Salt iodization in Armenia: a model of sustained success
Twenty years ago, Armenia was iodine deficient. After decades of salt iodization efforts in the Soviet Union, Armenia was experiencing a re-emergence of iodine deficiency disorders following the dissolution of USSR and the socialist economy in 1990. In 1995, the Ministry of Health jointly with UNICEF conducted a study, which showed that, in the mountainous areas, 50% of pregnant women and 40% of schoolchildren were suffering from goiter (1). Nationwide, goiter was found in almost a third of all reproductive-age women (2). Evidently, the progress achieved in the previous decades had been lost.

Efforts to bring back iodized salt began in 1997 with the support of UNICEF and other international donor agencies and in collaboration with the Ministry of Health (3). Recognizing the importance of adequate iodine nutrition to the nation’s health and economic progress, the national salt manufacturer Avan Salt in Yerevan began iodizing all salt for human consumption (i.e. table salt for consumers and salt used by food manufacturers) even before a government decree made it mandatory in 2004 (4). Thanks to the swift action of all stakeholders, already in 2000 the DHS estimated that 84% of households had access to iodized table salt compared with 70% in 1998 (2, 5). In 2005, the MoH in collaboration with UNICEF and the IGN (then ICCIDD) carried out a national survey covering all but one (Vayots Dzor) administrative regions of the country. It confirmed that not only was iodine intake sufficient again, but that adequately iodized salt now reached 97% of households (6). In 2006, UNICEF declared Armenia as free of iodine deficiency (3).

The new survey findings are reassuring

In 2016–2017, the first national iodine survey in over a decade was conducted under the auspices of the Ministry of Health (7). Urine samples were collected from 1,125 school-age children (SAC), women of reproductive age (WRA), and pregnant women (PW) from 13 towns across Armenia. The results confirm that iodine deficiency has not recurred (Table 1). The decrease in the median urinary iodine concentration (UIC) in SAC since 2005 (from 313 µg/L to 242 µg/L) (6) is expected and reflects a reduction in the mandated levels of iodine in salt from 50 ± 10 mg/kg to 40 ± 10 mg/kg in 2005 (4). Preliminary results also show that over 91% of salt samples collected from households have adequate levels of iodine.

Learning from the past success to safeguard the future

One of the key reasons why the salt iodization program has been so successful in Armenia (and other countries of South Caucasus, Eastern Europe, and Central Asia) is that it was based on decades of effective salt iodization efforts in the USSR as well as in the former Yugoslavia, Bulgaria, and Romania, dating back to the mid-1950s.

### TABLE 1 Results of the 2016–2017 national survey in Armenia show that iodine intakes are optimal (7).

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean age (SD), yrs</th>
<th>Median UIC (Q1, Q3) µg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>School-age children</td>
<td>361</td>
<td>10.54 (1.11)</td>
<td>242 (203, 289)</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>356</td>
<td>26.14 (4.69)</td>
<td>226 (209, 247)</td>
</tr>
<tr>
<td>Women of reproductive age</td>
<td>361</td>
<td>35.46 (8.68)</td>
<td>311 (244, 371)</td>
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</table>
To translate the experiences of the past into a lesson that won’t be lost to future generations, three essential needs must be met. First, Armenia needs an affordable and effective monitoring system, so that all stakeholders—from clinicians to policymakers—can access up-to-date information without needing to wait for expensive and infrequent nationwide surveys. A recent analysis of the 2012–2016 neonatal hypothyroid screening data shows a high degree of concurrence with the UIC data. Annual analyses of neonatal TSH could be useful in monitoring iodine nutrition in Armenia.

Secondly, while Armenia has experienced almost two decades of progress against all forms of malnutrition, such as stunting, wasting, and hidden hunger, more remains to be done. Understanding the underpinnings of the salt iodization success could help us recreate it in other programs that target micronutrient deficiencies, such as folate, iron, or vitamin A.

The final need is to ensure that evidence-based policy transfers to best practice, and reaches the population through the medical community. Clinical practitioners in Armenia have been largely unaware of the success of salt iodization, and some continue to attribute goiter and other thyroid symptoms to iodine deficiency when, in fact, they may be caused by other thyroid disorders. In these cases, correct diagnosis and treatment could be delayed or missed.

To address this need, the study team shared its findings at a conference on 10 October in Yerevan with representatives of the Ministry of Health, the endocrinology community, clinicians, policymakers, and members of the scientific community. The meeting focused on Armenia’s progress against iodine deficiency, the role of the salt iodization program, standards for reporting thyroid disease to the national statistics office, and clinical guidelines for diagnosing and treating thyroid disease. The study team has received additional support from the Jinishian Memorial Foundation to conduct over 20 smaller-scale workshops and seminars for clinicians across all provinces, which are scheduled to go ahead in the next few weeks.

A small country with a small population, Armenia faces considerable challenges but also significant opportunities. There is a strong sense of investment on the part of all stakeholders in understanding the current situation in order to get the most benefit for the patients and the public. This cooperative spirit on the ground and in Armenia’s leadership is a huge component of why this program has been so successful. And for as long as iodine deficiency remains in check, those in policy and practice are free to focus on other challenges to the health and development of the population.

References
3. UNICEF. Armenia beats iodine deficiency. November 2006. Available at: https://www.unicef.org/media/media_36637.html