IODINE DEFICIENCY:PUBLIC HEALTH PROBLEM

Learning objectives

By the end students of forth year should be able to :

- Define IDD.
- Describe the prevention of IDD.

IODINE DEFICIENCY

- Iodine deficiency is a major public health problem for populations throughout the world, particularly for pregnant women and young children.
- It is a threat to the social and economic development of countries.
- The most devastating outcomes of iodine deficiency are increased perinatal mortality and mental retardation.

IODINE DEFICIENCY

- Iodine is a chemical element.
- It is found in trace amounts in the human body, in which its only known function is in the synthesis of thyroid hormones.
- Iodine is primarily obtained through the diet but is also a component of some medications, such as radiology contrast agents.

IODINE DEFICIENCY

- Iodine is an absolutely vital nutrient, but humans require it in tiny amounts.

- Adults should consume 100 to 200 µg of iodine per day; this amounts to less than a spoonful of iodine per person every 50 years.

IODINE DEFICIENCY

- Normal dietary iodine intake:

- Adults and adolescents: 100- 200 mcg/d
- Pregnant women: 220 mcg/d
- Lactating women: 290 mcg/d
- Cildren aged 1-11 years: 90-120 mcg/d
- Infants: 100 -130 mcg/d

- The upper limit of safe daily iodine intake is 1100 mcg/d for adults.

EPIDEMIOLOGY OF ID

ETIOLOGY OF IODINE DEFICIENCY

- Iodine deficiency (ID) is very common, and occurs in geographically defined clusters.
- 29% of the world's population living in approximately 130 countries is estimated to live in areas of deficiency.
- Over 1.5 billion people live in iodine deficient areas, about half have thyroid disturbances, and 1/5 have health problems.

ETIOLOGY OF IODINE DEFICIENCY

- ***Causes:***

- The main factor responsible for iodine deficiency is a low dietary intake of iodine.

- The amount of iodine present in the soil varies from place to place and this influences the quantity of iodine present in the foods grown in different places and in the water.

ETIOLOGY OF IODINE DEFICIENCY

- Iodine content of the soil is reduced as a result of past glaciation or the repeated leaching effects of snow, water and heavy rainfall.
- Crops grown in this soil, therefore, do not provide adequate amounts of iodine when consumed.
- Those who consume only locally produced foods in these areas are at risk for ID.

- A less important cause of IDD is the consumption of certain foods which are said to be ***Goitrogenic*** or to contain goitrogens.

- Goitrogens are "antinutrients" which adversely influence proper absorption and utilization of iodine or exhibit antithyroid activity.

- Foods from the genus *Brassica* such as cabbage and mustard seeds contain goitrogens, as do certain root crops such as cassava and turnips.

ETIOLOGY OF IODINE DEFICIENCY

ETIOLOGY OF IODINE DEFICIENCY

- Cassava is a staple food in some areas, and in certain parts of Africa, for example Zaire.

- Cassava consumption has been implicated as an important cause of goitre.

DISTRIBUTION OF IODINE DEFICIENCY

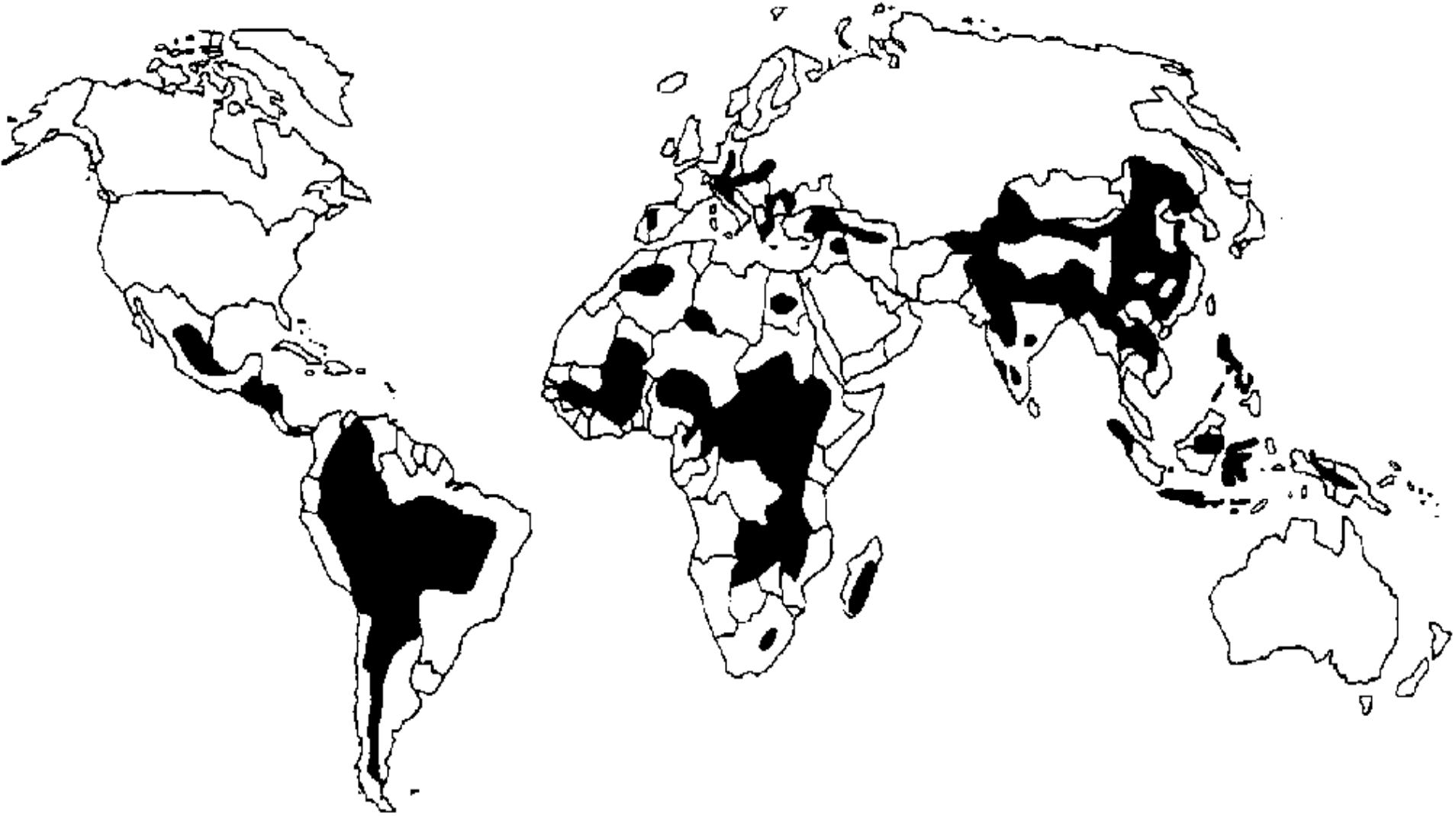
- Many areas where endemic goitre is or has been highly prevalent are plateau or mountain areas or inland plains far from the sea.

- This occurs primarily in mountainous regions such as the Himalayas, the European Alps, and the Rocky Mountains; smaller mountain ranges or highland areas in countries such as China, the United Republic of Tanzania, New Zealand, Papua New Guinea and countries of Central Africa; where iodine has been washed away by glaciation and flooding.

DISTRIBUTION OF IODINE DEFICIENCY

- Iodine deficiency also occurs in low land regions far from the oceans, such as inland areas and plains in the United States, Central Asia, Eastern Europe, and Australia (Figure 8).

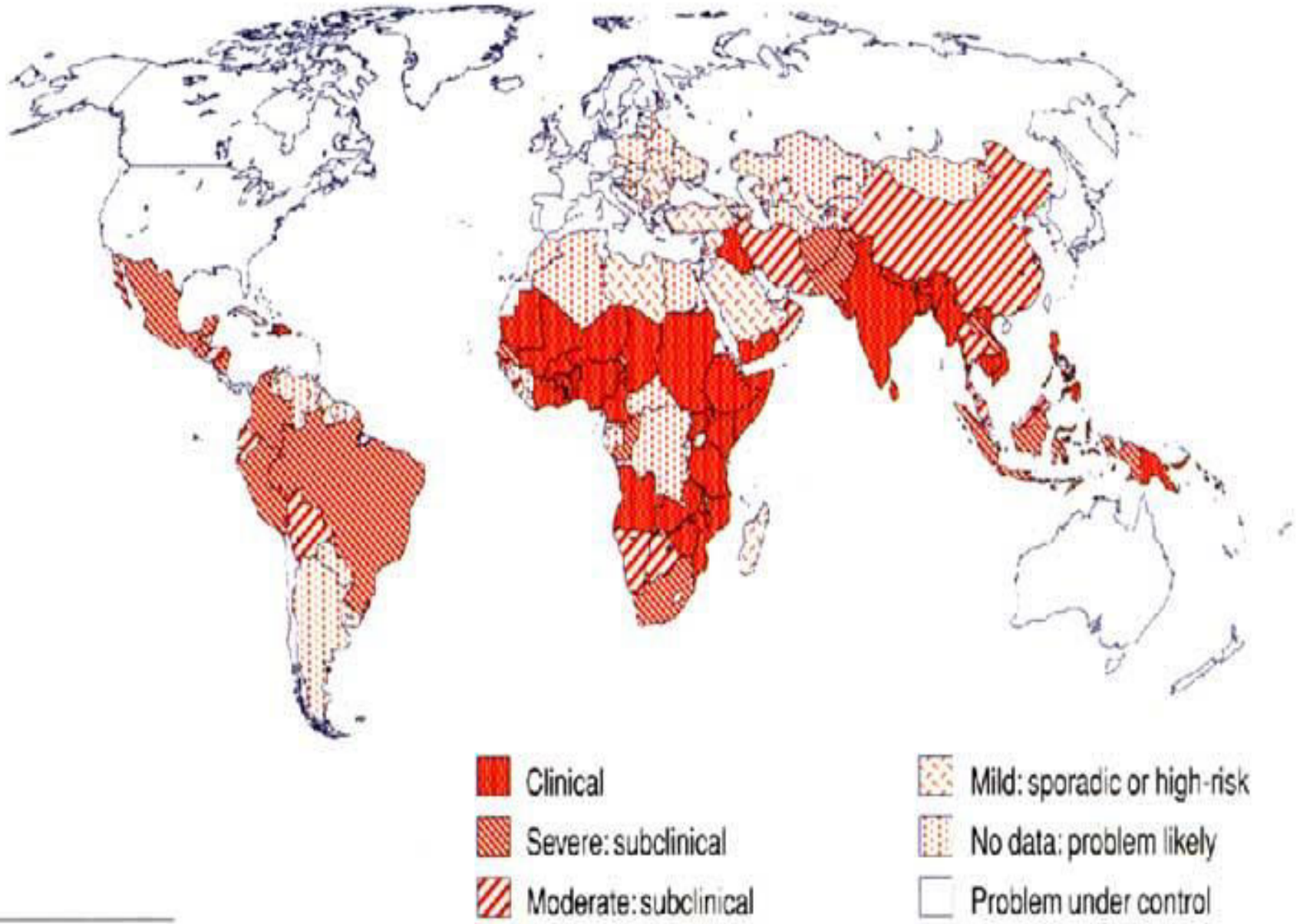
FIGURE 8. Areas of the world where iodine deficiency is prevalent



Areas with known iodine deficiency

Source: Dunn and van der Haar, 1990

Some unshaded areas may represent countries where surveys on IDD have not been conducted



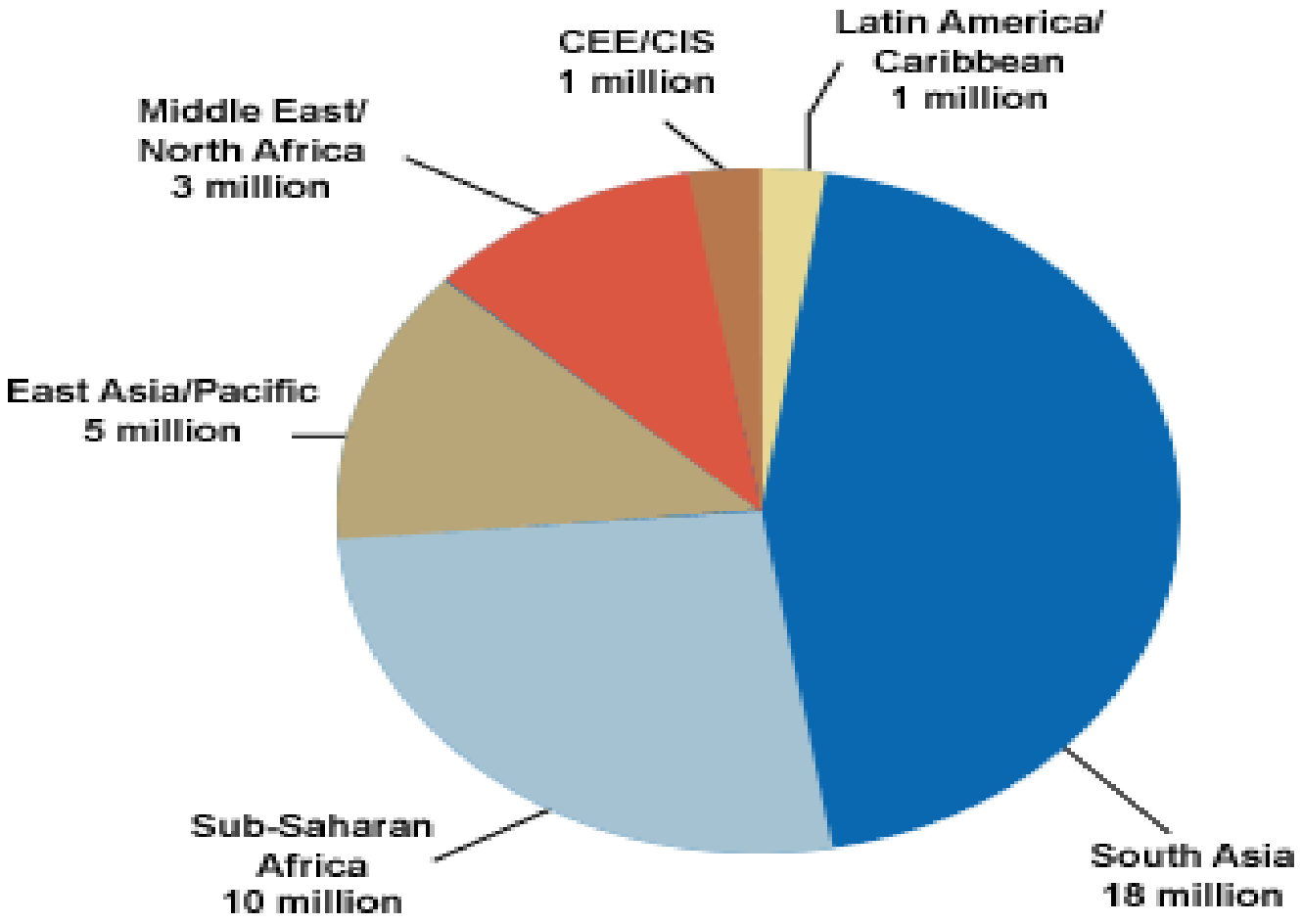
Data from the World Health Organization.

DISTRIBUTION OF IODINE DEFICIENCY

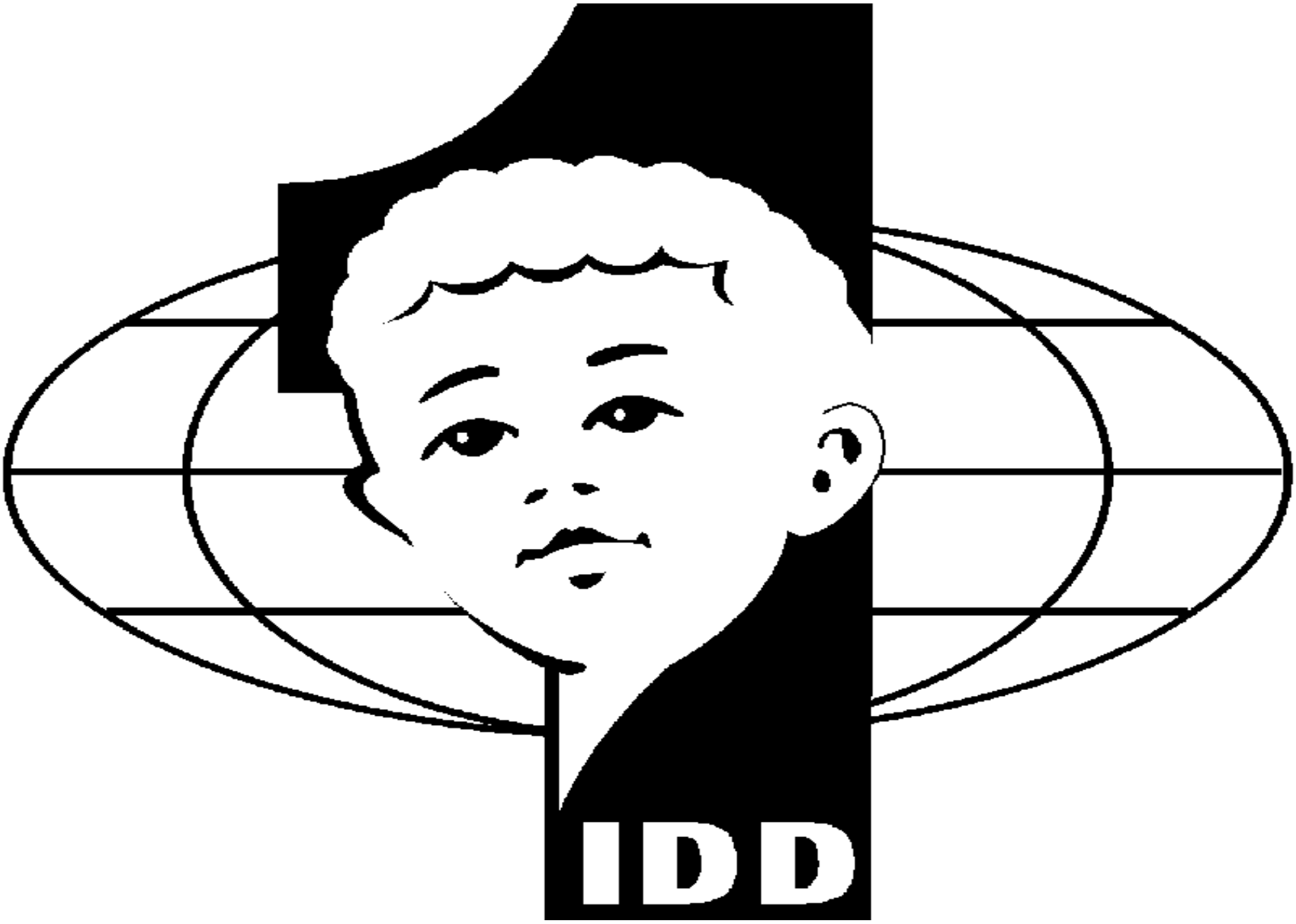
Insufficient Iodine Intake Worldwide	
Region	**Percentage of population**
Africa	42.6
Americas	9.8
South East Asia	39.8
Europe	56.9
Eastern Mediterranean	54.1
Western Pacific	24
Total	**35.2**

38 million newborns are not protected from Iodine deficiency

Number of births in households not consuming adequately iodized salt, by region (2000–2006)



MANIFESTATIONS OF ID



- Iodine is present in the body in minute amounts, mainly in the thyroid gland.

HEALTH CONSEQUENCES

- Its main role is in the synthesis of thyroid hormones.
- When iodine requirements are not met, thyroid hormone synthesis is impaired, resulting in hypothyroidism.
- A series of functional and developmental abnormalities grouped under the heading of "***Iodine Deficiency Disorders (IDD)".***

IODINE DEFICIENCY DISORDERS (IDDS),

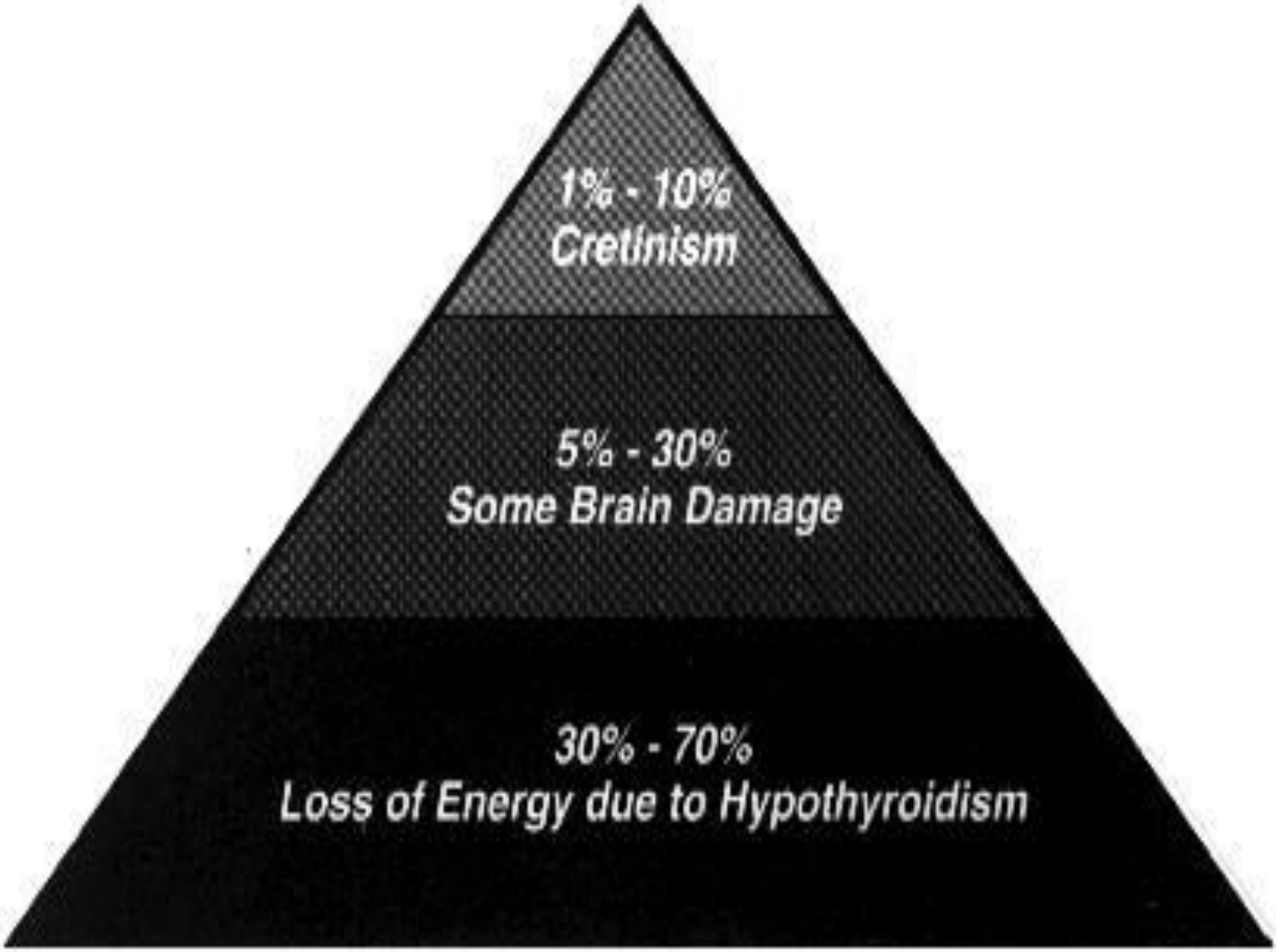
- Population effects of severe iodine deficiency, termed ***Iodine Deficiency Disorders (IDDs)***, include:

- Hypothyroidism
- Endemic goiter,
- Cretinism,
- Decreased fertility rate,
- Increased infant mortality, and
- Mental retardation.

Iodine Deficiency Disorders

Goiter

Cretinism


1% - 10%
Cretinism
5% - 30%
Some Brain Damage
30% - 70%
Loss of Energy due to Hypothyroidism

- ***Enlargement of the Thyroid Gland*** is the most frequently described and most obvious clinical manifestation of iodine deficiency.

- When dietary intakes of iodine fall below about 50 µg per day in adults, the thyroid gland begins to compensate by enlarging slowly over time.

THYROID EFFECTS - GOITER

- Endemic goiter results from increased thyroid stimulation by thyroid stimulating hormone (TSH) to maximize the utilization of available iodine and thus represents adaption to iodine deficiency.

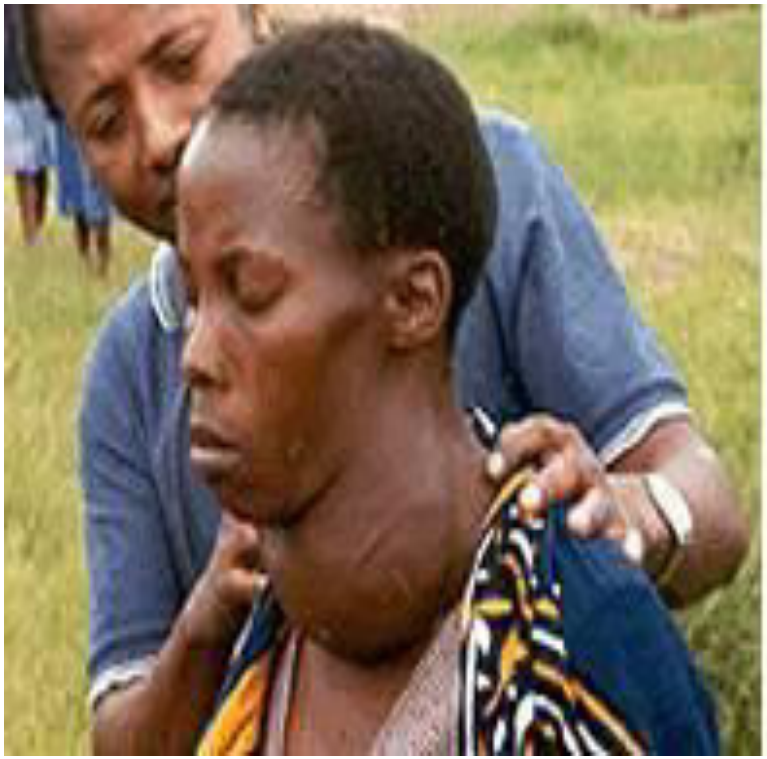
- Where there is a chronic dietary deficiency of iodine the thyroid often begins to enlarge during childhood, and it becomes more markedly enlarged around the time of puberty, particularly in girls.

THYROID EFFECTS - GOITER

- In many areas where goitre is endemic the majority of people have some evidence of thyroid enlargement.

- The rates may reach 100% when ID is severe.

THYROID EFFECTS - GOITER



THYROID EFFECTS - GOITER

- Thyroid nodules occur when ID is severe.
- While the goiter in itself is harmless, the nodules can cause obstruction of the trachea or impair function of laryngeal nerves.
- Some increase in cancer rates is suspected to be associated with goiter cases.

- ***Hypothyroidism:***

- If for any reason too little thyroid hormone is produced, the BMR goes down and a condition called hypothyroidism develops, which may lead to the clinical condition called myxoedema.

THYROID DISEASES- HYPOTHYROIDISM

- In the adult this condition is characterized by coarsened features, dry skin and sometimes puffiness of the face.

THYROID EFFECTS - HYPOTHYROIDISM

- The person is often somewhat overweight, has a slow pulse and feels sluggish.
- Testing would reveal a low BMR and low levels of thyroid hormones in the blood.
- Persons with endemic goiter may have good compensation and do not have evidence of either hypothyroidism.

- They are said to be euthyroid, which means that they have normal thyroid function despite thyroid enlargement.

- However, in endemic areas rates of hypothyroidism are elevated.

- In many cases the hypothyroidism is mild and not as obvious as classical myxoedema, but thyroid hormone levels are low, and low BMR, lower productivity and slower mental functioning may be chronic.

THYROID EFFECTS - HYPOTHYROIDISM

NEUROLOGICAL EFFECTS

- It is hypothyroidism in children, however, that is of most concern for developing countries, because of the strong evidence that it causes both mental retardation and slowing of physical growth.

- Neuromotor and cognitive impairment are the most important effects of ID.

- Mental retardation ranges from very severe, which is easy to recognize, to mild, which may be difficult to diagnose.

NEUROLOGICAL EFFECTS

- In areas with a high prevalence of IDD large numbers of children may fail to reach their intellectual potential because of impaired school performance and lower IQ than in matched groups from areas without iodine deficiency.

- A meta-analysis shows that iodine deficiency is responsible for a mean IQ loss of 13 points in the population.

- These children may later, as adults, fail to make as great a contribution to society and to national development as they would have made if they and their mothers had always consumed adequate amounts of iodine.

LOSS OF IQ
IMPLICATIONS

The Intelligence Quotient (IQ) score of children living in an iodine-deficient environment is nearly 13 IQ points less than those living in iodine-sufficient environments.

IMPLICATIONS OF LOSS OF IQ

Poor scholastic performance

↓

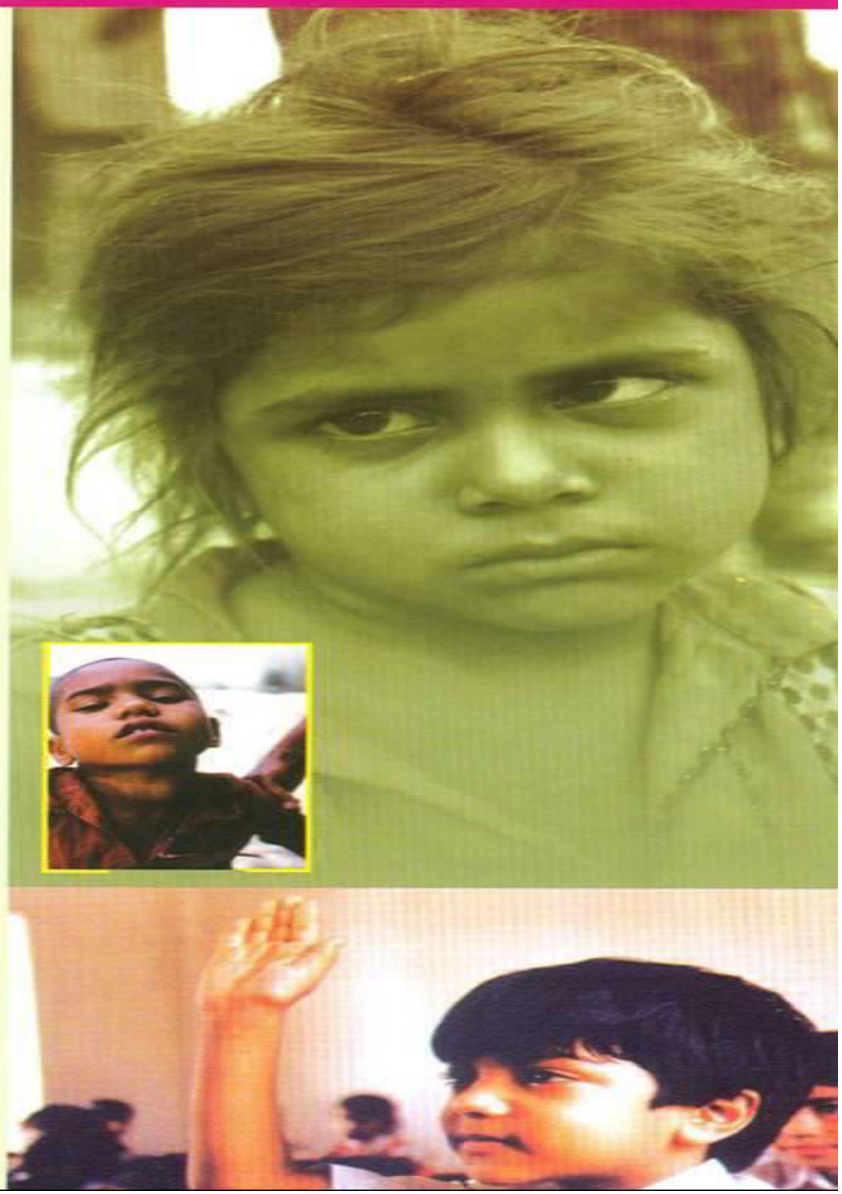
Frequent failures / grade repetitions

↓

Absenteeism / Drop outs

↓

Reduced impact on economic and social development



CRETINISM

- Iodine deficiency in a woman during pregnancy can lead to the birth of a cretinous child.
- Endemic cretinism, including deaf-mutism and mental retardation, begins in infancy.
- *In severely endemic areas, cretinism* may affect up to ***5–15%*** of the population.

CRETINISM

- Cretinism may occur in two forms, namely the neurological form and the hypothyroid form.
- However, many cretins have some manifestations of both.
- In both forms of cretinism the neurological damage, the mental retardation and the dwarfing are not reversible by treatment.

CRETINISM

- If iodine deficiency occurs during the most critical period of brain development (from the fetal stage up to the third month after birth), the resulting thyroid failure will lead to irreversible alterations in brain function.

- Worsening of the condition may be halted, but permanent damage has been done during pregnancy.

- Therefore the importance of prevention must be emphasized; it is imperative to ensure that women of child-bearing age are not iodine deficient.

NEUROLOGICAL EFFECTS OF CRETINISM

- In population where ID is severe and mothers have severe ID, endemic cretinism is found leading to:
- ***Cognitive impairment***
- ***Learning, speech deficit***
- ***Psychomotor problems***

Figure 5. Myxedematous endemic cretinism in the Democratic Republic of Congo. Four inhabitants aged 15-20 years : a normal male and three females with severe longstanding hypothyroidism with dwarfism, retarded sexual development, puffy features, dry skin and hair and severe mental retardation.

REPRODUCTIVE EFFECTS

- In areas with severe endemic IDD:
- ***Rate of reproduction is lowered***
- ***Rates of miscarriage and infant mortality are increased.***

- Iodine correction in a group of Chinese communities doubled the neonatal survival rates.

Table 1.1 The spectrum of IDD across the life-span

Fetus	Abortions Stillbirths Congenital anomalies Increased perinatal mortality Endemic cretinism Deaf mutism
Neonate	Neonatal goitre Neonatal hypothyroidism Endemic mental retardation Increased susceptibility of the thyroid gland to nuclear radiation
Child and adolescent	Goitre (Subclinical) hypothyroidism (Subclinical) hyperthyroidism Impaired mental function Retarded physical development Increased susceptibility of the thyroid gland to nuclear radiation
Adult	Goitre, with its complications Hypothyroidism Impaired mental function Spontaneous hyperthyroidism in the elderly Iodine-induced hyperthyroidism Increased susceptibility of the thyroid gland to nuclear radiation

Source: Adapted with permission of the publisher, from Hetzel (2), Laurberg et al. (3) Stanbury et al. (4).

OTHER EFFECTS

- Impaired agricultural productivity
- In China remarkable increase in sheep survival and growth followed iodine addition to water in an iodine deficient region
- Following iodine addition to feed the following results were recorded:

  * Australia - improvements in sheep industry
  * American North West - improvements in cattle industry

ASSESSMENT OF THE IODINE STATUS OF POPULATION

ASSESSMENT OF THE IODINE STATUS OF A POPULATION

- Several indicators are used to assess the iodine status of a population:

- ***Thyroid size by palpation and/or by ultrasonography,***
- ***Urinary iodine (UI) and***
- ***Blood constituents: TSH or thyrotropin, and thyroglobulin.***

IODINE STATUS ASSESSMENT

- **Goiter rates (*)**
  - Classification of goiters into grades 0, 1 and 2
  - ID suspected when >5% of school age children have grade 1 or 2 goiters
- **Urinary iodine (**)**
  - Can define individual status
  - Used to define population status
  - Used to monitor interventions

IODINE STATUS ASSESSMENT

- ***Goiter Classification:***

Grade 0: No palpable or visible goiter

Grade 1: Not visible with neck in normal position.

Mass moves upwards when subject swallows.
Nodular changes can occur when goiter is not visible

Grade 2: A swelling in the neck that is visible when the neck is in the normal position and

consistent with enlarged thyroid by palpitation.

IODINE STATUS ASSESSMENT

- ***Urinary Iodine*:**

  <25 microgram/l - severe deficiency, urgent intervention required
  <50 microgram/l - unacceptably low
  >100 microgram/l - sufficient levels

SEVERITY AND PUBLIC HEALTH SIGNIFICANCE OF IDD.

Severity	Clinical features[a]			Typical goitre prevalence (%)	Median urinary iodine (µg/litre)	Need for correction
	Goitre	Hypothyroidism	Cretinism			
Mild (Stage I)	+	0	0	5.019.9	>50-99	Important
Moderate (Stage II)	++	+	0	20-29.9	20 49	Urgent
Severe (Stage III)	+++	+++	++	>30	<20	Critical

Source: Adapted from WHO, 1994

TREATMENT OF IODINE DEFICIENCY

IODINE SUPPLEMETATION

- The treatment of goiter caused by iodine deficiency is easy and satisfying in the case of a simple goiter or a colloid goiter that is not very large. It includes iodine supplementation as:

- ***Oral Preparations:***
- Iodide tablets
- Iodine solution (Lugol's solution)
- Iodinated oil

❑***Injectable:***

- Iodinated oil

TREATMENT OF IODINE DEFICIENCY

- ***Potassium Iodide*** (6 mg daily) or
- ***Lugol's Iodine*** (one drop daily for ten days, then one drop weekly), will lead to a fairly rapid reduction in the size of the goiter.

- One drop of Lugol's iodine provides about 6 mg of iodine.

- If one drop of Lugol's iodine is put in 30 ml of water, then one teaspoonful of dilute solution will provide about 1 mg of iodine.

TREATMENT OF IODINE DEFICIENCY

- Lugol's solution is very cheap and is widely available.

- Of primary school children treated in Tanzania, over 60 percent with Grade 1 goiter had no goiter after 12 weeks of receiving Lugol's iodine, and most larger goiters had improved markedly.

- An alternative treatment which is also effective but which needs careful medical supervision is the use of ***Thyroxine***.

TREATMENT OF IODINE DEFICIENCY

- Large nodular goiters and some other goiters that do not respond to treatment with either iodine or thyroxine can only be properly treated by ***Surgical Excision (Thyroidectomy)***.

- Surgery is especially needed if the goitre is causing symptoms because it is retrosternal or pressing on the trachea.

- Patients who have had total thyroidectomy must receive thyroxine or thyroid hormones for the rest of their lives.

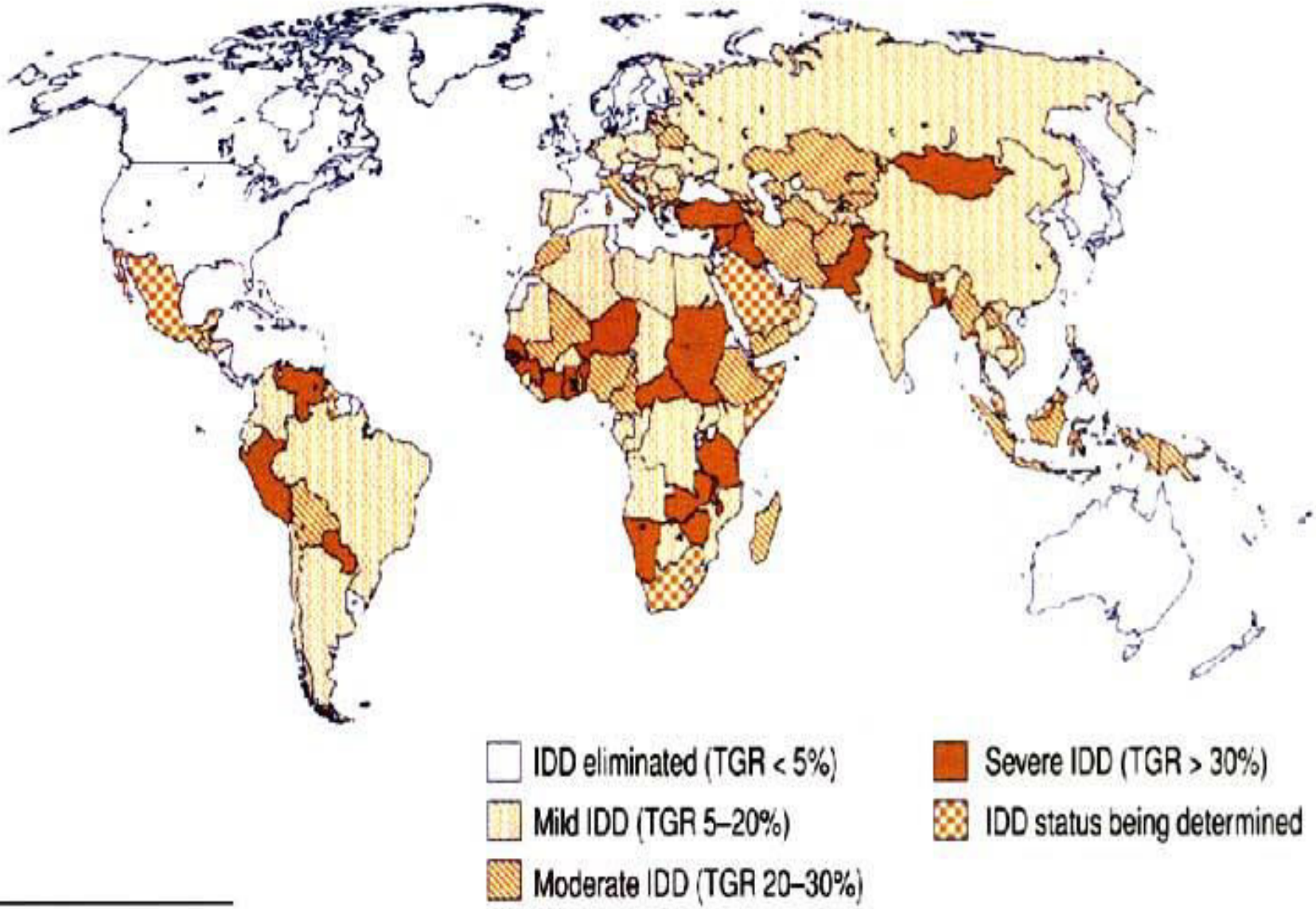

Sustainable Elimination
of Iodine Deficiency
unicef

PREVENTION AND CONTROL OF IODINE DEFICIENCY

- Iodine deficiency is the world's most prevalent, yet easily preventable, cause of brain damage.
- This is the primary motivation behind the current worldwide drive to eliminate it.
- Today we are on the verge of eliminating it – an achievement that will be hailed as a major public health triumph that ranks with getting rid of smallpox and poliomyelitis.

PREVENTION AND CONTROL OF IDD

- The number of countries where iodine deficiency is a public health problem has halved over the past decade according to a new global report on iodine status.
- 54 countries are still iodine-deficient.
- Efforts are required to strengthen sustainable salt iodization program.



Data from CIDDS database (USAID/ICCIDD/UNICEF/WHO), updated January 1995.
Based on total goiter rate in school-age children.

PREVENTION AND CONTROL OF IDD

- Iodine is the easiest of the three important micronutrient deficiencies to control.

- The recommended strategy for IDD control is based on correcting the deficiency by i***ncreasing iodine intake*** through :

- ***Supplementation***
- ***Food fortification***

TREATMENT OF IODINE DEFICIENCY

- ***Medicinal Iodine Supplements:***

- Iodine can be provided medicinally to cure IDD, to reduce goitre size and to prevent IDD, including cretinism.

- Widespread dosing with either oral or injectable iodine has been used in high-risk areas and may be a suitable strategy to reduce IDD quickly while salt iodization is being introduced.

ID PREVENTION - SUPPLEMENTATION

- ***Iodine Supplementation:***
- The first iodine supplements were in the form of an oral solution of iodine such as Lugol, which was given daily.
- After the Second World War, iodized oil was introduced to reduce IDD.
- Initially intramuscular form was used and in the 1990s the oral form was used.

ID PREVENTION - SUPPLEMENTATION

- ***Iodinated Oil:***
- The preparation most widely available is Lipiodol, which provides 480 mg iodine in 1 ml of oil.
- It can be either given by injection or taken orally.
- Injections of iodized oil are claimed to prevent IDD for three to four years, and oral iodine capsules for one to two years.

ID PREVENTION - SUPPLEMENTATION

- Oral iodine has many advantages over injectable iodine;
- It can be given by persons who are not trained to give injections, and therefore it is cheaper to provide.
- It does not require special storage conditions or trained health personnel for the injection.
- It can be given once a year.
- Above all, there is no risk of spreading HIV/AIDS or other infections which can be spread by syringes and needles that are not sterile.

IODINE SUPPLEMENTATION

- Compared to iodized salt, however, it is more expensive and;
- coverage can be limited since it requires direct contact with each person.
- With the introduction of iodized salt on a large scale, iodized oil is now only recommended for populations living in severely endemic areas with no access to iodized salt.

ID PREVENTION - FOOD FORTIFICATION

- It is almost unanimously agreed that fortification is the most effective strategy for the control of IDD.

- Over the past century, many food vehicles have been fortified with iodine: ***bread, milk, water, salt,*** various sauces and other foods.

ID PREVENTION - FOOD FORTIFICATION

- ***Iodinated bread***:

- Netherlands, Russia and Tasmania have used bread as a vehicle for fortification.
- In the Netherlands and Australia, program stopped because of iodine-induced thyrotoxicosis and logistic reasons.

ID PREVENTION - FOOD FORTIFICATION

- ***Iodinated Water:***

- In selected rural areas of Thailand and Indonesia, iodine is added periodically to cisterns storing cooking and drinking water.

- In Sicily city water supplies have been treated, but this program was stopped for technical reasons.

- Irrigation water iodized in western China, resulted in increase in urine levels and children's growth.

FOOD FORTIFICATION: IODIZED SALT

- A spectacularly simple, universally effective, wildly attractive and incredibly cheap technical weapon – that's ***Iodized Salt***!

- ***Five US cents a year*** and a ***teaspoon of iodine*** for a lifetime – a small price to pay for protection against the devastating effects of iodine deficiency.

- It was first introduced in the 1920s in the United States and in Switzerland.

FOOD FORTIFICATION: IODIZED SALT

- Since the 1980s, WHO has been at the forefront of a worldwide public health drive to eliminate this under-publicized yet devastating deficiency.

- In 1993 the World Health Assembly adopted ***Universal Salt Iodization (USI)*** (the iodization of salt for both human and livestock consumption) as the method of choice to eliminate IDD.

FOOD FORTIFICATION: IODIZED SALT

- Four main components are required to implement the strategy:

- Correction of iodine deficiency,
- Surveillance including monitoring & evaluation,
- Inter-sectoral collaboration
- Advocacy and communication to mobilize public health authorities and
- Educate the public.

ID PREVENTION - FOOD FORTIFICATION

- The Organization provides both technical tools – scientifically sound standards, guidelines and methodologies – and technical guidance to build up national salt iodization programs.

- This strategy has been implemented in most countries where iodine deficiency is a public health problem.

FOOD FORTIFICATION - SALT IODIZATION

- USI was chosen as the best strategy based on the following facts:

- salt is one of the few commodities that is widely available and consumed by everyone in regular amounts throughout the year;
- salt consumption is fairly stable throughout the year;
- salt production is usually in the hands of few producers;
- salt iodization technology is easy to implement

-

FOOD FORTIFICATION- SALT IODIZATION

- The cost of iodizing it is extremely low – only about US$ 0.05 per person per year.
- Is available at a reasonable cost (0.4 to 0.5 US cents/kg, or 2 to 9 US cents per person/year);
- the addition of iodine to salt does not affect its color, taste or odor;
- the quality of iodized salt can be monitored at the production, retail and household levels; and
- salt iodization programs are easy to implement.

FOOD FORTIFICATION - SALT IODIZATION

- In order to meet the iodine requirements of a population it is recommended to add 20 to 40 parts per million (ppm) of iodine to salt (assuming an average salt intake of 10 g per capita/day).

- There are two forms of iodine fortificants; ***potassium iodate and potassium iodide***.

- Because iodate is more stable under extreme climatic conditions it is preferred to iodide, especially in hot and humid climates.

Iodizing Table Salt Is One Of The Best And Least Expensive Methods Of Preventing IDD.

FOOD FORTIFICATION - SALT IODIZATION

- The level of fortification varies from country to country and should be based on two considerations:
- mean levels of salt intake by at-risk populations and
- other sources of iodine in the diet.

- The technology for iodine fortification of salt has been known for a long time, and it is a simple, relatively inexpensive process.

- It does not change either the appearance (including the colour) or the taste of the salt.

ID ASSESSMENT AND MONITORING

- Iodine fortification and supplementation are safe if the amount of iodine administered is within the recommended range.

- For more than 50 years iodine has been added to salt and bread without noticable toxic effects.

- However, a rapid increase in iodine intake can increase the risk of iodine toxicity in individuals who have previously had chronic iodine deficiency.

OVER CORRECTION OF ID

OVER CORRECTION OF ID

When ID is severe and there are are thyroid nodules in ID persons, and when iodine treatment is introduced without appropriate control and monitoring, a fraction of the population will develop thyrotoxicosis.

OVER CORRECTION OF ID

- ***Iodine-Induced Hyperthyroidism (IIH)*** is the most common complication of iodine prophylaxis.
- It has been reported in almost all iodine supplementation programs in their early phases.
- For programs using iodized salt, there is less information.
- IIH occurs in the early phase of the iodine intervention and primarily affects the elderly who have longstanding thyroid nodules.
- However, it is transient and its incidence reverts to normal.

MONITORING AND EVALUATING THE CONTROL PROGRAM

- The most effective means for preventing IIH and its health consequences are:

- Monitoring of salt quality and iodine status of populations
- Training of health staff in identification and treatment of IIH.

MONITORING AND EVALUATING THE IODINE DEFICIENCY CONTROL PROGRAMMES

- ***Monitoring Iodine Levels Of Salt:***

- Governments usually set the level at which salt should be iodized.

- Monitoring aims to ensure that the salt industry complies with the regulations set by the government and that the iodine levels are re-adjusted if necessary.

- Iodine levels are monitored (at a minimum) at the factory and household levels, and if possible at the retail level.

MONITORING AND EVALUATING THE IDD CONTROL PROGRAMMES

- If iodized salt is imported it is monitored at the point of entry into the country.
- The monitoring process at the factory level is the salt producer's or importer's responsibility and is regularly supervised by the relevant public authorities.
- In most cases the Ministry of Health carries out the monitoring at the household level.

- Iodine content in salt is best measured by titration.
- Field test kits have been developed.
- They only give qualitative results, indicating if iodine is present or not.
- Because of this, they are of limited use, moreover their reliability has recently been questioned.
- However, they are can still be useful for training educating and for advocacy purposes for the public and staff.

MONITORING AND EVALUATING THE IDD CONTROL PROGRAMMES

MONITORING AND EVALUATING THE IDD CONTROL PROGRAM

- For iodine deficiency, toxicity of thyroid function can be induced when correction of ID is not carefully monitored.
- It is important to establish monitoring and control when implementing corrective actions for micronutrient deficiencies.
- The potential harms and benefits will differ in each location and population and therefore have to be evaluated each time an intervention program is planned or performed.
- A balance between harm and benefit has to be achieved.

HEALTH PROMOTION

HEALTH PROMOTION

- ***Increasing Awareness Of Public Health Authorities And The General Public:***

- WHO has played a pioneer role in mobilizing the international community and public health authorities by providing strategic guidance and technical support.

- In 1990, the World Health Assembly adopted a resolution urging Member States to take the appropriate measures to eliminate IDD.

HEALTH PROMOTION

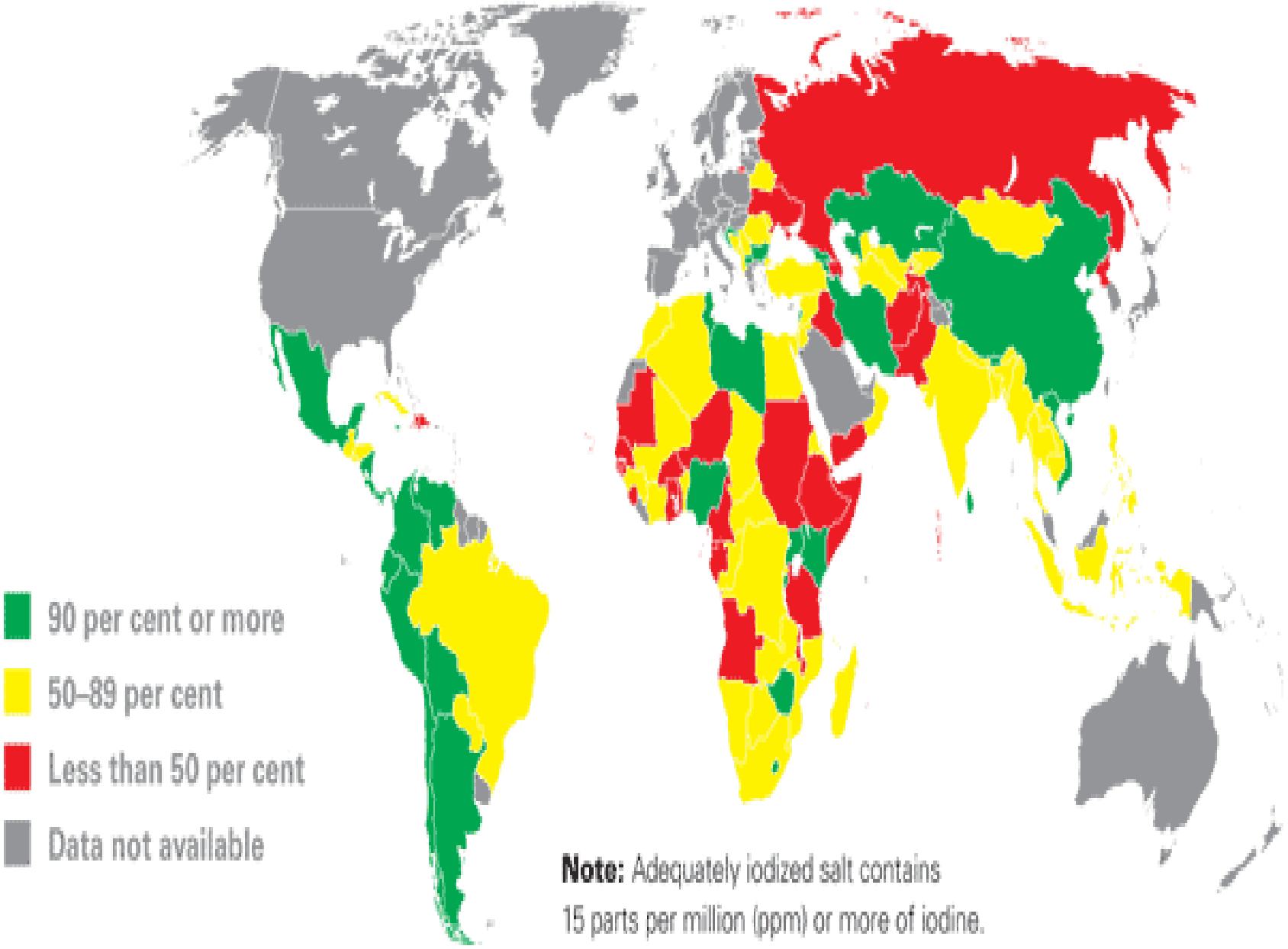
- This goal was reaffirmed in a series of subsequent international fora including:

- The 1990 World Summit for Children (New York),
- The Joint WHO/Food and Agricultural Organization of the United Nations (FAO) and
- The International Conference on Nutrition in 1992 (Rome)
- The Special Session on Children of the UN General
- Assembly in 2002 (New York).

FOOD FORTIFICATION - SALT IODIZATION

- In 2002, at the Special Session on Children of the United Nations (UN) General Assembly, the goal ***"to eliminate IDD by the year 2005 was set"***.

- Globally, UNICEF estimates that 66% of households now have access to iodized salt.


90 per cent or more
50–89 per cent
Less than 50 per cent
Data not available
Note: Adequately iodized salt contains 15 parts per million (ppm) or more of iodine.

NUTRITION EDUCATION

- ***Improving Diets:***
- Nutrition education and other methods to influence people to change their diets do not work as measures to control IDD because the iodine content of foods depends more on geography than on the foods.

- The iodine content of plants is much affected by the iodine content of the soil in which they are grown.

- Thus most foods grown in soils depleted of iodine, found most frequently in highland areas, are deficient in iodine.

NUTRITION EDUCATION

- The vegetables, cereal grains, legumes and other foods grown in iodine-depleted soils high in the Andes or Himalayas have much less iodine than those grown in the lowlands near the mouth of the Amazon River or in the Ganges Delta.

- Influencing higher consumption of particular local foods is therefore not effective.

- Seafood and seaweed are rich sources of iodine, because sea water has high levels of the mineral. However, these foods cannot be promoted in areas far from the sea.

NUTRITION EDUCATION

- Nutrition education and other methods to influence behaviour change can be used to reduce consumption of foods containing goitrogens, such as cabbage, vegetables of the genus *Brassica* and also some kinds of cassava.

- In countries where salt is available in both iodized and non-iodized forms, nutrition education and other means should be used to encourage people at risk to use the iodized salt.

- Nutrition education can also serve to explain the cause of the problem and to stimulate demand for government and other action.

INTERSECTORAL CO-OPERATION

INTERSECTORAL CO-OPERATION

- Control of IDD is an intervention for which poor countries can usually quite easily get support from organizations such as FAO, UNICEF, WHO, the World Bank and bilateral aid agencies.

- At US$0.05 per person per year, iodization of salt is a very cheap intervention.

INTERSECTORAL CO-OPERATION

- Partnerships have been crucial to turning the tide against IDD.
- The commitment to eliminate ID catalyzed the involvement of a large number of additional actors.
- Alliances among ***international, national organizations and the salt industry*** have helped countries set up permanent national salt iodization programs.

INTERSECTORAL CO-OPERATION

- The United Nations Children's Fund (UNICEF) was one of the first organizations to assist countries in establishing salt iodization programmes and still now plays a leading role in this regard.

- The International Council for the Control of Iodine Deficiency Disorders (ICCIDD) played an instrumental role in providing technical support.

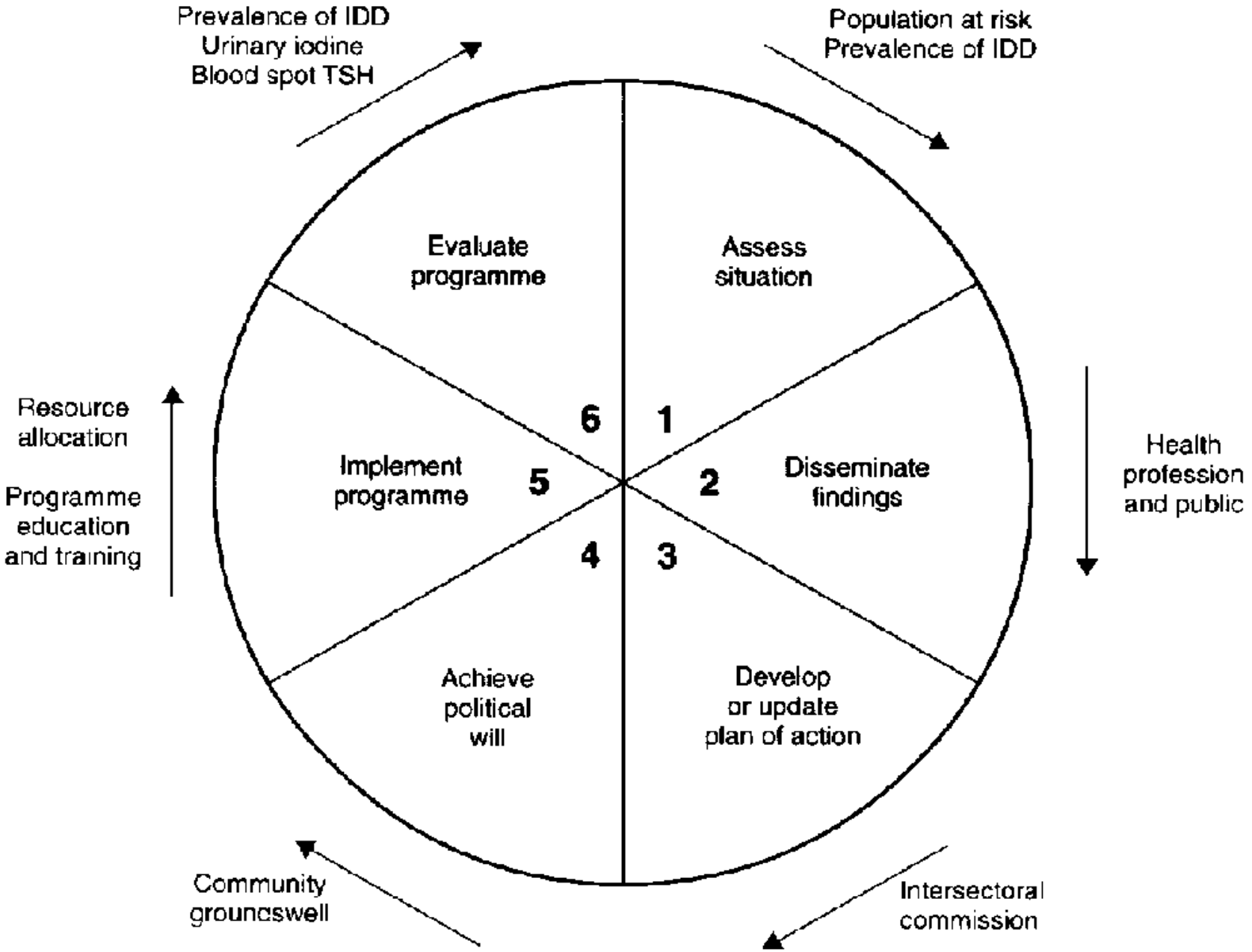
INTERSECTORAL CO-OPERATION

- Other important actors are the :
- Bilateral co-operation agencies,
- Non-governmental organizations (NGOs) such as The Micronutrient Initiative, the salt industry, and
- Donor foundations such as Kiwanis International and the Bill and Melinda Gates Foundation.

PROCESS MODEL FOR A NATIONAL IDD CONTROL PROGRAM

FIGURE 22. Process Model For A National IDD Control Program

Source



SIX STEPS TO A NATIONAL PROGRAMME OF IDD CONTROL

- ***Situation Analysis:*** assess the prevalence of goitre and cretinism and the population at risk of IDD, as well as the status of the salt industry and salt importations in the country.
- ***Dissemination of Information:*** The findings from the assessment and from other sources must be disseminated to the public, to key government officials and to politicians.
- This step perhaps needs to go beyond simple dissemination of information and might include strong advocacy.

SIX STEPS TO A NATIONAL PROGRAMME OF IDD CONTROL

- ***Development of a Plan:*** The plan is much more likely to be implemented if various actors are involved in the planning process: IDD experts, senior staff from the national nutrition institute and from research institutions and representatives from the salt industry and from consumer organizations.

- ***Political Commitment:*** A political decision to move forward to implement the plan is the next essential step.

- It requires the commitment of funds and perhaps the use of some external financing and expertise.

- ***Implementation of Salt Iodization*** follows, involving activities at the site where salt is prepared and distribution of the salt to the market, combined with education and training.

- ***Monitoring And Evaluation*** is the last step in what is a continuous cycle.

SIX STEPS TO A NATIONAL PROGRAMME OF IDD CONTROL

- There should be national monitoring of the distribution of the iodized salt, and if possible assessment of the iodine content of the salt at all stages of the food chain from the factory, to the retailer, to the household.

- There should be attempts to show the effectiveness of the programme in terms of reduction in goitre prevalence, perhaps using sentinel sites which may correspond to those used in the first step.

SIX STEPS TO A NATIONAL PROGRAMME OF IDD CONTROL

SIX STEPS TO A NATIONAL PROGRAMME OF IDD CONTROL

- In some countries measurement of urinary iodine and determination of thyroid hormone levels may be feasible as part of the evaluation.

- Reduction in rates of cretinism may be more difficult to demonstrate because goiters are highly prevalent, whereas cretinism usually is not.

ID CONTROL PROGRAM

- It is believed that once a government manages to get the iodization of salt well established and supported by legislation, it provides by far the best solution to the control of IDD for those who consume the salt, and the control should be sustainable.

- Many of the industrialized countries have maintained salt iodization for decades and have controlled IDD.

ID CONTROL PROGRAM

- For a variety of reasons, not all of which have been fully publicized, iodization of salt in many developing countries, even when legislated, has not been successful.

- It has not failed because the technology is wrong, but because of other failures in the system.

ID CONTROL PROGRAM

- To work, the strategy requires not only political will, but

  genuine political and government action;
- honest and incorruptible people at all levels, from top government officials to lower-level technologists;
- well-trained personnel with knowledge and expertise;
- social support for the exercise;
- and finally adequate funding.

ID National Programs

Europe and North America

- Iodized salt universally available
- Mass media campaign
- Medical education
- Nutrition education
- Cooperation of industry
- Iodine deficiency nearly non existent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Thank
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