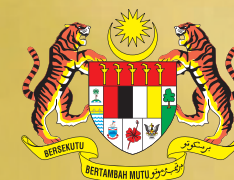


**IMPLEMENTATION
OF WATER FLUORIDATION
PROGRAMME IN
MALAYSIA**



**Oral Health Division
Ministry Of Health, Malaysia**

**IMPLEMENTATION
OF WATER
FLUORIDATION PROGRAMME
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FOREWORD



Water fluoridation as a public health measure for the prevention of dental caries was implemented as a government policy in 1972. After more than 30 years of implementation, this programme has brought about a marked improvement in the oral health status of school children and adults in our country. In 2005, more than 95% of the Malaysian population received piped water, making water fluoridation the most cost effective and feasible public health measure in the control of caries in Malaysia. However, only 72% of the piped water is fluoridated, and thus some 30% of the population do not benefit from this programme.

To maximize the benefit of fluoride use in dental caries prevention, consolidation efforts should be enhanced between organisations, agencies and individuals. It is hoped that this document will facilitate further inter-agency collaboration and understanding, whether between various government agencies or between the public and private sectors, and serve as a reference for the continued implementation of water fluoridation. Most importantly all parties must understand that it is essential for the fluoride level in the water reticulation system, recommended by the National Standard for Drinking Water Quality, be maintained and constantly monitored.

I take this opportunity to thank all those involved in the implementation of water fluoridation for the past 30 years. I also extend my warmest appreciation to those who contributed to the preparation of this document. I am confident that this document will be of benefit to all concerned parties and will ensure that this programme is continued, expanded and sustained, contributing towards an improvement in the oral health status, and hence the quality of life of the Malaysian population.

A handwritten signature in black ink, appearing to read 'Dato' Dr. Wan Mohamad Nasir Bin Wan Othman', written over two horizontal lines.

DATO' DR. WAN MOHAMAD NASIR BIN WAN OTHMAN
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All those who have contributed in one way or another in preparing this document.

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IMPLEMENTATION OF WATER FLUORIDATION PROGRAMME IN MALAYSIA

1. INTRODUCTION

This document is mainly a compilation of literature review, objectives and strategies for implementation of a fluoridation programme to assist planners and implementers, and to ensure that this programme is continued, expanded and sustained.

Fluoridation of water supplies may be defined as the controlled addition of suitable fluoride compounds to community water supplies, aimed at adjusting the fluoride content of drinking water to a level sufficient for the control of dental caries and in compliance with criteria governing the provision of a safe water supply ¹.

It is endorsed by major international dental, medical and scientific organisations like the World Health Organisation, the U.S. Public Health Service, the American Medical Association, the American Academy of Pediatrics, the American Academy of Family Physicians, the International Association for Dental Research, the American Cancer Society, the Federation Dentaire Internationale (FDI), and the British Dental Association (BDA) (Appendix 1). In 2004, about 405 million people in more than 60 countries lived in communities with fluorides in their water supply (Appendix 2).²⁻³

“Fluoridation of drinking water is one of ten great public Health achievements of the 20th century. It is the single most effective public health measure to prevent dental decay and improve oral health over a lifetime, for both children and adults ”

-The Centers for Disease Control and Prevention, USA-

Fluoridation of the water supplies in Malaysia is the cornerstone of the dental public health programme and constitutes one of three primary prevention programmes of the Oral Health Division. It obtained Cabinet approval in 1972 ⁴ following the recommendation of a Special Appointed Commission to institute water fluoridation in

Malaysia⁵. At the time, the recommended optimum level was 0.7 parts per million (ppm) based on the volume of water intake in our climate. However, the fluoride level was reviewed to 0.5 ppm in 2004 following studies done on Fluoride Enamel Opacities among 16 year-old Schoolchildren⁶ (2000) and Fluoride Exposure and Fluorosis among Schoolchildren in Malaysia. It is mainly due to availability of alternative sources of fluoride in the country⁷.

The programme is multi-sectoral with active involvement of both public and private agencies, among others are the Oral Health Division, the Engineering Division and the Public Health Department of the Ministry of Health (MOH), the Water Supply Department of the Ministry of Energy, Water and Telecommunication, the Chemistry Department, Ministry of Science, Technology and Innovation, the Public Works Department, Water Supply Boards and Private Water Companies.

Currently, about 69% of the population benefits from this programme⁸. As more than 95% of the population receive public water supply⁹, fluoridation remains the most appropriate public health measure to prevent and control dental caries in Malaysia. However, continuous expansion and monitoring is important to ensure safety and optimum benefit to improve oral health and an enhanced quality of life of the nation.

2. BACKGROUND

2.1 History of Water Fluoridation

The history of water fluoridation dates back to the early 1900s in Colorado Springs, Colorado, when Dr. Frederick McKay discovered the *Colorado stains* in the local inhabitants¹⁰ and later, found these teeth to be surprisingly resistant to decay¹¹. Adopting the term "fluorosis" to replace "mottled enamel," Dr H.T. Dean conducted extensive observational epidemiologic surveys and by 1942 had documented the prevalence of dental fluorosis for much of the United States¹². Further studies followed which confirmed the cause-and-effect relationship between fluoridation and the reduction in dental caries¹³.

In 1939, Dr. Gerald J. Cox and associates were the first to publish a paper that proposed adding fluoride to drinking water to reduce dental decay¹⁴. This hypothesis was tested in

a prospective field study conducted in four pairs of cities in the U.S. (intervention and control) starting in 1945 when the fluoride level of community water supplies were adjusted from negligible levels to 1.0-1.2 ppm. Post-fluoridation results after 15 years showed that children in the fluoridated cities have between 50-70% less dental decay than those in non-fluoridated cities¹⁵⁻¹⁶.

Epidemiologic investigations of the patterns of water consumption and caries experience across different climates and geographic regions in the United States, led in 1962, to the development of a recommended optimum range of fluoride concentration of 0.7-1.2 ppm¹⁷.

The astounding success recorded in these early studies firmly established fluoridation as a practical and safe public health measure in reducing dental caries, and ensured that it would be quickly embraced by other communities. By 2004 approximately 405 million people in more than 60 countries worldwide enjoy the benefits of fluoridated water³.

2.2 Fluorides and Dental Caries

Dental caries is an infectious, communicable, multifactorial disease in which bacteria dissolve the enamel surface of a tooth¹⁸. The major etiologic factors for this disease are specific bacteria in dental plaque (particularly *Streptococcus mutans* and lactobacilli) on susceptible tooth surfaces and the availability of fermentable carbohydrates.

Fluoride's caries-preventive properties initially were attributed to changes in enamel during tooth development when fluoride is incorporated, resulting in a more acid-resistant mineral. However, laboratory and epidemiologic research suggests that fluoride prevents dental caries predominantly after eruption of the tooth into the mouth, and its actions are primarily topical for both adults and children. These mechanisms include inhibition of demineralisation; enhancement of remineralisation, inhibition of bacterial activity in dental plaque.

The maximum reduction in dental decay is achieved when fluoride is available pre-eruptive (systemically) for incorporation during all stages of tooth formation and post-eruptive (topically) at the tooth surface. Water fluoridation provides both types of exposure¹⁹⁻²².

2.3 Effectiveness of Water Fluoridation

The effectiveness of water fluoridation has been documented in scientific literature for over 60 years, since the first community fluoridation programme began in 1945²³⁻²⁷. Community water fluoridation is the single most effective public health measure to prevent dental decay, prompting the U.S. Centers for Disease Control and Prevention to proclaim it one of ten great public health achievements of the twentieth century²⁸. The earliest studies on effectiveness of water fluoridation conducted in the 4 pairs of cities in the U.S. showed substantially less dental decay in children in the fluoridated areas compared to those in non-fluoridated cities²⁹.

The first fluoridation survey in the state of Johor in Malaysia reported an overall reduction of 44.8% in dental caries; with 60.1% in the permanent dentition and 29.4% in the deciduous dentition³⁰.

Unlike the early studies when drinking water was the only source of fluoride other than fluoride that occurs naturally in foods, more recent studies were conducted in an era of universal availability of fluoride from other sources including food, beverages, dental products (toothpaste, rinses, professionally applied foams, gels and varnish) and dietary supplements³¹. Despite this, studies prove that water fluoridation continues to be effective in reducing dental decay by 20-40%³²⁻³³.

In 1983, a study undertaken in North Wales to determine if decay rate of fluoridated Anglesey continued to be lower than that of non-fluoridated Arfon, as had been indicated in a previous survey conducted in 1974. Study results demonstrated that a decline in decay had occurred in both communities since the previous survey in 1974. The study also indicated a continuing need for fluoridation although decay levels had declined³⁴.

In a review of studies conducted from 1976 through 1987³² when data for different age groups were separated, reductions in dental decay in fluoridated communities were:

- 30-60% in the primary dentition
- 20-40% in the mixed dentition (aged 8 to 12)
- 15-35% in the permanent dentition (aged 14 to 17); and
- 15-35% in the permanent dentition (adults and seniors)

Newburn E, 1989

The possible benefits water fluoridation had for adults were seen in both the systemic and topical effects of fluoride exposure ³⁵. Another protective benefit for adult is the prevention of root decay. Adults with gum recession are at risk for root decay because the root surface becomes exposed to cariogenic bacteria in the mouth. Studies have demonstrated that fluoride is incorporated into the structure of the root surface, making it more resistant to decay ³⁶.

Using data from the dental surveys in 1991-2 and 1993-4, a British study demonstrated that children in lower socio-economic groups derive an even greater benefit from water fluoridation with an average 54% reduction in dental decay. Therefore, children with the greatest dental need benefit the most from water fluoridation ³⁷.

In the York Report, it was found that the available evidence on social class effects of water fluoridation in reducing caries appears to suggest a benefit in reducing the differences in severity of tooth decay between social classes among 5 and 12 year-old children ³⁸.

"Community water fluoridation is safe and cost-effective and should be introduced and maintained wherever it is socially acceptable and feasible"

-World Health Organisation Expert Committee -

In 2003, studies on initiation and discontinuation of fluoridation were systematically reviewed. The best available evidence on cessation of water fluoridation indicates that when fluoridation is discontinued caries prevalence appears to increase at a faster rate in the area that had been fluoridated compared with the control area ³⁸.

Fluoridation has substantial lifelong decay preventive effects and is a highly cost-effective means of preventing tooth decay in countries with established municipal water systems, regardless of socioeconomic status ³⁹⁻⁴¹. The cost of community water fluoridation can vary in each community depending on the size of the community, the number of fluoride injection points, the amount and type of fluoride compound used and the expertise of personnel at the water treatment plant ⁴¹.

The annual cost of fluoridation is approximately \$0.50 per person in U.S. communities of greater than 20,000 persons to a mean of \$3.00 per person in communities of less than 5,000 (in 1995 dollars) for all but the smallest systems ⁴². An economic analysis has determined that in most communities, every \$1 invested in fluoridation saves \$38 or more in treatment costs ⁴³. Compared with other methods of community-based dental caries prevention, water fluoridation is the most cost effective for most areas of the United States in terms of cost per saved tooth surface ⁴⁴.

A study found that Medicaid-eligible children in communities without fluoridated water were three times more likely to receive dental treatment in a hospital, than Medicaid-eligible children in communities with fluoridated water and the cost of dental treatment per eligible child was approximately twice as high ⁴⁵.

Prevention of dental decay may include intangible or indirect benefits such as freedom from pain, a more positive self image, fewer cases of malocclusion aggravated by tooth loss, reduced need for dentures, bridges and implants and less time lost from school or work because of dental pain or visits to the dentist ⁴⁶.

“Water fluoridation has helped improve the quality of life through reduced pain and suffering related to tooth decay, reduced time lost from school and work, and less money spent to restore, remove, or replace decayed teeth. Fluoridation is the single most effective public health measure to prevent tooth decay and improve oral health over a lifetime, for both children and adults.”

- Centers for Disease Control and Prevention, USA -

2.4 Population Receiving Fluoridated Water

To be considered a public water system, the system must have greater than or equal to 15 service connections or must regularly serve an average of greater than or equal to 25 persons for greater than or equal to 60 days per year. Public water systems do not necessarily follow city, country, or even state boundaries ⁴⁷.

Approximately 405 million people in over 60 countries benefit from fluoride in the public water supply; the countries include the United States, Canada, Brazil, Australia, New Zealand, Spain, Greece, Switzerland, Finland, Ireland, the former USSR and the United Kingdom. The most recent country to implement water fluoridation was South Africa ⁴⁸.

Of the 50 largest cities in the United States, 42 have community water fluoridation (and 2 cities have natural fluoride levels that are optimal). Fluoridation reached 67 percent of the population through public water supplies which means that it reached more than 170 million people ⁴⁹.

In August, 2001, the Centre of Disease Control (CDC), United State of America issued a recommendation to continue and extend fluoridation of community drinking water at 0.7–1.2 ppm ⁴⁰. As part of “Healthy People 2010” the U.S. Department of Health and Human Services set a goal of at least 75% of the American population served by community water systems should receive the benefits of optimally fluoridated water by 2010 ⁵⁰.

In Malaysia, approximately 93% of the population receives piped water and about 65% enjoyed the benefits of fluoridated water at the end of 2004 ⁵¹. In many parts of the world, fluoridation is not feasible nor considered a high priority, usually due to the lack of a central water supply, the existence of more life threatening health problems, the lack of trained technical personnel or insufficient funds for start-up and maintenance costs ⁵².

2.5 Safety and Legal Issues in Water Fluoridation

After 60 years of research and practical experience, the preponderance of scientific evidence indicates that community water fluoridation is both safe and effective. The three primary agents used in drinking water fluoridation are sodium fluoride, sodium fluorosilicate and fluorosilicic acid. These fluorides are considered "not classifiable as to its carcinogenicity to humans" (Group 3) in the classification scheme of the International Agency for Research on Cancer (IARC)⁵³.

In 1994, an expert committee of the WHO published a report which reaffirmed its support of fluoridation as being safe and effective in the prevention of dental decay, and stated that “provided a community has a piped water supply, water fluoridation is the most

effective method of reaching the whole population, so all social classes benefit without the need for active participation on the part of the individual”¹.

Almost 100 eminent international organisations recognise the public health benefits of community water fluoridation for preventing dental decay. The question of possible secondary health effects caused by fluorides consumed in optimal concentrations throughout life has been the object of thorough medical investigations, which have failed to show any impairment of general health throughout life⁵⁴.

The US and British courts, have ruled that fluoridation does not impinge on a fundamental right, does not violate a recognised constitutional right to privacy, and does not constitute compulsory medication⁵⁵.

2.6 Surveillance of the Water Fluoridation Programme

It is essential that a surveillance system is put in place. Studies have demonstrated that the oral health benefits are reduced if the optimal level of fluoride is not maintained⁵⁶⁻⁵⁷. In the U.S. for example, The Water Fluoridation Reporting System (WFRS) is the principal management tool for state oral health programme staff to monitor the quality of the water fluoridation programme in their state. Data provided are used to recognise excellent work in water fluoridation and identify opportunities for continuous improvement in the water fluoridation programme. The data are also used to develop estimates of the percentage of the population that receives fluoridated water⁵⁸.

2.7 Twenty - first Century Challenges

Despite the substantial decline in the prevalence and severity of dental caries in the United States during the 20th century, this largely preventable disease is still common⁵⁹. With the change in public attitudes and expectations regarding dental health, tooth loss is no longer considered inevitable. More adults in the United States are retaining most of their teeth for a lifetime⁶⁰. With more teeth at risk for caries among persons aged greater than or equal to 60 years, water fluoridation will continue to help prevent caries among these older persons.

The availability of fluoride from other sources has led the public, scientists and policymakers to perceive inaccurately that dental caries as no longer a public health

problem nor fluoridation a necessity. Adoption of water fluoridation requires political processes that make the establishment of this public health measure difficult. Furthermore, opponents of water fluoridation often make unsubstantiated claims about adverse health effects of fluoridation in attempts to influence public opinion ⁶¹.

“Water fluoridation continues to be effective in reducing dental decay by 20–40% even in an era with widespread availability of fluoride from other sources such as fluoride toothpaste”

-York Review, 2003-

There are many public water systems which are not fluoridated and tend to serve small populations. This increases the per capita cost of fluoridation. These barriers present serious challenges to expanding fluoridation in the 21st century.

To overcome the challenges facing this preventive measure, public health professionals at the national, state, and local level will need to enhance their promotion of fluoridation and commit the necessary resources for equipment, personnel and training ²⁹.

3. WATER FLUORIDATION IN MALAYSIA

Water fluoridation was first introduced in Malaysia in 1957 in the state of Johor. Since then several towns in the state have had their water supplies fluoridated (Table 1). In Penang fluoridation commenced in 1959 at the Guillemard water treatment plant followed by Air Terjun and Air Hitam in 1962. In Sarawak fluoridation was first introduced in 1961 at Simanggang followed by Serian in 1962.

Table 1: Areas in Johor Receiving Fluoridated Water before 1972

Name of Town	Location of Plants	Year of Commencement	Area Served
Johor Bahru	Tebrau & Gunung Pulai	1957	Johor Bahru District
	Skudai	1958	Johor Bahru District
Kluang	Kluang	1966	Kluang Town Area
Muar	Sg. Muar & Mt. Ophir	1968	Muar District
Kota Tinggi	Kota Tinggi	1968	Kota Tinggi Town Area
	Kota Tinggi	1969	Along Kota Tinggi to Johor Bahru Main Trunk Road
Batu Pahat	Parit Sulong & Bt. Banabg	1968	Batu Pahat District
	Parit Raja	1970	Batu Pahat District
Segamat	Segamat	1969	Segamat Town

A study conducted in Johor between 1964 –1976 had shown that water fluoridation in the state reduced the occurrence of dental caries by 60% and it is most beneficial when optimal amounts of fluoride in the water supply are ingested from birth onwards.

In 1969 The Committee on Fluoridation of Public Water Supplies in West Malaysia was appointed by the Honourable Minister of Health to study and report on the feasibility of introducing the fluoridation of public water supplies as a public health measure in all states of West Malaysia. The Committee stated that it “ **Strongly recommends that fluoridation of public water supplies be instituted in West Malaysia as soon as possible and further recommends that an optimum level of 0.7 part per million (ppm) fluoride be maintained in the reticulation system**” ⁵ . Based on this recommendation, in 1972 the Malaysian Cabinet ⁴ approved the addition of fluoride to the public water supplies as a primary prevention measure against dental caries.

In 1974, the nationwide water fluoridation programme was implemented incrementally with the installation of fluoride feeders in water treatment plants of at least 0.5 million gallons per day (mgd) capacity. Additionally, in order to increase coverage and reduce the dilution effect as water from fluoridated and non-fluoridated water mixed at reticulation points, in the Sixth Malaysian Plan, installation of fluoride feeders was extended to water treatment plants of at least 0.1 mgd ⁶² . However, prior to implementation, pre-fluoridation tests on raw water was carried out to determine the natural fluoride level, before a decision was made. In addition, raw water is also tested to ensure proper dosage of fluoride adjusted to the optimum level.

Implementation of this programme requires active involvement of both public and private agencies namely, the Ministry of Health (Oral Health Division, Engineering Division and Public Health Division), the Ministry of Energy, Water and Telecommunication, the Ministry of Science, Technology and Innovation (Chemistry Department), states authorities, public works department and private water authorities.

In 2004, considering the consumption of alternative sources of fluoride in the population ⁷, the Oral Health Division had recommended that the optimum level of fluoride be reviewed from 0.7 ppm to 0.5 ppm. This level was accepted by the National Drinking Water Quality Committee and the standard accepted in the National Guidelines for Drinking Water Quality was 0.4-0.6 ppm effective in 2005 ⁶³.

At the end of year 2005, more than 95 percent of the population received a piped water supply. Most states had a good coverage of 95% to 99 % except Sabah (75.5%) and Kelantan (70%) ⁹ (Figure 1 and Table 1).

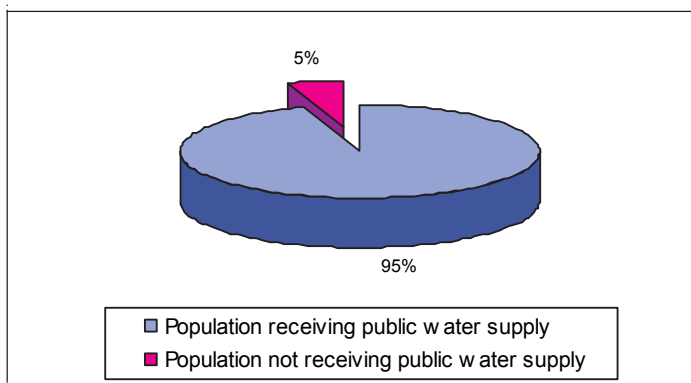


Figure 1:
Proportion of population receiving public water supply, 2005

Source: Oral Health Division, Ministry of Health

Table 2: Percentage of the population receiving public water supply versus percentage of the population receiving fluoridated public water supply.

State	Percentage of the Population Receiving Public Water Supply, 2005	Percentage of the Population Receiving Fluoridated Public Water Supply, 2005
Perlis	99.5	70.8
Kedah	99.5	88.4
Penang	99.8	88.5
Perak	99.8	85.2
Selangor & WPKL	99.5	99.5
N.Sembilan	99.8	93.9
Melaka	99.8	85.9
Johor	99.5	71.4
Pahang	95.5	62.5
Terengganu	96.0	0.00
Kelantan	70.0	0.00
Sabah	75.5	3.5
Sarawak	96.0	84.1
Malaysia	95.0	69.0

Source : Oral Health Division, Ministry of Health
Ministry of Energy, Water and Telecommunication

However, only 69% of the population received a fluoridated water supply (Figure 2). This accounted for about 72.6% of those receiving piped water supply (Figure 3). In most of the states more than 70% of their population received fluoridated water except Pahang (62.5%), Sabah (including Wilayah Persekutuan Labuan) (3.5%), Kelantan (0%) and Terengganu (0%) (Table 1)

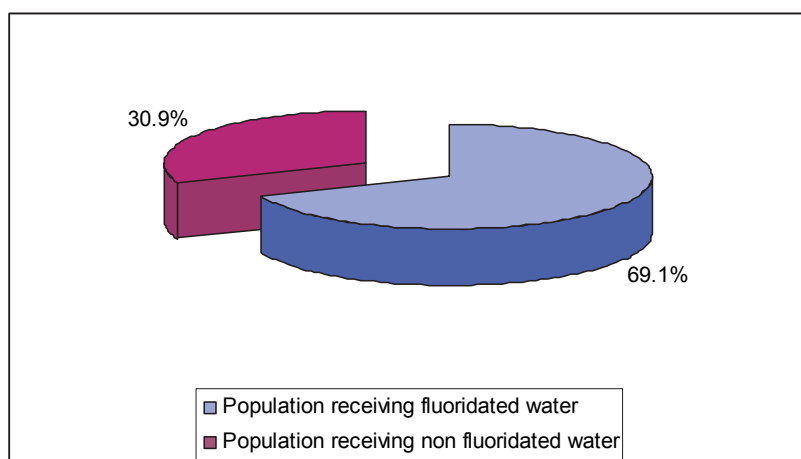


Figure 2:
Proportion of population receiving fluoridated public water supply, 2005

Source: Oral Health Division, Ministry of Health

In Kelantan, fluoridation was introduced in the 1970's. By year 1995, 33 water treatment plants were equipped with fluoride feeders, and almost 60% of the population was receiving a fluoridated water supply. However, this programme was discontinued in 1995 soon after privatization of the water treatment plant.

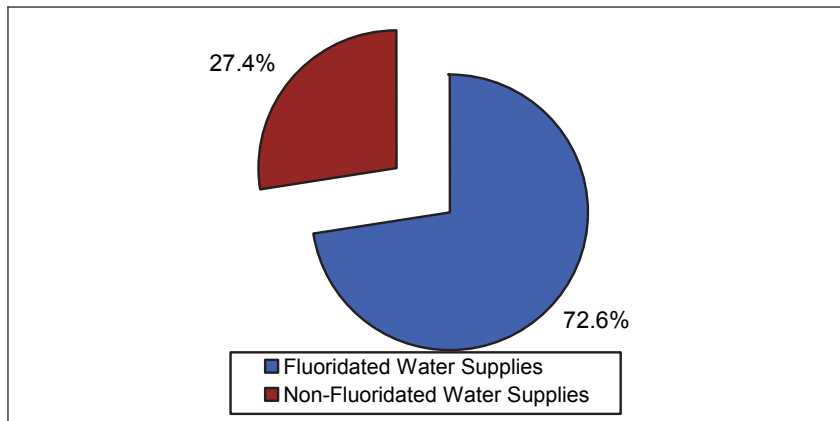


Figure 3:
Proportion receiving
fluoridated water
among population
receiving pipe water
supply, 2005

Source: Oral Health Division, Ministry of Health

In Terengganu, fluoridation started in the 70's. In 1999 all water treatment plants were installed with fluoride feeders with total population coverage of more than 80%. However, fluoridation discontinued shortly after privatization of the water treatment plants in 1999.

Therefore, about 27.4% who receive piped water supply (Figure 3) or about 26% of the population will receive the benefits of this programme with the reinstatement and further expansion of this programme.

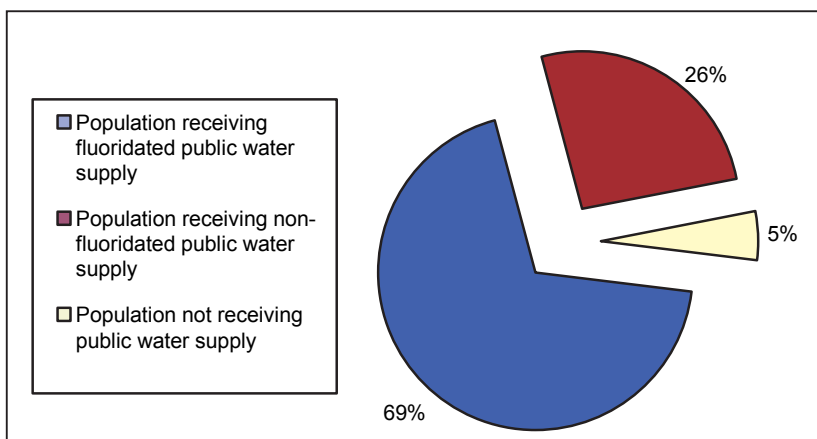


Figure 4:
Proportion of population receiving fluoridated and non-fluoridated water supplies

Source: Oral Health Division, Ministry of Health

At present, a total of 254 (58.7%) water treatment plants have been installed with fluoride feeders. These include 72% water treatment plants with the capacity of more than 0.5 mgd and 14% with capacity less than 0.5 mgd. However, only 223 (87.8%) water treatment plants supply fluoridated water. This is due mainly to non-functioning fluoride feeders and fluoride compound not being available.

The common fluoride compounds used in this country are sodium silicofluoride and sodium fluoride (Table 3). Like any other chemical compound, proper packaging, storage and handling are required to ensure effectiveness and safety.

Maintaining optimum fluoride levels in the water supply is important to achieve maximum benefit to oral health and safety. Monitoring of fluoride levels is done at two levels; at water treatment plants and at reticulation points and this involves water treatment plant operators, the Ministry of Health (Engineering, Public Health and Oral Health Divisions) and the Chemistry Department personnel.

All water treatment plants were run by the government until the introduction of the National Privatisation Policy in the 1980's which included water treatment plants. In 2005, about 43% of the water treatment plants with fluoride feeders were privatised (Table 4). Funding of the fluoridation programme for all government operated water treatment plants was given to the Ministry of Health and channeled at the state level to the water department for implementation of the fluoridation programme. For privatised water treatment plants, all costs of the fluoridation programme are borne by the company.

Information on water treatment plants and fluoridation programme status are important to ensure optimum population benefits from this programme. Therefore, guidance on how such information is to be gathered is necessary to assist planners.

Table 3: Fluoride compound use in water treatment plants by state, 2005

State	No. of Water Treatment Plants	No. of Water Treatment Plants with Fluoride Feeders	No. of Water Treatment Plants Supplying Fluoridated Water	Fluoride Compound	
				Sodium Silicofluoride	Sodium Fluoride
Perlis	3	2	2	2	0
Kedah	28	22	20	20	0
Pulau Pinang	10	10	12	12	0
Perak	46	36	35	8	27
Selangor & WPKL	33	32	32	32	0
N. Sembilan	25	17	17	4	13
Melaka	6	6	4	4	0
Johor	44	27	26	26	0
Pahang	71	46	37	37	0
Terengganu	17	17	0	0	0
Kelantan	29	0	0	0	0
Sabah	32	5	3	3	0
Sarawak	89	34	32	32	0
MALAYSIA	433	254	220	180	40

Source: Oral Health Division, Ministry of Health

Table 4: Summary of number of water treatment plants with fluoride feeders, by stakeholder and by state, 2005

State	Number of water Treatment Plants	Number of Water Treatment Plants with Fluoride Feeders (Stakeholders)	
		(Government)	(Private)
Perlis	3	2	0
Kedah	28	12	10
Penang	10	0	10
Perak	46	32	4
Selangor & WPKL	33	0	32
N.Sembilan	25	17	0
Melaka	6	0	6
Johor	44	0	27
Pahang	71	46	0
Terengganu	17	0	17
Kelantan	29	0	0
Sabah & W.P.Labuan	32	5	0
Sarawak	89	31	3
MALAYSIA	433	145	109

Source: Oral Health Division, Ministry of Health

After more than 30 years of implementation of this programme, caries prevalence and experience in Malaysia have been reduced significantly⁶⁴⁻⁶⁶. Among 6, 12 and 16 year-old schoolchildren, ten yearly epidemiological survey data shows a gradual reduction in dental caries prevalence (Figure 5). Similar patterns were also seen in caries experiences in the 12 and 16 year-old schoolchildren (Figure 6). In the 1997 survey of schoolchildren it was also found that the caries experience and prevalence were lower in fluoridated areas compared to the non - fluoridated areas. In view of the long term effect of fluoridation, periodic evaluation of its effects on dental caries needs to be sustained.

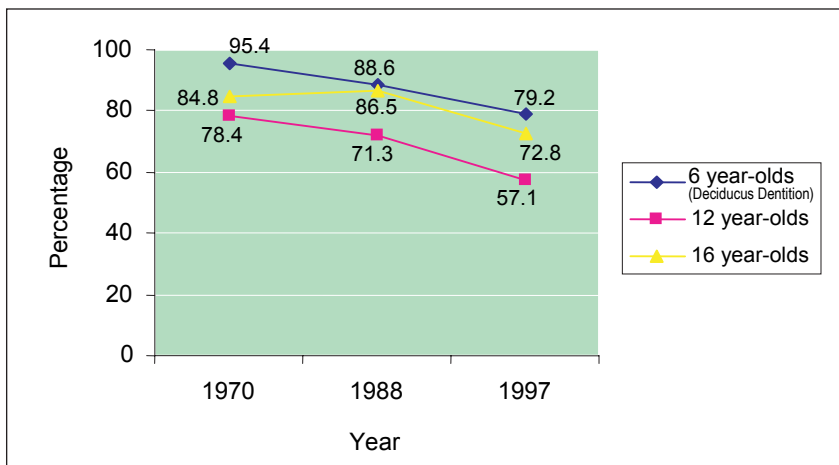


Figure 5 : Caries prevalence trend in 6,12 and 16 year-olds in 1970, 1988 and 1997

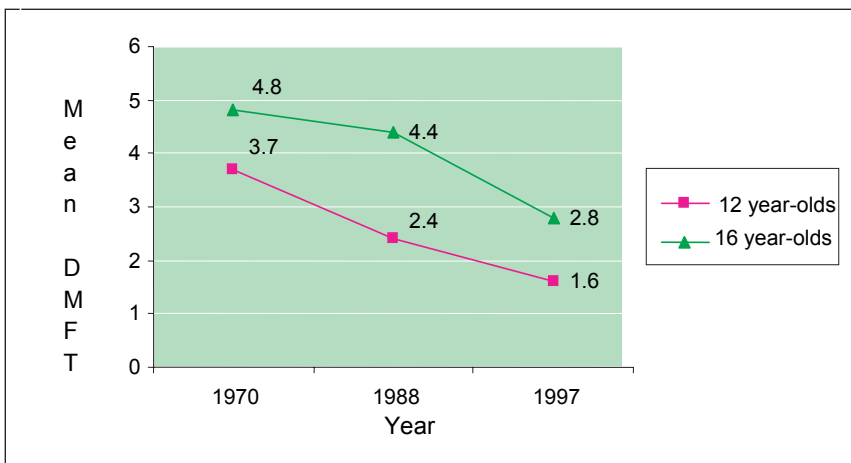


Figure 6: Caries experience (DMFT) of school children in Peninsular Malaysia

The success of this programme depends on effective cooperation between the various agencies involved at the state and national levels. This includes the installation of fluoride feeders, the smooth running of the fluoride feeders, supply of fluoride compound and determining and maintaining optimum levels of fluoride. Continuous monitoring is important to ensure safety and optimum benefit leading to improved oral health and an

enhanced quality of life, to as many Malaysians who receive a public water supply as possible.

4. OBJECTIVE

4.1. General Objective

The general objective of this programme is to continue implementing water fluoridation as a public health measure to ensure optimum benefit in reducing tooth decay leading to improved oral health and an enhanced quality of life.

4.2. Specific Objectives

This programme aims to achieve the following specific objectives:

- i. To expand the percentage of the population benefiting from a fluoridated public water supply
- ii. To maintain an optimal level of fluoride in the water supply

5. STRATEGIES

5.1. To Establish A Standard for Water Fluoridation

The Oral Health Division should play a lead role in determining the appropriate level of fluoride in drinking water to ensure that it is safe and effective in reducing dental caries. The standard level for fluoride in drinking water is incorporated as a policy into the National Guidelines for Drinking Water Quality document in order to implement water fluoridation in the country (National Standards of Drinking Water Quality Revised 2000). It is the responsibility of all water treatment plant operators to comply with the standard. Any changes in the recommended level will need the approval of the National Drinking Water Quality Technical Committee.

5.2. To Ensure Installation of Fluoride Feeders at All Water Treatment Plants

The State Deputy Health Director (Dental) will identify water treatment plants to be equipped with fluoride feeders. Projects shall be identified on a five yearly plan with priority based on water treatment plants with a capacity of more than 0.1 mgd and population coverage. The information may then be transmitted to the Senior Dental Officers in the districts who will then liaise with their counterparts for the installation of fluoride feeders. The water treatment plant management will have the option to decide on the location, and type of fluoride feeders and fluoride compound used.

5.3. To Ensure Funds are Available for Fluoridation

The State Deputy Health Director (Dental) has to ensure that sufficient funds are allocated for this programme for the public water treatment plants. Funding is available five yearly under the Malaysia Plans for installation of fluoride feeders, annual operating budget, New Policy or 'One-Off' for supply of fluoride compound, maintenance and replacement of fluoride feeders. These funds are channeled to the Public Water Supply Department or Water Supply Department at state/district level. In addition, sufficient funds should also be allocated for equipment and reagent to monitor fluoride levels by the dental department. For the private water supplies, all costs incurred for this programme will be borne by the water treatment plant company.

5.4. To Monitor Fluoride Levels in Public Water

5.4.1 Oral Health Division

The Oral Health Division monitors the fluoridation programme at national level by establishing a standard in the National Indicator Approach to ensure maximum benefit and safety of fluoride levels at reticulation points. The Senior Dental Officer in the state will monitor fluoride levels both at the water treatment plant sampling point and at reticulation points in the district using appropriate fluoride test equipment eg. Colorimeters / ionic colorimeter. Details on monitoring, recording and reporting are in Appendix 3.

5.4.2 Public Health Department

The Public Health Department, MOH is responsible for monitoring the quality of the drinking water. Water taken from sampling points by relevant Health Inspectors will be also tested for fluoride levels by the Chemistry Department every three months. Reports on fluoride levels will be relayed back to the Engineering Division, MOH, the State Health Department and the District Health Officer. Any violation on standards should be rectified in time to ensure effectiveness and safety of the programme. The report will be tabled periodically at meetings or reported at district, state and national levels.

5.4.3 Water Treatment Plant Management

The management of the water treatment plants both public or private have to ensure that fluoride levels are maintained at all times, both at water treatment plants and at identified reticulation points using appropriate fluoride test equipment.

5.5. To Strengthen Collaboration with All Relevant Agencies

The Oral Health Division / the State Deputy Director of Health (Dental) / the Senior Dental Officer (District) must ensure continued collaboration with all the following relevant agencies:

- The Public Water Department, the Water Supply Department, Private Water Companies and the Water Supply Board is responsible for the implementation of the fluoridation programme, including installation and maintenance of fluoride feeders, supply of fluoride compound and monitoring and maintaining fluoride levels.
- The Engineering Division, Ministry of Health Malaysia is responsible for the standard for fluoride in the National Guidelines of Drinking Water Quality and ensuring compliance to the standards.
- The Chemistry Department is responsible for the analysis and reporting on the level of fluoride in water-samples.

- The Public Health Department, Ministry of Health is responsible for collecting water at water treatment plants and reticulation sampling points to monitor fluoride levels every three month.
- Other Related Agencies such as state government, associations, and organisations.

Discussions on matters pertaining to fluoride in drinking water can be held between various agencies involved at relevant meeting, such as the National Technical Meeting on Drinking Water Quality and meetings at state or district levels, and visits.

5.6 To Conduct Periodic Evaluation of the Water Fluoridation Programme

Evaluation of the programme needs to be carried out at district, state and national levels from every six months to ensure the continuous safety and effectiveness, through the routine Modified Budgeting System every five years or findings from surveys, research / Health System Research.

5.7 To Train and Educate the Public on the Water Fluoridation Programme

- Dental Officers should be updated continually on all aspects of fluoridation either through seminars, courses, etc, to ensure they are resource persons on fluoridation.
- All relevant health personnel handling water fluoridation programmes should be continually trained to create awareness and update their knowledge through various avenues, such as meetings, discussions, seminars, continuous education programmes, conferences and workshops. The safety measures and hazards of the programme should be included in the agenda. This will garner more cooperation through better understanding of the programme.
- To educate and advise public, government and non-governmental organisations on issues pertaining to fluoridation such as effectiveness, safety, ethics and benefits.

5.8 To Report Yearly on the Fluoridation Programme

Reports on the fluoridation programme should be done yearly as in Appendix 2. The reports should be used to evaluate performance and plan improvements for the programme (Appendix 4).

6. CONCLUSION

Several factors contribute to the success of the fluoridation programme in the country. Among others are political commitment, collaboration and cooperation between the various parties involved and more importantly the continual, extensive upgrading of the piped public water supply infrastructure. Continuous efforts to monitor and evaluate the programme are essential to ensure its cost-effectiveness, safety, and benefits, which will contribute towards improving the oral health and enhancing the quality of life of the population.

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APPENDICES

**International Organisations that Recognise the Public Health
Benefits of Community Water Fluoridation
for Preventing Dental Decay**

INTERNATIONAL ORGANISATIONS THAT RECOGNISE THE PUBLIC HEALTH BENEFITS OF COMMUNITY WATER FLUORIDATION FOR PREVENTING DENTAL DECAY:

Academy of Dentistry International
Academy of General Dentistry
Academy for Sports Dentistry
Alzheimer's Association
America's Health Insurance Plans
American Academy of Family Physicians
American Academy of Nurse Practitioners
American Academy of Oral and Maxillofacial Pathology
American Academy of Orthopaedic Surgeons
American Academy of Pediatrics
American Academy of Pediatric Dentistry
American Academy of Periodontology
American Academy of Physician Assistants
American Association for Community Dental Programs
American Association for Dental Research
American Association for Health Education
American Association for the Advancement of Science
American Association of Endodontists
American Association of Oral and Maxillofacial Surgeons
American Association of Orthodontists
American Association of Public Health Dentistry
American Association of Women Dentists
American Cancer Society
American College of Dentists
American College of Physicians- American Society of Internal Medicine
American College of Preventive Medicine
American College of Prosthodontists
American Council on Science and Health
American Dental Assistants Association
American Dental Association
American Dental Education Association
American Dental Hygienists Association
American Dietetic Association
American Federation of Labor and Congress of Industrial Organizations
American Hospital Association
American Legislative Exchange Council
American Medical Association
American Nurses Association
American Osteopathic Association
American Pharmacists Association
American Public Health Association

<http://www.ada.org/public/topics/fluoride/facts/compendium.asp>

7/25/2005

**INTERNATIONAL ORGANISATIONS THAT RECOGNISE THE PUBLIC HEALTH
BENEFITS OF COMMUNITY WATER FLUORIDATION FOR PREVENTING DENTAL DECAY:**

American School Health Association
American Society for Clinical Nutrition
American Society for Nutritional Sciences
American Student Dental Association
American Veterinary Medical Association
American Water Works Association
Association for Academic Health Centers
Association of American Medical Colleges
Association of Clinicians for the Underserved
Association of Maternal and Child Health Programs
Association of State and Territorial Dental Directors
Association of State and Territorial Health Officials
Association of State and Territorial Public Health
Nutrition Directors
British Fluoridation Society
Canadian Dental Association
Canadian Dental Hygienists Association
Canadian Medical Association
Canadian Nurses Association
Canadian Paediatric Society
Canadian Public Health Association
Child Welfare League of America
Children's Dental Health Project
Chocolate Manufacturers Association
Consumer Federation of America
Council of State and Territorial Epidemiologists
Delta Dental Plans Association
FDI World Dental Federation
Federation of American Hospitals
Hispanic Dental Association
Indian Dental Association (U.S.A)
Institute of Medicine
International Association for Dental Research
International Association for Orthodontics
International College of Dentists
March of Dimes Birth Defects Foundation
National Association of Community Health Centers
National Association of County and City Health Officials
National Association of Dental Assistants
National Association of Local Boards of Health
National Association of Social Workers
National Confectioners Association
National Council Against Health Fraud
National Dental Assistants Association
National Dental Association
National Dental Hygienists' Association
National Down Syndrome Congress
National Down Syndrome Society
National Eating Disorders Association

INTERNATIONAL ORGANISATIONS THAT RECOGNISE THE PUBLIC HEALTH BENEFITS OF COMMUNITY WATER FLUORIDATION FOR PREVENTING DENTAL DECAY:

National Foundation of Dentistry for the Handicapped
National Head Start Association
National Health Law Program
National Healthy Mothers, Healthy Babies Coalition
Oral Health America
Robert Wood Johnson Foundation
Society for Public Health Education
Society of American Indian Dentists
Special Care Dentistry
 Academy of Dentistry for Persons with Disabilities
 American Association of Hospital Dentists
 American Society for Geriatric Dentistry
The Children's Health Fund
The Dental Health Foundation (of California)
U.S. Department of Defense
U.S. Department of Veterans Affairs
U.S. Public Health Service
 Health Resources and Services Administration (HRSA)
 Centers for Disease Control and Prevention (CDC)
National Institute of Dental and Craniofacial Research (NIDCR)
World Federation of Orthodontists
World Health Organisation

**Worldwide Status ¹ On Populations Receiving
Fluoridated Water**

WORLDWIDE STATUS¹ ON POPULATIONS RECEIVING FLUORIDATED WATER

Country	Population	Adjusted population served	Natural population served	Total population served(%)
Argentina ^a	35,926,000	3,100,000	4,500,000	21.1
Australia ^b	19,338,000	11,722,000	143,433	61.0
Austria ^c	8,070,000	0	160,000	2.0
Brazil ^b	172,558,000	65,585,000	?	>41.0
Brunei ^a	310,000	175,000	0	56.0
Canada ^c	31,000,000	13,330,000	300,000	43.0
Chile ^b	15,401,000	5,423,877	788,550	40.0
China	1,292,378,000	0	200,000,00 ⁱⁱ	15.0
Colombia	42,802,000	29,406,860	600,140	70.0
Cuba ^d	11,236,000	ⁱⁱⁱ	0	
Cyprus ^c	689,471	0	approx40,000	5.7
Czech Republic	10,260,000	0 ^{iv}	15,000	>0.1
Denmark	5,332,000	0	50,000	1.0
Egypt ^d	69,079,000	^v	0	
Fiji	822,000	300,000	0	36.0
Finland	5,177,000	0 ^{vi}	200,000	4.3
France	59,452,000	0 ^{vii}	1,800,000	3.0
Gabon	1,261,000	0	1,261,000	100
Germany	82,183,824	0 ^{viii}	0	0
Guatemala ^e	11,686,000	1,800,000	?	15.0
Guyana	762,000	45,000	200,000	32.0
Haiti	8,269,000	0	11,461	<0.1
Hong Kong ^c	6,708,309	6,708,309	0	100.0
Iran	71,368,000	0	^{ix}	
Ireland ^f	3,840,000	2,345,000	200,300	66.0
Israel ^a	6,370,000	4,267,900	509,000	75.0
Italy	57,502,000	0	^x	
Japan ^g	127,334,000	0 ^{xi}	0	0
Korea ^g	46,125,000	5,367,000	0	11.4
Kiribati	84,000	0	50,400	Approx60.0
Libya ^d	5,407,000	400,000	1,000,000	26.0
Malaysia ^a	22,632,000	approx15,842,000	0	Approx70.0

WORLDWIDE STATUS¹ ON POPULATIONS RECEIVING FLUORIDATED WATER

Country	Population	Adjusted population served	Natural population served	Total population served(%)
Malta ^c	386,000	0	38,600	10.0
Mexico ^a	100,367,000	0 ^{xii}	3,000,000	3.0
Namibia	1,787,000	0	approx200,000	approx11.0
Nauru	13,000	0	^{xiii}	
Netherlands	16,000,000	0 ^{xiv}	0	0
New Zealand	3,807,000	2,317,728	0	61.0
Nigeria	116,928,000	0	20,000	<0.1
Panama	2,898,000	509,554 ^{xv}	0	18.0
Papua New Guinea (1975)	4,919,000	102,000	70,000	3.0
Paraguay (1977)	5,635,000	350,000	^{xvi}	>6.0
Peru ^d	26,092,000	500,000	80,000	2.0
Philippines	77,130,000	approx5,000,000	850,000	approx8.0
Poland	38,576,000	80,000	300,000	1.0
Puerto Rico ^a	3,500,00	approx35,000 ^{xvii}	0	<1.0
Senegal	9,661,000	0	1,000,000	10.0
Serbia	10,537,000	300,000	?	approx3.0
Singapore ^b	4,107,000	4,107,000	0	100.0
South Africa ^a	43,791,000	0 ^{xviii}	?	?
Spain	39,920,000	4,000,000	0	10.0
Sri Lanka	19,103,000	0	2,799,390	15.0
Sweden	8,832,000	0	750,000	8.4
Taiwan ^e	22,500,000	0 ^{xix}	?	
Tanzania ^c	35,000,000	0	12,250,000 ^{xx}	35.0
Thailand ^a	60,161,000	91,000	approx150,000	approx4.0
UK ^c	59,541,000	5,400,000	330,000	10.0
USA ^a	281,421,906	171,000,000	10,001,000	64.0 ^{xxi}
Uruguay	3,360,000	0	15,000	<0.1
Venezuela	24,631,000	0	100,000	<0.1
Vietnam	79,700,000	4,400,000	0	6.0
Zaire	37,500,000	0	600,000	2.0
Zambia ^c	10,200,000	0	947,166 ^{xxii}	10.0
Zimbabwe ^c	13,000,000	0	2,600,000 ^{xxiii}	20.0
	TOTAL	355,105,318	49,961,040^{xxiv}	

- i. Data published by FDI 1990 unless otherwise indicated as follows: a USPHS Division of Oral Health, CDC, 2002/3; b USPHS Division of Oral Health, CDC, 1998; c British Fluoridation Society survey, 2002; d FDI 1981; e FDI 1984; f O'Mullane, 1996; Journal of Dental Health (Official publication of the Japanese Society for Dental Health) 51(4) 2001.
- ii. Includes above optimal.
- iii. Water fluoridation schemes in operation in 5 communities, number of people affected unknown.
- iv. Extensive fluoridation served 1.5 million people in Prague area, 1975-1989.
- v. Pilot study begun in Alexandria number of people affected unknown.
- vi. Kuopio (population 76,000) fluoridated 1959-1992
- vii. Fluoridated salt was introduced in 1986 and, for example for the period 1991-1996, made up 40-50% of sales.
- viii. Fluoridation in former GDR discontinued since reunification. Fluoridated salt was introduced in 1991 and as at 1997 made up 25% of sales.
- ix. Several cities, population coverage not known.
- x. 1 community, population coverage not known.
- xi. Planning to start fluoridation in Kumejima, Okinawa soon.
- xii. 100% of salt is fluoridated.
- xiii. Water supplies imported from Australia & New Zealand, known if fluoridated.
- xiv. Fluoridation to around 30% of the Netherlands population was ceased in 1973 because of inadequate legislation and anti-flouridation activity.
- xv. This estimate dates from 1974. However, recent communication with CDC confirmed that artificial fluoridation continues in the two largest cities.
- xvi. 3 communities numbers covered not known.
- xvii. Puerto Rico has passed a mandatory fluoridation law which has not been enforced yet.
- xviii. Mandatory fluoridation during 2003/2004.
- xix. Fluoridation project serving 600,000 operational from 1969 to 1981. Discontinued because of antifuoridation activity.
- xx. Remaining 65% of the population are at higher than optimal concentrations.
- xxi. This rises to 67.9% when expressed as a % of the population served by public water systems
- xxii. Approximately 300,000 people receive water at 2.78 parts per million.
- xxiii. Approximately 650,000 people receive water with higher than optimal fluoride concentrations
- xxiv. Excluding China where levels include above optimal.

<http://www.bfsweb.org>. One in a Million. Chapter 7 page 75-77 accessed on 25/8/2006

**Monitoring Fluoride Levels of Water Supply at Reticulation
by Oral Health Personnel**

MONITORING FLUORIDE LEVELS OF WATER SUPPLY AT RETICULATION BY ORAL HEALTH PERSONNEL

1. PERSONNEL

- Personnel shall be identified and trained / briefed on procedures of sample collection and testing.

2. WATER SAMPLE LOCATION

- Water samples shall be taken from the water supply which is as representative as possible of that supply from the consumers' tap points, such as dental clinics or sampling points as identified by the assistant environmental officer.

3. SAMPLING PROCEDURES

- Samples shall be collected either in plastic bottles or thiobags. The volume of water shall be sufficient for analysis. The sampler shall label the containers with the date and location where the samples were taken.
- Samples shall be collected at least twice a month at reticulation points and once a month at the water treatment plant. In areas where there is no fluoridation programme samples shall be collected at least once a month.
- The sample bottle shall be sealed and remain so until they are opened for analysis in the clinic.
- The sample shall be forwarded to the clinic within 24 hours of sampling.

4. ANALYSIS PROCEDURES

- The sample should be analysed for fluoride levels as soon as possible, preferably within 72 hours after collection. Samples can be stored at 4 – 10 C for up to a maximum of 28 days.
- The tester shall analyse, complete, sign and send the appropriate form (PKP 204) to the Dental Officer in-Charge.

5. TEST KITS

- All testing kits must be standardised before being used and calibrated annually. The method of use of test kits shall be followed in detail as recommended by the manufacturer.

Note : In cases where fluoride level analysis in the drinking water is required to be done at the Chemistry Department, follow the protocol as in the National Standards for Drinking Water Quality.

6. REPORTING OF RESULTS

- Results shall be reported immediately by the personnel responsible.
- Results not conforming to the recommended standards (0.4 – 0.6 ppm) shall be reported within 7 days of analysis to the District Dental Office.
- For a routine sample with normal results, it shall be reported monthly to the District Dental Officer.

7. REMEDIAL ACTION PROCEDURES

- Upon receiving reports on violations to the recommended standards in drinking water, the District Dental Officer shall liaise with District Health Officer for further action as stipulated in the National Standard for Drinking Water Quality.
- In addition the District Dental Officer shall inform the district water authorities of the said violation.

8. RECORD KEEPING

- All report summaries sent by the District Oral Health Office shall be compiled at the State Oral Health Services Office and sent to Oral Health Division, Ministry of Health every month. One copy to be sent to Information and Documentation Unit, Ministry of Health.
- All data pertaining to fluoride level in drinking water supply shall be retained, analysed and filed as long as they may be useful.
- The maintenance of accurate and complete records shall be an integral part of the surveillance of fluoride level. Apart from the recording of analytical results, the following shall also be recorded :
 - Information on construction and location of water supply and its fluoride feeder.
 - Detailed status of fluoride feeder.
 - Report on corrective actions taken.
 - The keeping of records shall be used to evaluate performance and planning improvements.

**MINISTRY OF HEALTH MALAYSIA
HEALTH MANAGEMENT INFORMATION SYSTEM**

**Monthly Monitoring of Fluoride Feeder At
District/ State Level**

1. General guidelines on monthly report of the condition of fluoride feeders from district/ state.

1.1. Objective

The aim of this report is to provide monthly feedback on the condition of fluoride feeders by keeping checks on its breakdown frequency. In addition, the report helps to monitor the level of fluoride in public water supply and water supply plants to ensure that it is at its optimum level (0.4 – 0.6 ppm) for the effectiveness in the prevention of dental caries.

1.2. Preparation and sending of reports

1.2.1. The monthly report shall be prepared by the Senior Dental Officer (SDO) of a district by using the PKP 204b. It has to be prepared in 4 copies and sent through the state dental director to the Information and Documentation System Unit.

- 1 copy for the SDO
- 1 copy for the State Dental Director
- 1 copy for the Information and Documentation System Unit, Ministry of Health Malaysia
- 1 copy to the Oral Health Division, Ministry of Health Malaysia

1.2.2. The status and condition of fluoride feeders can be monitored through visits to the water supply plants with the co-operation of the Water Supply Department, Managers of water supply plants, Chemistry Department, Public Health Department and also from the water sample testing carried out at the respective clinics.

Recording Instructions for the Monthly Monitoring of Fluoride Level in Public Water Supply and the Status of Fluoride Feeder (Clinic Level)

Column No.	Information	General Instructions
Title	Year	Record the year when the report was prepared
	Month	Record the month when the report was prepared
	Clinic/ District/ State	Record the name of clinic/ district/ state from where the report was prepared
1	Number	Record the entry beginning with number 1
2	Name of water treatment plant	Record the name of water treatment plant
3	Water treatment plant with fluoride feeder	Tick (/) for water treatment plant with fluoride feeder
4	Water treatment plant without fluoride feeder	Tick (/) for water treatment plant without fluoride feeder
5	Number of days not functioning	Record the number of days for non- functioning fluoride feeder in that particular month
6	Reason for not functioning	Record the reasons for non- functioning fluoride feeder (Feeder damage, No fluoride compound or others)
Fluoride level reading		
7a , 7b , 7c , 7d	L	Record the readings of fluoride in the water sample at the treatment plant in ppm
8a , 8b , 8c , 8d	R	Record the readings of fluoride in the water sample at the reticulation point
Number of readings conforming to the recommended standards 0.4 ppm - 0.6 ppm		
9	L	Record the total number of readings of water sample at the treatment plant that conformed to the recommended standard 0.4-0.6 ppm for the particular month
10	R	Record the total number of readings of water sample at the reticulation points that conformed to the recommended standard 0.4-0.6 ppm for the particular month

Number of readings not conforming to the recommended standards		
	< 0.4 ppm	
11a	L	Record the number of readings of water sample less than 0.4 ppm at the water treatment plant for the particular month
12a	R	Record the number of readings of water sample less than 0.4 ppm at the reticulation points for the particular month
	> 0.6 ppm	
11b	L	Record the number of readings of water sample more than 0.6 ppm at the water treatment plant for the particular month
12b	R	Record the number of readings of water sample more than 0.6 ppm at reticulation point for the particular month
Minimum		
11c	L	Record the lowest reading of water sample at the water treatment plant for the particular month
12c	R	Record the lowest reading of water sample at the reticulation point for the particular month
Maximum		
11d	L	Record the highest reading of water sample at the water treatment plant for the particular month
12d	R	Record the highest reading of water sample at the reticulation point for the particular month
Total number of water treatment plants		Record the total number of water treatment plants at the district

DEFINITION

WTP : Water treatment plant

Reticulation Point : Place identified by the clinic for water sampling

**Recording Instructions for the Monthly/ Yearly Monitoring of the Condition of
Fluoride Feeder at District/ State Level**

Column No.	Information	General Instructions
Title	Year	Record the year of the report.
	Month	Record the month of the report.
	District/ State	Record the name of the district/ state where the report was done
1	Number	Record the entry beginning with number 1
2	Month	Record the month when the report was done.
3	Number of treatment plants	Record the total number of water treatment plants at the district/ state
4	Number of treatment plants with fluoride feeders	Record the total number of treatment plants with fluoride feeders at the district/ state
5	Number of treatment plants with non-functioning fluoride feeder	Record the number of treatment plants with non-functioning fluoride feeder that exceeds 5 days in the particular month
Number of days non production of fluoridated water (enter according to reasons given)		
6	Non-functioning fluoride feeder	Record the total number of days for non-functioning fluoride feeder for the particular month (if more than 5 days not functioning)
7	No fluoride Compound	Record the total number of days for non production of fluoridated water due to inavailability of fluoride compaund for the particular month
8	Others	Record the total number of days for non production of fluoridated water due to inavailability of fluoride compound due to other reasons for the particular month
9	Total	Record the total number of non-functioning fluoride feeder (6), No fluoride compound (7) and others(8)
10	Average	Record the total number for non production of fluoridated water due to inavailability of fluoride compound in column 9 and divide by the total number of treatment plants with non functioning fluoride feeder (5)

Fluoride level reading		
Minimum reading (ppm)		
11	L	Record the lowest reading of water sample at the treatment plants for the particular month
12	R	Record the lowest reading of water sample at the reticulation points for the particular month
Maximum reading (ppm)		
13	L	Record the highest reading of water sample at the treatment plants for the particular month
14	R	Record the highest reading of water sample at the reticulation points for the particular month
Number of readings		
15	L	Record the total number of readings of water sample at the treatment plants for the particular month
16	R	Record the total number of readings of water sample at the reticulation points for the particular month
Number of readings conforming to recommended standard 0.4 ppm -0.6 ppm		
17	L	Record the total number of readings of water sample at the treatment plants that conformed to the recommended standard 0.4-0.6 ppm for the particular month
18	R	Record the total number of readings of water sample at the reticulation points that conformed to the recommended standard 0.4-0.6 ppm for the particular month
Percentage of readings conforming to the recommended standard 0.4 ppm -0.6 ppm		
19	L	Record the percentage of readings of water sample at the treatment plants conforming to the recommended standard 0.4-0.6 ppm for the particular month (total readings of water sample at the treatment plants conforming to the recommended standard 0.4-0.6 ppm divided by all the total readings of water sample at the treatment plants)
20	R	Record the percentage of readings of water sample at the reticulation points conforming to the recommended standard 0.4-0.6 ppm for the particular

		month (total readings of water sample at the reticulation points conforming to the recommended standard 0.4-0.6 ppm divided by all the total readings of water sample at the reticulation points)
No. of readings not conforming to the recommended standards		
	< 0.4 ppm	
21	L	Record the percentage of readings of water sample less than 0.4 ppm at the treatment plant for the particular month (total readings of water sample less than 0.4 ppm at the treatment plants divided by all the total reading of water sample at the treatment plants)
22	R	Record the percentage of readings of water sample at the reticulation points less than 0.4 ppm for the particular month (total readings of water sample less than 0.4 ppm at the reticulation points divided by all the total reading of water sample at the reticulation points)
	> 0.6 ppm	
23	L	Record the total readings of water sample more than 0.6 ppm at the treatment plants for the particular month
24	R	Record the total readings of water sample more than 0.6 ppm at the reticulation points for the particular month
Percentage of readings not conforming to the recommended standards		
	< 0.4 ppm	
25	L	Record the percentage of readings of water sample less than 0.4 ppm at the treatment plants for the particular month (total readings of water sample less than 0.4 ppm divided by all the total readings of water sample at the treatment plants)
26	R	Record the percentage of readings of water sample less than 0.4 ppm at the reticulation points for the particular month (total readings of water sample less than 0.4 ppm divided by all the total readings of water sample at the reticulation points)

	0.6 ppm	
27	L	Record the percentage of readings of water sample more than 0.6 ppm at the treatment plants for the particular month (total readings of water sample less than 0.6 ppm divided by all the total readings of water sample at the treatment plants)
28	R	Record the percentage of readings of water sample more than 0.6 ppm at the reticulation points for the particular month (total readings of water sample less than 0.6 ppm divided by all the total readings of water sample at the reticulation points)
29	*Total Population	Record the total population of the district/ state for the particular year
30	*Total population receiving piped water supply	Record the total population from the district/ state benefiting from public water supplies for that particular year
31	*Coverage of total population	Record the total population from the district/ state benefiting from fluoridated water for that particular year

* To be filled at the end of the year

DEFINITION

WTP : Water treatment plant

Reticulation Point : Place identified by the clinic for water sampling to be taken

Reporting Format of Fluoridation Programme

Reporting on the water fluoridation programme

- All information pertaining to the programme shall be obtained and compiled at district level and sent to state level before 31st January every year using FPD 1 - 3
- All information gathered from the district will be compiled and sent to Oral Health Division by the State Oral Health Department before 1st Mac every year using FPS 1 - 5
- All information obtained from the states shall be compiled and reported by the Oral Health Division, Ministry of Health yearly.
- All reports shall not become an end in itself but should be a part of a greater aim i.e. to evaluate performance and to plan for improvements in water fluoridation programme

Instruction to fill up FPS 1/2006 and FPD 1/2006

1. State the name of all water treatment plants in the state
2. State the plant capacity in million liter per day (mld)
3. State the actual water treatment plant capacity in million liter per day (mld)
4. Indicate (/) if water treatment plant is managed by Public Water Department
5. Indicate (/) if water treatment plant is managed by Water Supply Department
6. Indicate (/) if water treatment plant is managed by Water Supply Board
7. Indicate (/) if water treatment plant is managed by Private Water Company
8. State the number of population coverage estimated
9. Indicate (/) if water treatment plant is without fluoride feeder
10. State year where fluoridation started
11. Please state the number of months which the WTP supplied fluoridated water in a year
12. Please state month/year WTP Fluoridation officially discontinued
13. Please (/) if fluoride feeder is operating using volumetric feeder
14. Please (/) if fluoride feeder is operating using gravimetric feeder
- 15-20. Please (/) the appropriate fluoride analysis equipment used
21. State type of fluoride compound used for current year
22. Please state relevant information such as reason if fluoridation status is not active, etc

Note: Please fill in NA where column is not applicable

Data Collection Format on Budget Allocated and Spent on the Fluoridation Programme at State Level
 Year _____

State: _____

Type of Fund	Budget Allocated		Amount Spent		Remarks
	Amount (RM)		Items Purchased	Amount(RM)	
Annual Operating Fund			Equipment		
			Fluoride Compound		
			Others*		
			Sub-total		
Development Fund (RMK - ____)			Equipment		
			Fluoride Compound		
			Others*		
			Sub -total		
New Policy/One-Off Fund			Equipment		
			Fluoride Compound		
			Others *		
			Sub-total		
TOTAL ALLOCATED			TOTAL SPENT		

* Please specify in remarks column.
 Please (-) if not applicable

Signature and Stamp of Deputy State Director of Health (Dental)

Data Collection Format for Intercolaboration with Other Agencies at State Level

Year : _____
 State : _____

State/ District	Date	Personnel involved	Category *				Agency Involved*					Summary of Issues	Remarks
			Discussion/ Visit	Meeting	Others	District Health Office	WTPO, WSB, WSD, WSC, PWD	Chemistry Department	State Health Department	Others			
1	2	3	4	5	6	7	8	9	10	11	12	13	

* Please (/) in appropriate column
 WTPO - Water Treatment Plant Operator
 PWD - Public Water Department
 WSD - Water Supply Department
 WSB - Water Supply Board
 WSC - Water Supply Company

 Signature and Stamp of Deputy State Director of Health (Dental)

