

Macedonia

The Republic of Macedonia shares a history of iodine deficiency with former Yugoslavia (1). Local surveys during the mid-previous century showed high goiter prevalence in many areas, ranging from 18% in the capital Skopje to as high as 60% in Skudrinje area (2). In Yugoslavia, regulations on salt iodization were first introduced in 1937 and initially at 5mg KI/kg for household salt directed to high goiter areas only. In 1954, after a review at the Congress on Preventive Medicine, the level was set to 10mg KI/kg and expanded to all salt destined for human and animal consumption. Although studies conducted 10 year later demonstrated a fourfold reduction in the goiter prevalence in school children, studies in Macedonia during the 1980s revealed that goiter persisted in the population born after USI was introduced (3). Upon peaceful separation from Yugoslavia in 1991, extensive studies during 1995-1996 among 7-15y old school children showed enlarged thyroid volume in 18.7% (7.8-29% variation by municipality) and a median UI of 110µg/L (variation 79-190µg/L). These findings led to the formation of an Expert Committee on Iodine Deficiency in December 1997 to provide oversight and policy guidance. The findings of continued weak USI impact were re-confirmed in a survey in early 1999 in 30 randomly selected primary schools, finding again elevated thyroid volume and a median UI of 117µg/L. Thus, the Expert Committee proposed and developed a new Rule Book on edible salt which was made effective by Government decision in October 1999. The regulation specifies that all the edible salt imports in the Former Yugoslav Republic of Macedonia, including the salt used by food industry, should contain 20-30 mg iodine per kg salt, while permitting only KIO₃. A survey one year later, in September-October 2000, and using the standard 30x30 design in 8-10y old school children showed a quantum improvement in UI to 154µg/L (variation 96-207µg/L), with no contrasts between gender or urban/rural location (4).

Macedonia imports its salt requirements from suppliers in Austria, Bosnia-Herzegovina, Bulgaria, Egypt and Greece. All salt import consignments are inspected by the State Sanitary Services who issue a certificate of conformity, which is required prior to release by the Customs Authority. Unsatisfactory salt is returned to the producer. Only one local processing company, Solbit, is exempted from the import ban of non-iodized salt. The company has plants in Bitola and Skopje (±40% national market share) and it processes salt imported from Egypt and Belarus by spray iodization, which were functioning well during an independent external assessment (5). Iodizing salt is self-financed with no Government subsidy. The importers and the processing plant are primary responsible for the quality of the edible salt supplies, including iodine content. Registered import firms are required to submit the purchase order for each shipment through the Ministry of Economy and Trade, together with a laboratory certificate from the country of origin. On arrival at the border, sanitary inspectors perform an inspection in such a way that the results of iodine measurements are available within 2-3 hours. Studies by the State Institute for Health Protection in 2002 confirmed the high stability of iodate in typical imported salt samples under severe storage conditions for 6 months. Measurements by the Veterinary Institute confirm that salt used for animals is as properly iodized as the salt for household and food industry use. Finally, regular salt sampling in the primary schools of Macedonia by the Institute of Public Health demonstrate that over the years 2000-2003, 65-70% of the iodine content in salt used in the households remained in the range of 20-30 mg/kg (6).

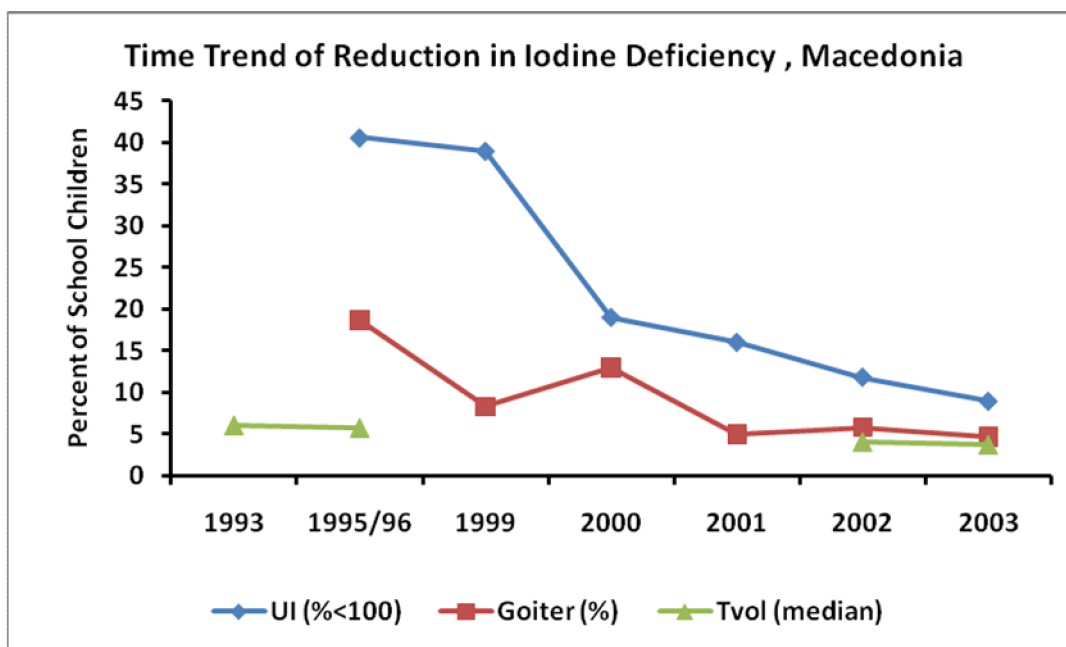


Figure 1: Iodine deficiency indicators in School Children by year of survey, FRY Macedonia

Time trends of population iodine indicators (Figure 1) show a clear correspondence among the UI values <100 μ g/L, goiter prevalence (by palpation) and thyroid volume in school-age children, measured by ultrasound (6). The improvement in iodine nutrition of the school children, associated with the change in mandated salt iodine content to 20-30mg/kg in 2000 is illustrated in Figure 2.

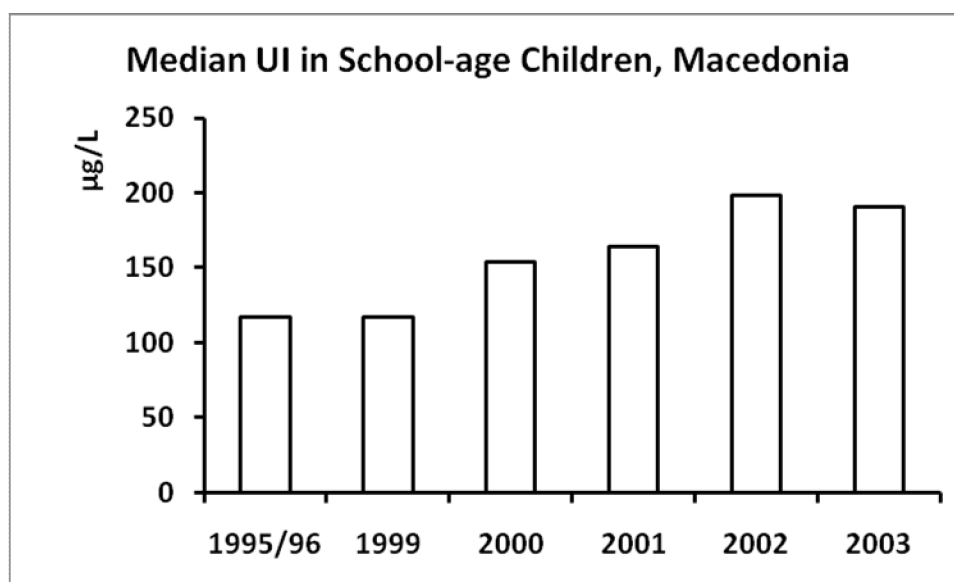


Figure 2: UI concentrations (μ g/L) in school children, Macedonia 1995/96 to 2003

In the course of the years, a variety of educational activities has taken place, including collaborative mass distribution of informational materials among the public with the Ministry of Education and Science, consumer information with the Consumer's Association of Macedonia and extensive publicity in

the media. The essential knowledge of IDD and USI has been inserted in several specialist curriculums at university level. An opinion survey among ambulant patients in Skopje illustrates that the population is generally well aware of the threat of iodine deficiency and the benefit of using iodized salt, although the knowledge about the consequences of iodine deficiency for brain development was somewhat wanting.

The Committee on Iodine Deficiency is being composed of members from a wide range of Government branches (Health, Education, Agriculture/veterinary, Economy/trade, etc), scientific institutions (Public Health, Neonatology, Obstetrics & Gynecology, Food chemistry & technology, etc), salt importers and producers, media (journalists, TV, radio, etc) and consumer interests, thus representing the broad range of partners. The minutes and reports of the Committee are publicly available.

In 2003, an external assessment team of experts delegated by the Network for Sustained Elimination of Iodine Deficiency assessed the performance of the USI strategy and concluded that the problem of iodine deficiency in Macedonia had been successfully overcome. In addition to the recommendation that the USI strategy should be continued, the team suggested that the iodine situation among pregnant women and newborns should be assessed. The report of the external assessment was launched at a national ceremony event in October 2003 with a range of high-level officials of various government branches, salt producers/traders and consumer organizations in attendance.

Neonatal screening (thyrotropin, or TSH) was introduced in Macedonia in 2002 and has spread to encompass the majority of newborns in the country. If a population is iodine deficient, >3% of the newborns will have TSH values >5mU/L. Studies by the Clinic for Pediatric Disorders of the Faculty in Medicine shows the following time trend: elevated TSH 4.3% in 2002, 5.9% in 2003, 2.8% in 2004, 0.8% in 2005, 1.8% in 2006, and 1.5% in 2007. The trend and prevalence of TSH elevations indicate that the mothers giving birth were not exposed to iodine deficiency during pregnancy. Extensive studies have been conducted also among pregnant and lactating women in the period 2003-2007, generally indicating that pregnant women have adequate iodine status, although the practice of prescribing iodine supplements during pregnancy is still prevalent among healthcare providers. TSH, FT4, Tg, and TPO measurements (all indicative of thyroid function) among pregnant women also indicate that iodine deficiency is not a public health threat for each new generation of newborns in Macedonia (7).

Participation of national officers in UNICEF-supported regional iodine meetings:

- Workshop on Strengthening Strategies for the Elimination of Micronutrient Malnutrition. Antalya, 4-8 April 2005

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