internacional (*fuente: DeCS, BIREME*).

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Introduction

Iodine deficiency is the most common cause of preventable brain damage. WHO estimates that 2.2 billion people are at risk in 130 countries (*1*). These people live in environments where the soil has been leached of iodine because of flooding in river valleys and high rainfall and glaciation in hilly areas. The deficiency in the soil leads to deficiency in all forms of plant life, including cereals. Large human populations living in systems of subsistence agriculture in developing countries are consequently affected, for instance in the great river valleys of Asia (*2*).

Iodine is an essential element in the chemical structure of thyroid hormones and iodine deficiency leads to a reduction in the secretion of these hormones. This is particularly important in pregnant women, who may not be able to produce the extra thyroid hormone required for normal fetal brain development in the first half of pregnancy (*2*).

Programmes to eliminate iodine deficiency have been established on the basis of an informal global partnership and the distribution of iodized salt. The partnership is made up of the people and governments of the affected countries, three international agencies (WHO, United Nations Children's Fund (UNICEF), and the World Bank), three bilateral development agencies (Australian Agency for International Development, Canadian International Development Agency, and the Dutch International Cooperation) that provide funding to countries, the salt industry, and Kiwanis International (a World Service Club with 600 000 members which has raised US$ 40 million for the support of country programmes through UNICEF) (*3*).

Since 1985 an international expert network, the International Council for Control of Iodine Deficiency Disorders (ICCIDD), has played an important, primarily scientific role in the partnership, relating to the initiation and monitoring of a global preventive programme involving the use of iodized salt. This body now has 600 members from 100 countries. They are professionals in the fields of endocrinology, nutrition, epidemiology, public health, iodine technology, education, and planning, and most are from developing countries. From the outset the members have been committed to assisting countries with their programmes, using iodized salt as the main technology. More recently Micronutrient Initiative and the Program Against Micronutrient Malnutrition have joined the Partnership as technical agencies.

The role of the International Council for Control of Iodine Deficiency Disorders (ICCIDD)

The role of ICCIDD can be divided into the four stages that are necessary for the provision of technical support: firstly, communication of the problem as a significant factor in human development at the population level; secondly, advocacy with agencies and governments; thirdly, implementation of country programmes; and fourthly, sustaining country programmes.

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Communication

The results of relevant research had to be communicated with a view to the initiation of national prevention programmes. This required a reconceptualization of the effect of iodine deficiency from the common lump in the neck (goitre) to a general effect on growth and development at population level, with particular reference to brain development. The term "iodine deficiency disorders" (IDD), proposed in 1983, has been generally adopted (*4*). It refers to all the effects of iodine deficiency on growth and development in human and animal populations which can be prevented by correcting the deficiency (*4*, *5*). These effects include goitre, abortion, stillbirth, and neonatal and other types of hypothyroidism, but the major consequences are fetal brain damage of varying degrees and cretinism.

A meta-analysis was conducted of data from 18 studies in which comparisons were made between iodine-deficient populations and control populations with similar social and cultural backgrounds. The mean intelligence quotient score for the iodine-deficient groups was 13.5 points below that of the groups that were not iodine-deficient (*6*). The data further highlighted the major population dimension of the effect of iodine deficiency on neuropsychological development.

In relation to the development of national prevention programmes the IDD concept had to be disseminated among politicians and bureaucrats in non-technical language as well as among the wide range of professionals involved in public health programmes.

The correction of iodine deficiency brings considerable economic benefits. In humans, productivity is increased, the quality of life is enhanced and children improve their performance at school. There is increased productivity of chickens, pigs, sheep, and cattle, and the people who farm them gain financially. It is important to draw attention to these benefits when attempts are made to encourage acceptance of iodization programmes (*3*).

Advocacy

Discussions on the creation of ICCIDD were held in 1985 at a WHO/UNICEF intercountry meeting in Delhi, India. A group of 12 thyroid scientists and public health professionals, including WHO and UNICEF representatives, agreed to proceed with initial support from the Australian Aid Programme (AusAID), UNICEF, and WHO. ICCIDD was formally inaugurated with the support of WHO and UNICEF in Kathmandu, Nepal in 1986 (*2, 3*). Subsequent support was received from AusAID, the Canadian International Development Agency, World Bank, Dutch International Cooperation, and the Swedish International Development Agency.

In 1987, ICCIDD was recognized as the expert group on all aspects of IDD by the United Nations system through its Subcommittee on Nutrition, which established an IDD Working Group of multilateral and bilateral agencies involved in nutrition programmes. ICCIDD reports to this body. In 1994, ICCIDD was officially recognized by WHO as a nongovernmental organization working collaboratively towards the elimination of IDD (*3*).

Since its foundation, ICCIDD has made technical assistance to national programmes its first priority. This led to a close working relationship with governments of countries with severe IDD, usually through health ministries, and with WHO and UNICEF. The 1986 World Health Assembly passed a Resolution noting this new approach to the prevention and control of IDD (*7*).

In 1990 a World Health Assembly Resolution called for the elimination of IDD by 2000 (*8*), and in 1996 one calling for sustainability of the programme through systematic monitoring was passed (*9*). Both Resolutions included a reference to the role of ICCIDD and its availability to assist countries.

Iodine deficiency has been met at the technological level with the use of iodized salt (*1–3*), which was effective in a number of industrialized countries. However, in developing countries the results of this approach were generally disappointing until the previous decade. The situation changed, however, once the effects of iodine deficiency on brain development were recognized.

By 1990 an action plan for the elimination of IDD by 2000 had been developed by ICCIDD, embracing measures to be adopted at the global, regional, and national levels (*10*). It was endorsed by the United Nations Subcommittee on Nutrition in February 1990. In the same year the goal for IDD elimination was accepted by the World Health Assembly, UNICEF, and the World Summit for Children. The latter meeting was attended by 71 Heads of State, who signed a declaration on the provision of new goals for improved health and education for all children (*11*). This declaration, which was subsequently signed by representatives of 88 other national governments, has provided very important political support for national IDD programmes throughout the world.

Implementation

A significant factor in the development of these national programmes has been a series of regional meetings held by ICCIDD with the support of WHO and UNICEF. They were attended by representatives of health ministries, the salt industry, the mass media, and other important sectors. They took place in Yaoundé, Cameroon, in 1987; Delhi, India, in 1989; Dar es Salaam, United Republic of Tanzania, in 1990; Tashkent, Uzbekistan, in 1991; Brussels, Belgium, in 1992; Alexandria, Egypt, in 1993; Quito, Ecuador, in 1994; Dhaka, Bangladesh, in 1995; Harare, Zimbabwe, in 1996; Munich, Germany, in 1997; and Beijing, China, in 1998.

These meetings have enabled the experts within the ICCIDD network to communicate with professionals from many countries. An additional development has involved consultancies and further contacts through ICCIDD regional coordinators, designed to identify and remove obstacles to progress. A model national programme has been presented at the regional meetings, to demonstrate its multisectoral nature and the relationships between its different elements (Fig. 1).

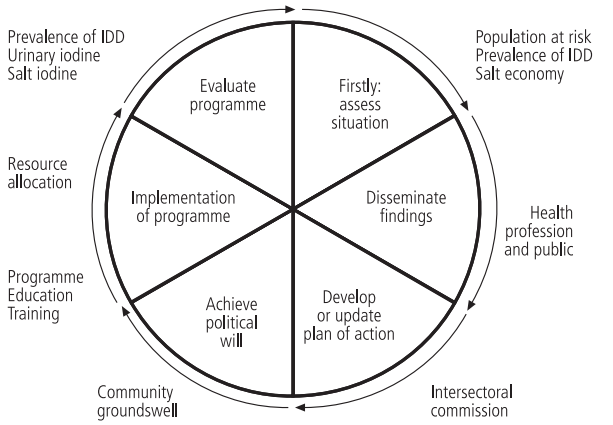
The ICCIDD multidisciplinary network meets the need for expertise in epidemiology, the establishment of laboratories for the determination of iodine concentration in salt and urine, planning, communication, management, and salt iodization and other iodine technologies.

On the grounds of effectiveness and cost the preferred approach is that of universal salt iodization. This means that all salt for human and animal consumption should be iodized. Legislation on this matter has been passed in 98 countries and there is draft legislation in another 12 (*1*). The recommended iodine level is 20–40 mg as potassium iodate per kg of salt (*12*).

Sustainability

The next challenge faced by ICCIDD and its partners concerns sustainability. In the past, success has been followed by failure for various reasons. In Colombia and Guatemala, for example,

Fig. 1. **Wheel model for a national IDD[a] elimination programme**



Source: ref. *3*.

[a]IDD = iodine deficiency disorders.

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political changes and social upheaval were responsible for failure. In the countries of the former USSR, complacency and apathy followed initial success.

The cooperation of the salt industry in providing iodized salt of good quality is very important for sustainability. The Salt 2000 Meeting in The Hague resolved to support the elimination of IDD. A Global Network for the Sustainable Elimination of Iodine Deficiency has been established between the salt industry, WHO, UNICEF, ICCIDD, Micronutrient Initiative, Program Against Micronutrient Malnutrition, and Kiwanis International.

Criteria for the elimination of IDD as a cause of brain damage were determined by a joint WHO/UNICEF/ICCIDD working group in 1994. They have recently been reviewed (*13*). Particular emphasis was laid on the levels of iodine in salt and urine. The level of iodine in salt should be in the range of 20–40 mg per kg; urinary iodine should be in the range of 100–200 μg/l (*12*, *13*). There is a vital need for monitoring of urinary iodine levels at both the higher and lower values. The higher level should not exceed 200 μg/l in order to minimize the risk of iodine-induced hyperthyroidism. The lower level is required in order to ensure the prevention of fetal brain damage during pregnancy and damage to the infant brain, particularly during the first two years of life, when it is developing very rapidly.

The term "partnership evaluation" has been adopted by ICCIDD in order to describe the independent checking of monitoring procedures and other aspects of national programmes by ICCIDD in collaboration with WHO, UNICEF, and national government representatives. Experience indicates that it is essential for the social process to continue — the "wheel" must keep turning if sustainability is to be ensured (Fig. 1). The wheel model shows the social process involved in a national IDD elimination programme. Success requires the establishment of a national IDD council for elimination with full political and legislative authority to carry out the process.

As an expert scientific body, ICCIDD has been particularly important in relation to the complications associated with an increased iodine intake in iodine-deficient populations (*14*). The most serious complication is iodine-induced hyperthyroidism, which mainly affects older people with nodular goitres. This disorder subsides after correction of the deficiency. In 1995, ICCIDD was involved in the monitoring of an iodine-induced hyperthyroidism (IIH) outbreak in Zimbabwe following salt iodization (*15*). The problem subsided after three years but there was some mortality from heart complications. IIH can be minimized by avoiding excessive iodine intake. In a well-controlled study the incidence of hyperthyroidism increased by 27% in one year after iodine intake increased from 90 μg per day to the recommended value of 150 μg per day. Subsequently there was a steady decrease in the incidence of the disorder (*16*).

The problem of IIH demonstrates the need for careful monitoring of the iodine intake of populations after salt iodization has been initiated. This can be done by determining the median urinary iodine level for 40 samples from schoolchildren or preferably from pregnant women. The benefits of correcting iodine deficiency for an entire population far outweigh the risks, which can be minimized by careful monitoring (*14*).

Conclusion

ICCIDD experience indicates that the nongovernmental organization model can assist a global programme by making it both initially effective and sustainable. We hope that this experience will contribute to the establishment of nongovernmental organizations for the implementation of global programmes in other areas of public health, in collaboration with United Nations agencies. ■

Conflicts of interest: none declared.

Résumé

Elimination des troubles dus à une carence en iode : rôle du Conseil international dans le partenariat mondial

La carence en iode est la plus fréquente des causes évitables de lésions cérébrales. L'OMS estime que 2,2 milliards de personnes sont exposées au risque de carence en iode dans 130 pays. Un programme d'iodation universelle du sel a été créé en 1994 dans le but d'éliminer ce problème à l'horizon 2000. Le présent article fait le point des progrès réalisés, en soulignant en particulier le rôle essentiellement scientifique du Conseil international pour la lutte contre les troubles dus à une carence en iode, organisation non gouvernementale fondée en 1986, et qui consiste maintenant en un réseau multidisciplinaire de 600 spécialistes répartis dans 100 pays.

Resumen

Eliminación de los trastornos por carencia de yodo: papel del Consejo Internacional en la alianza mundial

La carencia de yodo es la causa prevenible más frecuente de lesiones cerebrales. Según estimaciones de la OMS, aproximadamente 2200 millones de personas estarían expuestas a la carencia de yodo en 130 países. En 1994 se estableció un programa de yodación universal de la sal con la finalidad de resolver este problema antes del año 2000. En este artículo se informa sobre los progresos realizados en esta esfera y se presta especial atención a la función, primordialmente científica, del Consejo Internacional para la Lucha contra los Trastornos por Carencia de Yodo, una organización no gubernamental fundada en 1986. En la actualidad el Consejo constituye una red multidisciplinaria que enlaza a 600 profesionales en 100 países.

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Round Table Discussion

The challenge ahead: iodized salt on every table for ever

Gregory Gerasimov[1]

The history of the International Council for the Control of Iodine Deficiency Disorders (ICCIDD) is a remarkable example of what a nongovernmental organization with relatively small financial resources can do. With an overarching strategy and extensive network of members all over the world, it was able to mobilize international agencies and national government for IDD elimination. This success of the ICCIDD is also a personal accomplishment of its founder and former leader, Basil Hetzel. The Council showed itself especially efficient in advocacy: the goal of IDD elimination was accepted by the World Summit for Children in 1990 which was attended by 71 Heads of State, who signed a declaration on the provision of new goals for improved health and education for all children. By the end of 1999, more than 70% of the households in the world were using iodized salt, compared with possibly only 20% in 1990.

However, new challenges are ahead for the ICCIDD and its partners in the Global Network for Sustainable IDD Elimination founded in 2001. While progress has been impressive, and many nations have achieved high salt iodization coverage, in 36 countries less than half of the population uses iodized salt. In countries of Central and Eastern Europe and the Newly Independent States less than 25% of households consume iodized salt and iodine deficiency remains a public health problem. In these countries the full implications of iodine deficiency and its impact on human development have not been fully appreciated and the ICCIDD, with other members of the Network, must continue the advocacy process.

One should not forget that iodine deficiency is still not eliminated in many of the industrialized western countries either. There is a growing number of reports that the iodine intake in populations in the economically advanced parts of the world has fallen during the period in which most developing nations have been tackling the iodine deficiency problem. This is potentially dangerous not only for the people in these countries but for the whole global effort of IDD elimination. It arouses the suspicion of double standards, with universal salt iodization advocated only for the economically disadvantaged.

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But the main challenge for the ICCIDD is the transition from running a campaign to sustaining its success. Sustained elimination of IDD means that from now on and for ever, every family table should have salt on it containing the optimal quantity of iodine. This is not an easy task. In the countries of the former Soviet Union iodine deficiency was once almost fully eliminated. It returned when salt iodization rates, once believed to be safely adequate, dropped dramatically. Complacency and lack of an efficient monitoring system were the main reasons for this relapse. Actions for maintaining success are not the same as those needed for achieving it, and they still need to be worked out. This is the new challenge for the ICCIDD. ■

Eliminating iodine deficiency disorders in India

Chandrakant S. Pandav[1]

An analysis of iodine deficiency disorder (IDD) elimination programmes all over the world shows that four elements contribute to their success: political commitment, administrative infrastructure, scientific leadership, and monitoring and evaluation. The International Council for the Control of IDD (ICCIDD) came into existence formally in 1986 but its members in India have been involved with these efforts in India since the early 1950s. India's experience with the four essential elements can be summed up as follows.

Political commitment. For the first 20 years of its existence, the National Goitre Control Programme (NGCP, launched in 1962 and renamed as the National Iodine Deficiency Disorders Control Programme (NIDDCP) in 1992) was a low priority. The turning point was in 1983, when Prime Minister Indira Gandhi was briefed by top scientists on the consequences of IDD and the availability of a cheap and cost-effective solution. She decided that this was not only a health problem but a national development problem. Almost overnight, the programme underwent a sea change, and the strategy of Universal Salt Iodization was adopted. Goitre control was on the Prime Minister's 20-Point Programme, and the private sector was invited to produce iodized salt. Members of ICCIDD have helped to make the authorities aware on a regular basis of the need for iodization.

Administrative infrastructure. For proper administration, it is essential to have a nodal point for the programme. For India this is the Adviser (Nutrition) and Deputy Assistant Director General (Goitre). Each state also has an IDD cell to act as its nodal point. Interaction with the Prime Minister raised resource allocation to Rs 200 million in the Seventh Five Year Plan.

Scientific leadership. ICCIDD members have been involved in conducting research on different IDD for the last 40 years. The formation of the Council as an international NGO in India has facilitated the creation of a "home base" located in the country's premier health institute, the All India Institute of Medical Sciences. This serves as the training and resource centre for field surveys, training in measuring iodine levels in salt and urine (to track progress towards IDD elimination), information dissemination, technical expertise and monitoring and evaluation of activities. State-level workshops for IDD workers have been conducted from time to time to review progress, identify bottlenecks, learn from their own and others'experience, and modify programmes accordingly.

Monitoring and evaluation. India has a system in which food inspectors collect salt samples and send them to laboratories for analysis. In New Delhi, ICCIDD has established a system for regularly enlisting the schools in monitoring the programme (*1*). ICCIDD has also forged collaborative partnerships with a network of NGOs such as the Voluntary Health Association of India, and the Bharat Scouts and Guides, which carry out activities all over the country. In addition to providing technical support, ICCIDD has conducted independent evaluations of the Universal Salt Iodization Programme in New Delhi (*2, 3*), Madhya Pradesh (*4*), Sikkim (*5–8*) and Kerala (*9*).

The ICCIDD has played a major role in the IDD elimination programmes of many countries, especially those in southern Asia. The "5 Cs of ICCIDD" — commitment, cohesiveness, collaboration, credibility and continuity — have become not only an ideal but a reality. Their multidisciplinary team includes experts in public health, epidemiology, biostatistics, health social sciences, health economics, salt technology, medicine, endocrinology, biochemistry, and psychiatry. They have worked to establish partnerships between the stakeholders, who include the technical groups, the media, the legal experts and the salt industry.

As a result there has been a tremendous increase in iodized salt production: from 0.2 million tons in 1983 to 4.6 million tons in 2001. Coverage with adequately iodized salt is now 49%, according to a survey completed in 1999. But that means the glass is only half full. To reach and sustain 100% coverage is necessary and possible, but only when civil society is determined to make the effort. ■

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The alliance to eliminate iodine deficiency is impressive but not yet sufficient

Moulay Benmiloud[1]

Basil Hetzel explains the role of the International Council for Control of Iodine Deficiency Disorders (ICCIDD) in the global combat against iodine deficiency disorders, since its creation in 1995 (see pp. 410–413). As a long-time member of the executive of ICCIDD I can confirm his statements on its positive impact, especially in the developing countries of Africa and Asia where the risk of IDD risk is most severe. Indeed, the ICCIDD has been an important catalyst for the concerted activities of the global partnership of WHO, UNICEF, the World Bank, the international salt industry, the Kiwanis clubs and other bodies. These activities have led to worldwide use of iodized salt for IDD prevention

However, Hetzel's presentation overlooks the difficulties which have prevented us from fully reaching the goal of eliminating IDD by the year 2000. In this regard I can cite a few examples of defects in the global partnership, taken from my experience in Africa. Although not necessarily representative of the global picture, I believe they reflect inherent problems in multidisciplinary work involving many stakeholders.

Although great progress was noted in communication on IDD since the development of electronic means, much of the advocacy and technical publications still remain available only to minorities in ministries and universities. Lack of funds has hindered the ICCIDD from adopting a more aggressive attitude, and even the UNICEF and WHO country networks have had little direct access to field workers in the relevant health and salt industry sectors. Thus the participation of nationals is insufficient. National IDD committees, though a most welcome innovation, are not always functional, and suffer frequently from political instability.

Regional and subregional meetings organized by the continental task forces for IDD Control are useful but costly, and when far apart they do not facilitate an efficient re-evaluation of the programmes. These meetings, between national representatives and international sponsors, have provided the opportunity to redefine policies, but divergences on priorities and strategies occur between the global partners. A major line of division is between those who are more health-oriented and those who favour more industrial and commercial approaches. The resulting dissonance reduces the efficiency of the alliance, especially that of the ICCIDD which is financially weaker than other members.

A major handicap has been the slow development of an efficient monitoring system for country programmes. The supporting laboratory network is still dependent on a few national structures that were in place before the creation of ICCIDD. Field evaluation of iodine levels in salt is mostly quantitative and does not allow for adequate programme tuning. Urinary iodine measurement is available in only a few laboratories and is generally limited. This means that national capacity for sustaining the programmes is still fragile and there have been setbacks in Africa.

These shortcomings do not diminish the admirable accomplishments of the past 15 years. They should, however, remind the ICCIDD and its partners that the IDD problem is not solved. Greater cohesion in the global partnership is required, and the ICCIDD needs to keep a scientific watch over progress. ■

Iodine deficiency: a distinguished past, an uncertain future

François M. Delange[2]

Basil Hetzel provides an adequate overview (pp. 410–413) of the International Council for Control of Iodine Deficiency Disorders (ICCIDD). The importance of his own role in the creation and life of the Council is unquestionable and should be warmly acknowledged. The achievements of the ICCIDD are also the result of joint action by all its members, including its first chairman, John Stanbury, who already in 1954 published, with his colleagues, an outstanding study on endemic goitre (*1*), which has been an essential milestone for subsequent work on IDD.

ICCIDD is one among the hundreds of nongovernmental organizations dealing with health issues. Its special effectiveness appears to have been due mainly to the following characteristics.

First, as Hetzel points out, the Council was created at the initiative of thyroid scientists and public health professionals in order to tackle the specific problem of IDD. They were fully competent in this area and their objective was to bridge the gap between the knowledge available and the problems it could solve.

Second, the Council was conceived from the very beginning as a global partnership between the different stakeholders in the elimination of IDD. This took place some 15 years before such a partnership was established on a much larger basis between the major international organizations now involved. At least until recently, its Executive Group was largely international and multiethnic.

Third, during its early years the Council played a leading role in advocacy through UNICEF and WHO, which contributed to the decision by the 1990 United Nations World Summit for Children to commit itself to the goal of virtual elimination of IDD by the year 2000.

Fourth, in parallel and subsequently, it has played a determining role, frequently in direct collaboration with WHO and UNICEF, in science, technology and operational research for which it has a specific qualification, especially in the medical field. Examples are the side-effects of iodine supplementation (*2, 3*), normative values for variables defining the status of iodine nutrition (*4, 5*), laboratory methods (*6*), salt technology (*7, 8*), communication (*9*), and economic evaluation of IDD (*10*). Also, the majority of the experts involved in the production of the key documents establishing criteria for the elimination of IDD as a cause of brain damage (*11–13*) were members of ICCIDD.

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Fifth, not being a funding agency, ICCIDD has played a modest role in the spectacular progress of implementing prophylactic programmes based on the use of iodized salt. However, most of the successful experience resulting from the use of iodized oil as vehicle for iodine supplementation has resulted from actions conducted by ICCIDD members (*14, 15*).

Sixth and finally, the next steps are to complete iodine prophylaxis in all affected countries and to evaluate the country programmes and their sustainability. The role of the Council in these activities still has to be worked out. ■

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Eliminating iodine deficiency: applause and questions

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Basil Hetzel must take much of the credit for the worldwide recognition of the importance of iodine deficiency as a major public health problem. By coining the term "iodine deficiency disorders" (IDD) in his seminal 1983 *Lancet* paper he transformed our understanding of the problem from the seemingly trivial "endemic goitre" to a wide range of conditions, with the fetus and young child especially vulnerable (*1*). The realization that adequate amounts of iodine are vital for normal brain development, and that deficiency leads to a general suppression of mental ability in affected communities, galvanized world opinion from the mid-1980s onwards into pressing for action. The results have been very impressive, and even though the goal of elimination as a public health problem by 2000 has not been achieved in all countries, hundreds of millions of people who were at risk a decade ago no longer are.

Hetzel's paper in this issue of the *Bulletin* (pp. 410–413) raises several important questions. First, do international nongovernmental organizations (NGOs) such as ICCIDD have a role in global advocacy and action on important public health issues? The answer must be a resounding "Yes" based on ICCIDD's own success. The work of the traditional players in global health issues, notably WHO and UNICEF, can undoubtedly be complemented by that of international NGOs such as ICCIDD. However, sometimes focus on a single issue can lead to a loss of perspective. For example, some IDD protagonists have advocated elaborate vertical monitoring systems for the world's poorest countries, where access to basic primary health care services is very limited. In any given country, the fight against IDD must be seen in the context of the other important causes of the burden of disease and the overall resources available.

Second, is there a role for partnerships with private industry in tackling public health problems? Many public health workers are traditionally wary of the private sector as interested only in profit, remembering for example the role played by infant formula manufacturers in undermining breastfeeding in many developing countries in the 1970s, with disastrous consequences for babies in poor households. The recent successes in tackling IDD, though, have in large part been due to the successful partnership between the international agencies and NGOs, national authorities and the salt-producing companies. In Southern Africa this partnership has resulted in iodized salt being on hand in nearly all households, even in the remotest areas.

The next question follows on directly from the last: given the growing evidence for the harmful effects of high levels of salt consumption, should salt still be promoted as the vehicle for iodine supplementation? Indeed, some health workers regard the salt industry in the same way as the tobacco industry, only interested in promoting more salt consumption at the expense of public health (by increasing the prevalence of hypertension). Furthermore, iodization of salt might serve to encourage even higher levels of consumption. This issue has proved particularly controversial in Europe, and is one reason why that region now lags behind the rest of the world in the rate of progress towards eliminating IDD. Another is resistance to universal salt iodization as contrary to the notion of freedom of choice. It is important that those advocating universal salt iodization do not encourage increased salt consumption, and that they emphasise that iodine is an essential nutritional requirement.

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Finally, there is the question of whether we should be in such a hurry to eliminate IDD, given the recognized danger of an increased incidence of hyperthyroidism following the introduction of iodine supplementation (*2*). This has proved particularly controversial in poor developing countries where there may be extremely limited access to treatment for hyperthyroidism, but it is just those communities, in which iodine deficiency is so severe, that will benefit the most from supplementation. What is important is to provide physiological amounts of iodine. Early recommendations for Africa called for a standard level of 100 parts per million (ppm) of iodine (as potassium iodate) in all salt for human consumption. This level proved far too high for many countries. Following reports of increased hyperthyroidism in the Democratic Republic of the Congo and Zimbabwe, WHO, UNICEF and ICCIDD carried out a special study in seven African countries and subsequently lowered the recommended level of salt iodization to 20–40 ppm (*3*). Regrettably, the evidence base for the initial recommendation had been weak, and it was only through close monitoring of the impact of salt iodization that the danger was uncovered. ■

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