

## Ukraine

Ukraine, the 2<sup>nd</sup> largest country in Europe, has a shared history with the other former Soviet Republics of centralized prophylaxis during the decades of 1950 and 1960, including directed supplies of iodized salt to the areas considered endemic for goiter and cretinism (1), which were mostly located in Western Ukraine (2). The Soviet Ministry of Food Industry promoted the Artemsol salt enterprise near Soledar in Eastern Ukraine (3), and the Salt Industry Research and Development Institute of Ukraine was the major source of the machinery used for harvesting and processing of salt in the Soviet Republics. When the USSR broke apart in 1991, the production and supply of iodized salt had already faded (2) and, like in the other independent States, iodine deficiency and its consequences had made a comeback also in Ukraine during the 1990s (4, 5).

The meltdown of the Chernobyl Nuclear Power Plant in 1986 contaminated large surrounding areas in Ukraine, Russia and Belarus with radioactive <sup>131</sup>I fallout followed by a starkly increased thyroid cancer incidence in children (6). Although these traumatic events increased the public's perception of the existing linkages between iodine, nuclear fallout and thyroid cancer, it still remains more common in Ukraine that citizens worry about goiter and thyroid disease than that a typical citizen demands iodized salt for the prevention of these consequences.

In the 1990s, UNICEF started supporting the efforts to achieve USI through two projects under the Early Childhood Care and Development program: One addressed the existing iodine deficiency situation by high-level advocacy, development of capacity for salt iodization, and planning of a national program (including legislation), while the other aimed at raising the awareness and demand of the public mainly through the media and the press (7). In response to high-level advocacy, the Cabinet of Ministers adopted a Decree in 1997 "On Measures of IDD Prevention" and formed a National IDD Coordination Council, consisting mostly of academicians. The Decree was amended in 2001 to expand the national Council by adding members from government Ministries. Subsequently, no further Council meetings have taken place. The political situation at the time meant that most power was concentrated in the hands of a few and that decisions were taken in an authoritarian fashion. Only scarce resources were available for the work of officials in government and institutions. With the serious downturn of the economy during the 1990s, the issues of survival for the latter group had become pre-eminent above the decisions to improve the quality of life.

UNICEF's support during 1997-2002 included iodization equipment and KIO<sub>3</sub> to the salt industry. UNICEF also assisted in an arrangement with the salt industry to assist the company Iodobrom located in Crimea in the establishment of KIO<sub>3</sub> production in Ukraine. In 2001, Decrees by the Chief Sanitary Physician first banned the production and sale of non-iodized salt in Ukraine and then, 7 months later, revoked the ban at the request of the Association for Protection of Consumer Rights. On proposition by MOH, a national program for IDD elimination in Ukraine for 2003-2005 was approved by Government in September 2002. The program document recognized that 14.6million people were living in IDD endemic areas, which was putting pregnant women at risk. Despite the support by UNICEF for mandatory USI, the legislation still fell short of mandating USI however. Nevertheless, the period of 2003-2005 witnessed the revival of iodized salt production capacity in Ukraine. The National Salt Industry Association "Ukrsil" reported that

the iodized salt supplies of Ukraine had fallen to below 4,000MT by 2001 (8), while in 2004, based on purchase orders from the salt industry customers, the iodized salt supply had increased to more than 75,000MT, of which 40,000MT was for domestic consumption.

In October-December 2002, the Academy of Medical Sciences with technical support of CDC, Atlanta, conducted the first ever national micronutrient survey in Ukraine, including iodine status measurements among 15-49y old caretakers of 6-36m old children (9). The survey used the recommended 30X30 PPS design and included UI measurements among adult caretakers who brought a child for examination to a primary health clinic. The household salt in this survey had a median iodine content of 5.3mg/kg, with only 20%  $\geq 15$ mg/kg. The median UI concentration of the non-pregnant females was 90 $\mu$ g/L, with 57% below the 100 $\mu$ g/L minimum cut-off point for school-age children.

The UI concentrations of the women in this survey were converted to estimates of dietary consumption with the use of the formula of IOM (10) as follows:

$$\text{Estimated iodine intake } (\mu\text{g/d}) = \text{UI concentration } (\mu\text{g/L}) \times \text{Body weight (kg)} \times 0.0235$$

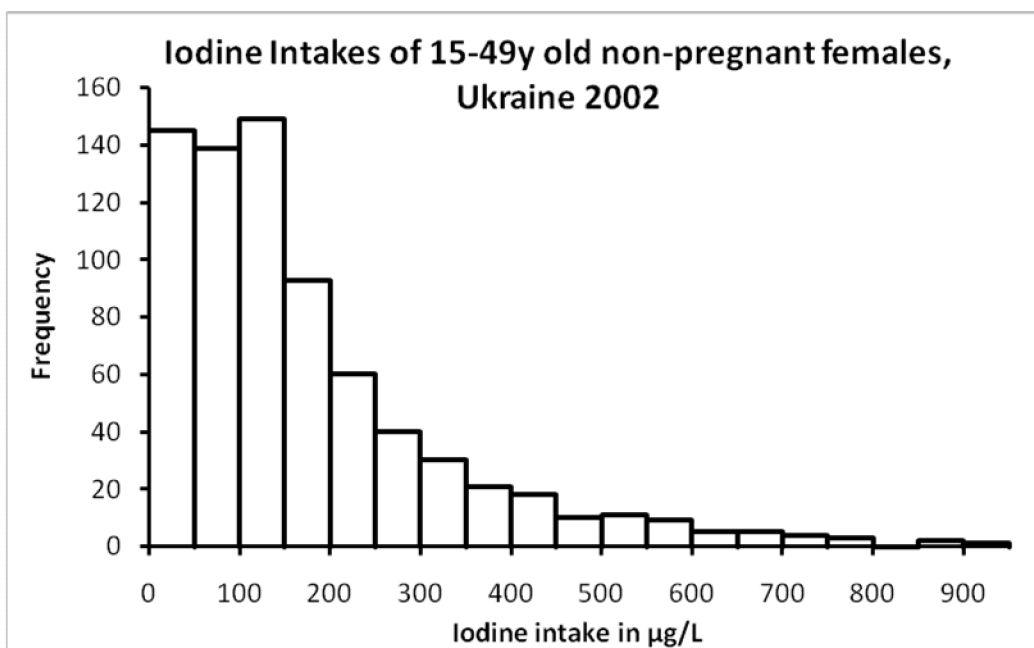


Figure 1: Histogram of iodine intake estimates among non-pregnant women, Ukraine, 2002

The distribution of estimated iodine intakes (Figure 1) was strongly skewed, with a median of 128 $\mu$ g/d, or 85% of the IOM recommended dietary iodine allowance (RDA) for adult women of 150 $\mu$ g/d, endorsed by WHO/UNICEF/ICCIDD. 58% (n=433) of the women had iodine consumption estimates below the RDA.

Further analysis (Table 1) demonstrates that the iodine intake among the women was strongly related to the salt iodine content in their households. Women in the households using salt with iodine content  $< 15$ mg/kg had a significantly ( $p < 0.001$ ) greater likelihood of consuming iodine below the RDA compared to those in the households that used salt with  $\geq 15$ mg iodine/kg. Because salt with iodine  $< 15$ mg/kg was

used in 80% of the households at that time, the increased risk of iodine deficiency affected the large majority of women in Ukraine. On a positive note, the Table also indicates that the median iodine consumption among the 20% of the women from the households using salt with iodine content  $\geq 15\text{mg/kg}$  was adequate to satisfy their RDA.

Estimated Iodine Consumption ( $\mu\text{g/d}$ ) in Non-pregnant Women, Ukraine 2002				
Household salt iodine content	N	Median consumption and 95% Confidence Interval	Below the RDA of $150\mu\text{g/d}$	
			Percent of women	Risk Ratio and 95% Confidence Interval
0 – 4.9 mg/kg	308	111 (101-124)	64	1.77*** (1.41-2.21)
5 - 14.9 mg/kg	289	126 (114-138)	62	1.71*** (1.36-2.15)
$\geq 15$ mg/kg	151	202 (172-234)	36	1.00

Table 1: Likelihood of low ( $<150\mu\text{g/d}$ ) iodine consumption among non-pregnant women related to the iodine content in their household's salt, Ukraine, 2002

Although the survey results clearly exposed the significance of iodine deficiency and the potential benefit of USI in Ukraine, the discussion of the results of the survey among influential academicians remained on an attempt to use the iodine status data for the purpose of defining areas within Ukraine that would benefit from iodized salt supplies, with the implicit assumption that other areas would not need it. Such a discussion neglects the principle that a PPS survey is not designed to represent individual clusters. More importantly, however, this approach ignores the essential understanding from research that IDD consequences, such as IQ loss, in an iodine-deficient population affects the entire distribution of values and not just the individuals below a certain threshold. This insight has not been accepted, or at least, never been taken into account by the influential government advisors in Ukraine.

Despite the objections against mandatory USI, UNICEF continued supporting the national program 2003-2005. Almost half of the respondents in a KAP survey in 2002 reported that their store sells iodized salt; 30% said they didn't know and 22% responded that their store did not sell iodized salt. The survey also revealed that 56% of the respondents considered iodized salt improper for food preservation, which is a widespread home-based habit in Ukraine. UNICEF also continued its strong support and involvement in social marketing efforts to promote the use of iodized salt in the households. A pilot in Kharkov Oblast, conducted jointly with the Sister Cities linkage between Kharkov and Cincinnati, led to the experience that a carefully planned combination of health communication, health worker education and a decree by the Governor's office can mimic an effective national program at decentralized level. Close monitoring in Kharkov Oblast demonstrated a sizable increase in the public awareness of the IDD/USI issues and a significant increase in the supply of iodized salt through industry sales channels. The pilot experience also generated a package of very creative and professional materials for mass communication (TV, radio, magazines and newspapers) that has proved very useful for the national public education efforts since then. The experience of Kharkov, which is located in Eastern Ukraine, was

used in Lvov Oblast in Western Ukraine. Supported by strong advocacy, health worker education, widespread multi-sector partnership and creative communication, and a resolution by the Oblast Governor, the social marketing in Lvov succeeded in raising the use of iodized salt in the households to 86%, leading to a sizable improvement of the iodine status among school children (11). While recognizing that local decrees and programs are not a substitute for national legislation, the so-called "Lvov IDD Elimination Model" has since then been extended to other Oblasts.

The period up to 2005, therefore, witnessed many activities to develop the elements that underlie the progress to IDD elimination, including support toward USI legislation, raising the national consciousness on IDD and USI, building capacity in the salt productive industry, communications for influencing public awareness, education of the academic understanding and stimulation of the market for iodized salt in two Oblasts and nationwide. The capacities in Ukraine for  $KIO_3$  as well as iodized edible salt production at that time were more than adequate to flood the national salt demand in the food industry and the households, although the official stand of the Salt Producers Association remained passive. The MICS in 2005, however, showed that adequately iodized salt was being used in only 22% of the households, one of the lowest achievements in the CEE/CIS region.

From late November 2004 to January 2005, a series of political events, named the Orange Revolution, took place in the aftermath of the run-off vote of the Presidential election, which was claimed to have been marred by massive corruption, voter intimidation and direct electoral fraud. Nation-wide protests focused on daily demonstrations in Kiev and succeeded in an annulment of the run-off results and the decision in the Supreme Court for a revote on 26 December. Under intense scrutiny by domestic and international observers, the second run-off was declared to be "fair and free". With the inauguration of the new President Victor Yushchenko on 23 January 2005, the Orange Revolution ended with high public expectations for a new and more democratic approach to national decision making.

The history from 2005 onward has been described in detail in a recent review (12). UNICEF continued collaborating with national partners in advocating for the adoption of USI legislation and promoting regional initiatives to increase the population's iodine consumption through the iodization of all edible salt. A national advocacy meeting in 2005, conducted with WHO, ICCIDD and CDC involvement, reached consensus that USI is the most efficient and cost-effective strategy in Ukraine to eliminate IDD. Also in 2005, the Minister of Health of Ukraine supported a resolution at the World Health Assembly on sustainable IDD elimination through USI. A cost-benefit analysis performed in 2006 projected >300,000 intellectually impaired newborns and US\$400million costs for health care associated with IDD during the next 10 years under the current status quo. Adoption of USI, on the other hand, would cost less than \$5million for prevention throughout the population, or \$0.01cent per person per year. The cost-benefit analysis was inserted in a high-level advocacy kit for members of parliament and high-level Government officials. UN Deputy Secretary General, Mr. Kul Gautam of UNICEF, spoke passionately of the imperative to enact USI for thyroid cancer prevention in children at the 20<sup>th</sup> anniversary of the Chernobyl nuclear plant meltdown. And UNICEF Goodwill Ambassador Antoly Karpov appealed personally to the President and First Lady of Ukraine at a meeting in November 2006.

Despite all advocacy and the compelling analyses, however, the proposed legislation became victim of the factious politics in the Parliament of Ukraine. A draft law “On prevention of IDD”, introduced in December 2006 by four deputies from different Parliamentary factions, was rejected in June 2007, stating a lack of scientific basis for the adoption of USI in Ukraine. In addition, the justification for rejection, written by the Parliamentary Health Committee, suggested the possibility of excessive iodine intake in certain regions and individuals, while it argued at the same time that a variety of other food products fortified with iodine, and nutritional supplements could cover the needs of the population. Obviously, the underlying reason for this position was not scientific or technical. After the contested Presidential election of end 2004, two heated Parliamentary elections added to an outbreak of serious and prolonged political infighting which distracted the high-level decision-makers from addressing issues of national importance. In the eyes of the leaders of the Parliamentary Health Committee, the legislation proposal was considered a brainchild of the pro-President Parliamentary faction, and mainly conceived during a period that the opposition faction boycotted the Parliamentary meetings.

Surveys of consumer practices had shown that one of the obstacles for reaching USI was the absence of iodized salt in a sizable proportion of outlets in Ukraine. As part of the continuation of social marketing campaigns, special efforts were inserted to communicate the need for/benefits of iodized salt among the major salt traders. This took place in combination with the distribution of informational posters and leaflets for public use through health promotion centers and NGOs in several Oblasts in central and Eastern Ukraine. In addition, mass media channels and public announcement locations were flooded with PSAs on iodized salt. In five Oblasts, the use of iodized salt in households was estimated to have increased to 40% by 2007, against a national average estimate of  $\pm 20\%$  (12). The experience suggests that a communications drive by itself, without the drive of a multi-sector partnership at Oblast level and a strong push by the Governor can only have limited effect on the goal of reaching the universe of households in an Oblast. Moreover, Ukraine counts 24 Oblasts and an Autonomous Republic Crimea (Plus two cities with “special status”). Rounding up the entire nation by a piecemeal approach would take many years, beyond the deadline imposed by the signature of Ukraine’s President on the global declaration of the goal.

Cognizant that most of the attention in support of USI legislation was focusing on the fraction of the iodized household salt supply, UNICEF supported a study during the fall of 2007 carried out by the State Medical University in Donetsk, Eastern Ukraine. The design was a randomised controlled trial of 2 weeks duration. Healthy pregnant women (PW), visiting for routine prenatal consultations at primary health centres of Donetsk, not using iodine supplements, and living in a stable household together with a 6-12y old schoolchild (SC), were candidates for inclusion. The households were enrolled in two groups: A “non-iodized salt” control group (n=80) where the salt in the household was replaced with study-provided salt of the type commonly sold in Donetsk; and an “iodized salt” experimental group (n=80) where the salt in the households was replaced with salt iodized with potassium iodate at 40mg iodine/kg. The household allocation was random and blinded to the investigators as well as the participants. Urine samples from the PW and SC as well as household salt samples were collected during household visits at baseline and 2-week follow-up. The baseline characteristics between the groups were comparable, except for sea fish consumption by the school-age children on the day before baseline.

At the start, the salt iodine content in the households was 10.2mg/kg and the UI concentrations in the PW (89µg/L) and the SC (101µg/L) did not differ significantly. In the experimental households, the salt iodine content during the 2-week trial period was 43.3mg/kg, which is significantly higher ( $p < 0.001$ ) than in the control households (11.4mg/kg). The final UI in PW (141µg/L; 95% CI: 123-163) in the experimental households was lower ( $p < 0.05$ ) than in the SC (169µg/L; 95% CI: 147-194), but the net consumption effect in the PW (73µg/L; 95% CI: 66-81) was significantly higher ( $p < 0.01$ ) than in their children (59µg/L; 95% CI: 53-67). In both groups, the baseline UI concentrations and the consumption of sea fish (both groups) and dairy products (children only) were significant effect modifiers. The key findings of the trial are illustrated in Figure 2.

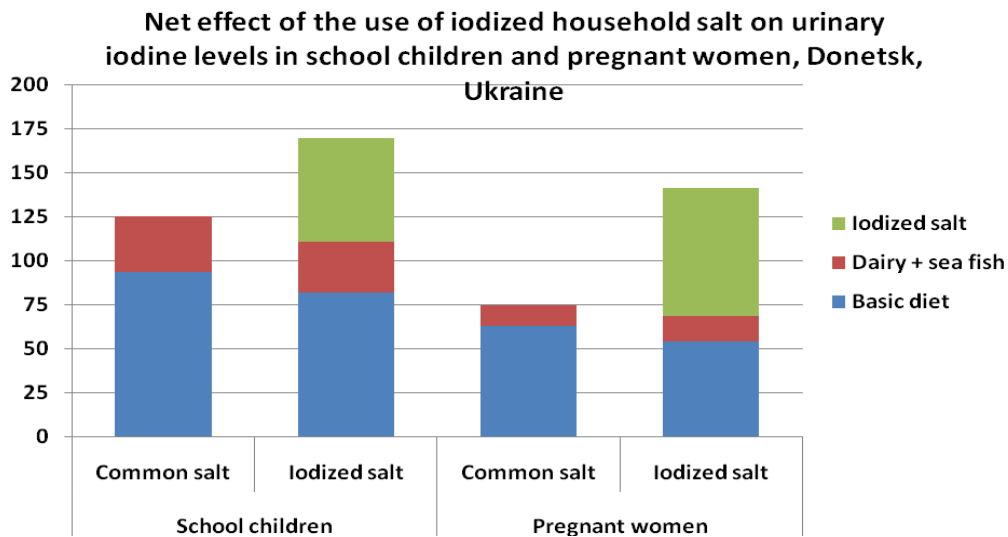


Figure 2: UI levels in pregnant women and school children of Donetsk after 2 weeks of habitually using common or iodized salt in their households

This study demonstrated two important conclusions. First, the final UI levels of the pregnant women in the households that used common salt (the typical situation) show that their dietary iodine intake is not sufficient to meet the RDA for pregnancy, despite the expert opinion held among academic Government advisors that IDD is affecting the endemic areas in Western Ukraine only. The second key conclusion is that the use of iodized salt at the regulated level of Ukraine ( $40 \pm 15$ mg/kg) was not effective in raising the dietary iodine intake of the pregnant women in Donetsk to the RDA for pregnancy, thus suggesting that the promotion of iodized household salt alone would not be sufficient for the prevention of fetal brain damage during the period that women are pregnant.

Since a Parliamentary law had been defeated, UNICEF worked in 2008 with its national counterpart, the Ministry of Family, Youth and Sports (MOFYS) to develop a Presidential Decree on USI. However, since the expert opinions were still entwined with the political partisan positions, the process became soon stalled. In a parallel process, MOFYS was also drafting a recommendation by the Minister to the Oblast Governors to encourage the development of regional programs, along the lines of the successful Lvov approach.

The opposition and reluctance in Ukraine to embrace USI is not limited to the influential expert advisors, however. The salt industry of Ukraine is an important source of the iodized salt supplies in a range of neighboring countries, many of which have decided for mandatory USI and have demonstrated success in eliminating iodine deficiency. Nevertheless, the industry remains in its basic position, voiced by the previous Director General of the “Ukrsil” Association: “If the customer requests, we will supply”. While that has been proven true for the populations in neighboring countries, the salt industry in Ukraine, which is an important ally in national partnership coalitions of many countries, is reluctant to take a patriotic leadership role. Surprisingly also, there is outright opposition to mandatory USI among some national NGOs. In 2001, when the Cabinet of Ministers amended the Decree “On measures of IDD prevention”, the NGO “Women of Ukraine” wrote a letter of objection to the Chief Sanitary Physician. Since then, this NGO has also published several letters to argue against USI on basis of “the right of free consumer choice”, an opinion that is also defended by another national NGO, the Association for Protection of Consumer Rights. In contrast, regional and local-level NGOs have played big and decisive support roles in driving the Oblast campaigns.

Concluding, the progress toward USI in Ukraine is troubled by a strong resistance among influential academic Government advisors, an aloof position in the salt industry, opposition by some NGOs and increased hostility among the legislators, who are encouraged by companies promoting so-called “alternative” products. A national partnership or coalition to drive and oversee progress has not transpired due to a lack of will to embrace participation by stakeholders outside Government. The salt industry is dominated by the Artemsol Company, which has the full capacity for adequate iodization and serves customers not only in Ukraine but also various neighboring countries. Artemsol has proven that it will deliver quality iodized salt in response to specific purchase orders, but it has inclination to partner in the promoting the USI strategy. The discussion among academics continues beholden to an outdated notion of endemic areas, and lawmakers give preference to a voluntary approach that leaves the door open to other commercial products.

There may soon be an opportunity to re-launch the collaboration around a discussion with the MOH, academicians and the Health Committee of Parliament on new ways to reach IDD elimination using approaches proven to succeed in Europe. This could include the bread industry (Belarus, Netherlands and Denmark as examples), special products for pickling and/or different standards for different salt grades (Germany as example). This implies less ambitious overall goal setting and closer collaboration on business models with the various industries that command the use of iodized salt for manufacturing common products for the dietary consumption of the population in Ukraine.

Participation of national officers in UNICEF-supported regional and international meetings:

- Joint Workshop on the Elimination of Iodine Deficiency Disorders, Ashgabad, Turkmenistan, Economic Cooperation Organization, UNICEF, WHO, June 1994

- Conference on Elimination of Iodine Deficiency Disorders (IDD) in Central Eastern Europe, the Commonwealth of Independent States, and Baltic States, 3-6 September 1997, Munich, Germany
- Regional Salt Producers' Meeting, 29 September – 1 October, 1999 Kiev, Ukraine
- Salt producers meetings of Russia, Ukraine and Belarus, Moscow (GCC Commission); and Conference of Iodized Salt Producers and Suppliers of the Russian Federation with international participation, 16-17 October 2002
- UNICEF-ADB Regional Workshop for Salt Producers, Bishkek, Kyrgyz Republic, July 2004
- Workshop on Strengthening Strategies for the Elimination of Micronutrient Malnutrition. Ankara, Turkey, 13-17 September 2004
- Workshop on Strengthening of Laboratory Capacity and Iodine Status Assessments for Monitoring of Sustained IDD Elimination through USI in the CEE/CIS Region. Istanbul, Turkey, 18-19 May 2006

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