

Means and Mode of Providing Information to People in their Fluorosis Prevention

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SUMMARY: The nature of the fluorosis problem in Thailand differs from one locality to another. In a user-based approach to combat fluorosis, it is essential that testing of fluoride in people's drinking waters goes hand in hand with other services required for the success of the mitigation program. In order to achieve that ICOH launched the use of a mobile unit, a minibus rebuild, equipped and staffed multiple disciplinary. It covers the need for simultaneous fluoride testing, fluorosis identification and counselling, community education and mobilisation to take own decisions on measures that fit people's way of life and socio-economy. The unit's working procedure and its outcome in terms of observed fluoride levels, identified fluorosis and achieved community mobilisation are stated. The lessons learned and the success factors are discussed.

Key words: Mobile unit, fluorosis prevention, fluoride levels, fluorosis occurrence, Thailand, user-based mitigation, success factors, community mobilisation.

INTRODUCTION

During decades of work, ICOH, the Intercountry Center for Oral Health in Chiang Mai, Thailand, has experienced that sustainable prevention of fluorosis can only be accomplished through programs that fit people's way of life and allow for people's own decisions. In such a user-based approach conceptual understanding of 1) the cause and effects of fluorosis and 2) the variety of potential measures are the initial steps required for proper decision-making.

Fluorosis in Thailand only occurs in specific locations scattered from north to south. People who live in these locations have lived with the fluorosis problem for generations. The nature of this problem differs from one locality to another in terms of severity, geographic location, fluoride concentration, socio-economic and cultural dimensions. After knowing that fluoride in their drinking water is the cause of fluorosis, the communities are naturally very anxious to solve the problem. Then it is absolutely essential immediately to provide each community with more specific information about the cause of fluorosis in their community and the options in solving the problem in a timely manner.

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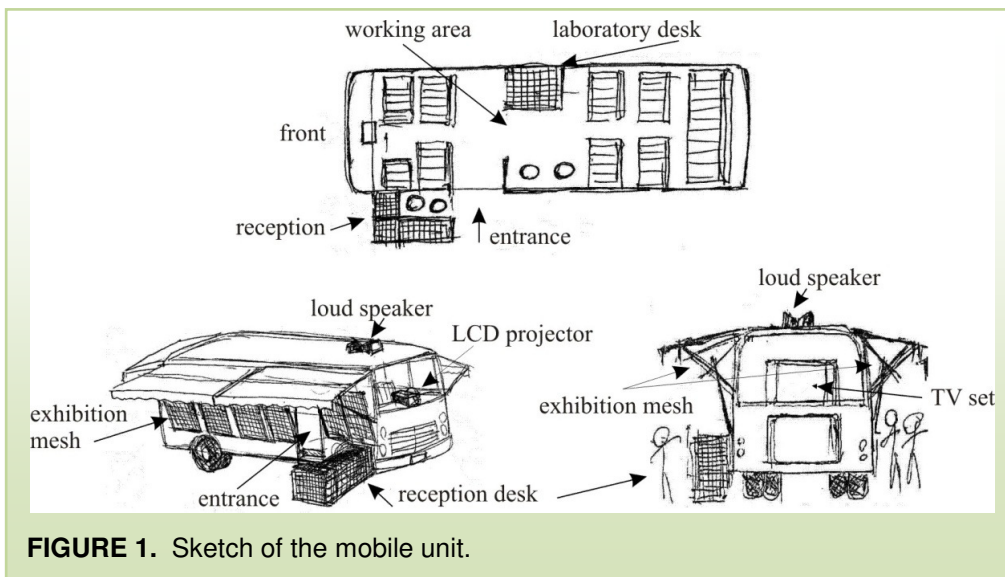


FIGURE 1. Sketch of the mobile unit.

Previously testing the water required sending samples to ICOH, doing the laboratory work at the Center and resending the results. This is took too long time and caused an unfortunate interruption in the efforts in getting the community involved in setting up their fluorosis prevention programs. To address this problem ICOH launched the idea of a mobile unit of professionals, equipment and materials all together approaching each community and working side by side with the people in the community. The objectives of the mobile unit were set as follows:

- To provide relevant information about fluorosis in each community.
- To increase awareness of the communities regarding the effect of excessive fluoride consumption on health.
- To serve the community with on-site analysis of fluoride content in the water.
- To give technical consultation concerning the possible alternatives to solve the problem in the community.

METHODS

Unit design: An old 20-seat minibus, cf. figure 1 & 2, was modified to serve as a mobile service centre. The budget for the modification of the minibus was about 10,000 Baht, equivalent to US\$ 250.



FIGURE 2. Illustration of the mobile unit exhibition and out- and in-working places.

Equipment: The unit was equipped with:

- A small lab facility including in site electrode potentiometer.
- An audiovisual facility including LCD projector, cassette player, video player with screen and a microphone with an amplifier.
- An education exhibition facility including stands, posters, boards, tables, and seats, cf. figure 1 & 2.

Professional team: The unit team consists of 4 professionals, each having a task as follows:

- A public health officer, who uses the exhibition, makes video presentation and provides further information about fluorosis in Thailand.
- A lab technician, who demonstrates the fluoride testing procedure. He/she also determines the fluoride content in water samples that are collected by the people in the community and reports the results to the community and to ICOH database.
- An oral health officer, who examines and provide consultation regarding people's oral health. Specially he/she screens the children aged 11-13 for dental fluorosis and observe other deformities and symptoms regarding fluorosis in the elderly.
- A "motivator", i.e. a representative from a neighbouring community, which has been though a fluorosis prevention program. He/she would share the community's fluorosis prevention experiences.

Preparatory public relations: In 2002 a meeting was arranged with the attendance of representatives from seventy local administrative bodies all from nearby areas considered to be at risk for fluorosis. An exhibition on “Fluorosis: Etiology and Remedies” was set up and the mobile unit and the planned activities were presented. The representatives who wanted the mobile unit to visit their community could make their request. Their name, addresses and telephone numbers were recorded and a schedule for the mobile unit was set up.

Community preparation: The venues for the mobile unit activities were proposed by the community leader and could be a school, a temple, a health center, an office of the local administrative body or any other place that has electricity and is easy accessible to the villagers. The administrative body also informed villagers and all stakeholders i.e. health workers, community water supply workers, leaders from the league of women’s group, etc. about the role and venue and time and the objective of the mobile unit visit. People are informed to bring their own water samples.

Working procedure: At arrival of the mobile unit to the selected site, the team discusses their plan with the community’s leader while water samples are tested for their fluoride concentrations. The villagers have to pay 50 Baht, i.e. US\$ 1.25, per sample. While waiting for the result of the test, the public health worker and the “motivator” from the experienced neighbouring community make their presentations and initiate a group discussion. The dentist would then start activities as described above.

The result of the fluoride test would be written on a green tag if the fluoride concentration is lower than 0.7 mg/L, i.e. within the Thailand safety limit or on a red tag if the fluoride concentration is higher than this limit. The people are told that a red tag means not recommended for drinking.

The lab technician also tests the community’s pipe water and school water. The results of these tests are then discussed with the community’s leader. Possible alternative water sources are discussed and samples of those are tested free of charge. Based on the results of these test, alternative water sources are recommended.

RESULTS

Areas served: Of the 70 local administrative bodies who participated in the meeting preparatory meeting “Fluorosis: Aetiology and Remedies”, 28 (41%) made a request for the mobile unit visit in 2002. Because of budget limitations, ICOH could only serve 18 communities. In 2003 there were 7 other requests for the mobile unit. Since all of the requests were in the northern part of Thailand, ICOH was able to serve all of them. The communities served by the mobile unit were within a 250 Km. radius of ICOH.

Involved stakeholders: The representatives from the communities could contact and motivate most of the stakeholders to join the prevention program. Apart from the community leaders the stakeholders included: sub-district chairmen, village chairmen, community water supply workers, leaders from the league of women's group and leaders of elderly groups. State agency stakeholders included a secretary of the grass root organisation, health workers and schoolteachers.

Water tests: The mobile unit determined fluoride content in 1,108 water samples from different water sources. Table 1 shows the different sources of the tested waters along with the fluoride levels found. Each community had between 5 and 10 different sources for pipe water. Of the 244 samples of deep well water used for village piped supply, 59 were tested more than once because of individual request.

Observed fluorosis: Fluorosis was clearly found in areas where the water sources had high fluoride content and where the same sources have been used for more than 10 years. 11-13 old children had moderate to severe dental fluorosis. Symptoms of joint pain, curved legs and difficulty in walking were common among the elderly. Even though some people drank rain or bottled water, dental fluorosis was still found, probably due to the use of the high fluoride water for cooking.

Observed community mobilisation: It appears that the mobile unit has succeeded in creation of concern about fluorosis and the high fluoride water. It also increased self-confidence of the members of the communities in discussion, empowered them to synthesize the alternatives in solving their problem, and to assist in transfer of knowledge and experience to other communities.

Outcome of the mobile unit: The communities visited by the mobile unit decided, according to their situation, to carry out one or more the following actions in order to solve their problem:

- Provision of rainwater tanks for safe drinking water.
- Set up of funds for later installation of rainwater tanks.
- Change of pipe water source in most cases from deep wells to shallow wells.
- Changed of the water supply.
- Set up a factory to produce bottled drinking water at low cost level.
- Preparation and use of bone char defluoridators.

TABLE 1: Water tested in different sources and supplies and their respective fluoride contents

Fluoride Conc. in mg/L	All Conc.		< 0.7		0.7-1.5		>1.5	
	No	%	No	%	No	%	No	%
Public Supplies:								
Deep well water used for village piped supply	244		144	59	34	14	66	27
Deep well water used for village piped supply (provided by Dept. of Rural Development)	9		6	67	3	33	0	0
Deep well water used for village piped supply (provided by Dept. of Mineral Resources)	5		1	20	1	20	3	60
Surface water used for village piped supply	37		35	94	1	3	1	3
Deep well water used for the Primary School piped supply	17		7	41	2	12	8	47
Water from river	7		7	100	0	0	0	0
Water from public reservoir	3		3	100	0	0	0	0
Private Supplies								
Deep well water with motor pumps in village households	148		104	70	16	11	28	19
Shallow wells in villager household	600		447	74	65	11	88	15
Distilled water	6		6	100	0	0	0	0
Bottled water	21		21	100	0	0	0	0
Harvested rain water	11		10	91	1	9	0	0
Total	1,108		791	71	123	11	194	18

DISCUSSION

The results from table 1 show that among public water supplies deep well water for village piped supply was the most likely to be tested for safety. Among private supplies, shallow wells in villager households were the most likely to be tested for safety.

The results also show that 71 % of examined water samples were safe. Surface water, rainwater and shallow well water were usually good sources of safe water. More than half of the deep wells contained fluoride within safety limit. Getting safe water by changing the source of drinking water was possible in all needy communities.

Lesson learned: The lesson learned were summarised as follows:

- Working with the community through the mobile unit at their location gives prompt information needed by the community and allows for effective facilitation of own decision making.
- A charge of 50 Baht (1.25 US\$) per sample for water tested for fluoride content was acceptable to the residents of all visited communities.
- The communities themselves know their capabilities and limitation so they can make appropriate and feasible choices for themselves. State agencies can provide them with essential information, which they cannot find by themselves.
- With the decentralization policy, the local administrative body can mobilize resources to support the action promptly.
- **Success factors:** The success factors were identified as follows:
- The essential information i.e. aetiology of fluorosis, health effects of excessive intake of fluoride, the incidence of fluorosis in the community, information about water sources and experiences from other communities etc.
- The awareness of the problem by all social groups within the community and the willingness of those to work together.
- The support from state agencies to empowering people to initiate their own programs.
- The community forum, which facilitates the exchange of experiences and mutual assistance.
- The select of appropriate technology to support self-reliance of the communities.

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