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TECHNICAL SERIES

Monitoring Iodized Salt Programs

Key Points

Iodine deficiency disorders (IDD) are a critical public health problem affecting the intellectual capacity of children worldwide. WHO has identified 118 countries as having a problem with iodine deficiency disorders of public health significance. Most of these countries have established salt iodization as the intervention of choice. For salt iodization to be effective, the product, salt, must consistently have adequate levels of iodine and the national program must have the necessary elements to be sustainable indefinitely.

Quality assurance is a proactive and continuous process of monitoring a system for reproducibility and reliability by: setting standards of performance and designating responsibility, defining corrective actions taken when criteria are not met, and performing measurements within a stated level of confidence. Quality assurance implies an overall set of processes designed to ensure that a specified product standard is being met; in this case, the required concentration (ppm) of iodine in salt.

Quality control is an indicator system for documenting performance and action that: provides a record of consistency of performance, records actions taken when performance fails to meet the standard, and uses a non-blinded system.

Monitoring provides the data to determine if the program is meeting its goals, and ensures that: all iodized salt meets government standards, i.e., it contains iodine within a range that the government has determined is necessary to prevent IDD; iodized salt does not contain too much iodine thus posing a safety hazard; communities understand the magnitude of their problem, thus helping to build awareness at the community level; and progress toward goals to eliminate IDD is measured.

Most countries are rapidly developing the capacity to iodize all salt for human and animal consumption. However, in many countries the amount of iodine in salt reaching communities is too variable, commonly due to lack of quality assurance measures associated with iodized salt production and the national program.

Essential Elements of a Monitoring Plan

The government must encourage and ensure that all salt producers and/or processors abide by government rules and regulations, and that the iodization program is effective in eliminating iodine deficiency disorders. Producers and processors must take responsibility for ensuring that the product they distribute is of good quality, and meets industry and government specifications. Consumers must recognize the importance of iodine in their diet so that they will demand iodized salt. Therefore, important elements of a monitoring plan include the following:

- a **political environment** that demonstrates commitment to universal salt iodization (USI), and hence supports monitoring efforts;

- a **government program** that: monitors the situation at many levels in order to enforce compliance with the law; facilitates greater consumer awareness; allocates appropriate resources (financial and human); identifies gaps in program implementation; and ultimately measures the impact of iodized salt;
- a **regulatory environment** that mandates iodization, and allows adequate inspection and enforcement;
- **producers** who are aware of the importance of their contribution to the program, and who incorporate internal quality assurance as a routine part of the production process, while at the same time being able to recover costs and maintain their profits;
- **distributors** who are attentive to transport time, warehousing practices and making sure iodized salt is in the marketplace at all times;
- **members of the community** who are aware of the importance of iodine in the diet, who express their demand for good quality iodized salt to the retailers providing the salt, and who may need to be willing to pay for the marginal increase in cost.

Production level quality assurance is perhaps the most important step. As part of their internal or plant level quality assurance, producers/processors are responsible for: appropriate quality of raw salt; machinery validation and maintenance; appropriate testing of iodine content in salt by a reasonable quantitative method during the production process; and packaging and labeling that reflects iodine content and otherwise meets government requirements. Adequate records are required that reflect production capacity and iodized salt quality, that can be used for taking timely corrective action, and that are readily accessible to government inspectors.

Monitoring iodine levels in salt as it moves through the distribution chain from producer to consumer may be important to track losses, or to understand other issues, such as improper labeling, counterfeiting, or using industrial salt. These issues might explain why salt in a given community contains inadequate iodine. Community monitoring provides the ultimate information on whether the salt consumed contains adequate iodine, providing an estimate of coverage. Because community household monitoring may be difficult to establish, salt testing in schools, representing communities, has been used as one mechanism to monitor coverage and effectiveness, identify high risk areas, and/or build awareness in the community.

Establishment of a good monitoring system can help achieve a good balance between motivation on the part of the producers, demand on the part of the consumers, and regulation on the part of the government. Failure in any one of these areas can slow down the transition to universally available iodized salt.

Sampling methods differ depending on what is being monitored. Use of existing surveys or community efforts can help monitor coverage. Lot quality assurance sampling allows producers to determine if a 'lot' meets a minimum standard while limiting the number of samples to be tested. Cluster survey methods allow program managers to determine statistically valid prevalence estimates, or to make more exact estimates of iodized salt coverage.

Steps in Establishing a Monitoring System

Every country's situation will require a slightly different monitoring system. The factors influencing the development of such a system include the maturity of the program, the human and financial resources available, and the infrastructure in which the monitoring system is implemented. However, there are several common steps that are helpful in establishing such a system. These are:

- completing a **salt situation analysis** that maps the current production, importation, distribution, and consumption of salt and provides information on production capacity, salt pricing, and consumer preferences;
- reviewing, modifying or promulgating **food laws and regulations** which accommodate universal salt iodization, and facilitating a multisectoral dialogue that includes the private sector and ensures that the regulations define each sector's role, responsibility, and authority;
- developing **laboratory capacity** to check quality control at production sites by titration or, in some instances, salt test kits, and to measure biologic impact through checking urinary iodine levels, thyroid stimulating hormone levels (TSH) or thyroglobulin, and other indicators as appropriate;
- holding discussions with Ministries of Education, Health, Industry, and Agriculture, along with NGOs to determine an organizational framework through which **community awareness** and demand for iodized salt can be created;
- describing in the overall monitoring plan the **flow of information** to those requiring the information in order to act: to modify policy, to

modify production procedures, to modify distribution practices, or to mobilize community efforts;

- including in the plan mechanisms and resources for periodic overall **impact assessment** through measurement of biologic indicators, such as urinary iodine, in selected populations.

Basing policy decisions on data available through monitoring efforts will strengthen the ability of salt iodization programs to be sustainable. Because iodine deficiency is geographic in nature, that is, it is the result of lack of iodine in the local environment, elimination efforts must be permanent. Establishing the appropriate monitoring system is important in ensuring that iodized salt is quality assured, and that consumers routinely consume adequately iodized salt.

Useful Facts

- Adult RDA (ICCIDD/WHO): 150 µg/day
 - Household level salt iodine ppm: 20-50ppm
 - Median urinary iodine > 100 µg/L indicates no IDD public health problem
 - Average adult daily salt consumption: 5-15 g/day
 - 168.6mg potassium iodate = 100mg iodine
 - % of neonatal TSH >5mU/l whole blood < 3% indicates no deficiency
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