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Development of a Milk Fluoridation Scheme for Prevention of Dental Caries

Preliminary Assessment of Feasibility

WORLD HEALTH ORGANIZATION

Oral Health Programme
Management of Noncommunicable Diseases
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Preface

The benefits of using water fluoridation as a public health measure for the prevention of dental caries have been clearly demonstrated over the past 50 years. Globally, approximately 250 million people are receiving fluoridated water. However, whilst it is recognised as being one of the most successful health promotion measures it is currently only available in a few high-income communities. The opportunities to introduce water fluoridation in middle and low-income communities would, in the foreseeable future, seem to be limited as the costs involved will often prove to be prohibitive.

During the last two decades in many parts of the world salt has also been used effectively as a vehicle for fluoride. However, there are many communities where the need for fluoride intervention is clear but neither water nor salt fluoridation can be implemented. This encouraged the World Health Organization (WHO) to establish the International Milk Fluoridation Programme (IMFP) which has been in operation since 1990. The main objective of the IMFP is to promote and support programmes aimed at demonstrating the feasibility of using milk fluoridation at a community level as an alternative to water or salt fluoridation.

The first community based milk fluoridation scheme was established in 1988 in Bulgaria. This provided valuable experience and led to the introduction of similar projects in the Russian Federation, the United Kingdom, the People's Republic of China, Chile and more recently in Peru and Thailand. Ongoing expansion of the IMFP is being achieved through the wider development of these projects and the implementation of new schemes in other countries.

The process involved in fluoridating milk is technically very simple and inexpensive. However, there are a number of factors that need to be addressed when considering the introduction of a community milk fluoridation programme. This document is based on experience gained as the IMFP has evolved and hopefully will prove to be of assistance to senior dental officers, community leaders and prospective producers of fluoridated milk who are considering this method of intervention.

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1. Introduction

1.1 Purpose of the document

This document offers guidance to making a preliminary assessment of the feasibility of introducing a milk fluoridation scheme. It explains briefly why a milk fluoridation scheme may be an appropriate public health approach to preventing dental caries, and provides an overview of the key stages in the development of such a scheme.

The questionnaire annexed to the document covers all the issues relevant to the establishment of a sustainable milk fluoridation scheme; completion of this questionnaire will provide the information necessary for preliminary assessment of the scheme.

1.2 Why milk fluoridation?

Notwithstanding a significant decline in the prevalence of dental caries in recent years, levels of the disease still remain unacceptably high in many parts of the world. The efficacy of fluoride in reducing dental caries is well recognized, and community-based fluoridation programmes are of particular value. The World Health Organization recommends fluoridation of community water supplies and salt (WHO, 1994), but also supports programmes designed to assess the feasibility of milk fluoridation as an alternative approach.

The nutritional value of milk is universally acknowledged (Baker et al., 1980; Cadogan et al., 1997), and clinical trials have established that milk is an effective vehicle for fluoride (Stephen et al., 1984; Bánóczy et al., 1985). Moreover, the feasibility of milk fluoridation as a community-based public health measure has been demonstrated (Pakhomov et al., 1995; Stephen, Bánóczy & Pakhomov, 1996).

2. Stages in the development of a milk fluoridation scheme

2.1 Feasibility

Once a suitable location for a milk fluoridation scheme has been identified, a preliminary feasibility study should be undertaken. Although the design of fluoridation schemes will vary according to local circumstances, feasibility assessments will follow similar guidelines in all cases.

The availability of a suitable milk supply is a fundamental issue in implementation. To date, all successful schemes have relied on existing milk distribution systems; this simplifies the process of implementation and provides a cost-effective method of targeting fluoride supplementation.

The cooperation of the milk supplier is crucial to successful implementation. The process of fluoridation, and particularly the point at which fluoride is added to milk products, also needs careful consideration. Technical guidelines on the production of fluoridated milk may be found elsewhere (Stephen, Bánóczy & Pakhomov, 1996).

Since almost all types of milk product can be fluoridated, a milk fluoridation scheme can be based on any delivery system that provides children with a reliable supply of milk or its derivatives. The effectiveness of the scheme, however, depends on children receiving fluoridated milk *regularly* – ideally, on at least 200 days a year.

An important determinant of the viability of fluoridated milk production is the number of children participating in the scheme. Schemes based on supplies of "long-life" milk (e.g. UHT, powdered) can be used for relatively small numbers, because large volumes of this type of milk can be produced, stored, and distributed as required over a period of months. Where fresh milk products are used, the number needed will be dictated largely by local dairy production capacity – but experience suggests that between 4000 and 5000 children should be involved.

Clearly, it is essential to establish that the oral health status of children in the chosen location warrants this type of intervention. Levels of dental decay in the target population and exposure to fluoride from other sources – water, diet, toothpaste, etc. – must be taken into consideration. Use of the questionnaire annexed to this document (see page 7) should provide an accurate indication of whether it is worth pursuing the development of a milk fluoridation scheme.

It should be stressed that consent from the appropriate local authorities is essential when this type of intervention is considered, and that the scheme as a whole must fulfil any legal requirements in the country in question.

2.2 Consultation

Key organizations, health authorities (national, regional, and local), and other bodies whose participation and cooperation will be essential to the success of the scheme should be identified and consulted. Generally speaking, the consultation process should also extend to the children's parents and teachers.

2.3 Planning

Once official support for the scheme has been obtained, the next essential step is planning. The plan – or protocol – should clearly specify both the strategic objectives and the operational details of the proposed intervention. It is effectively a contract between the participating organizations, setting out the agreed approach to implementation and the responsibilities of all parties.

2.4 Implementation and monitoring

Monitoring is essential to ensure that the milk fluoridation scheme is carried out in accordance with the protocol and to assess the success of the scheme. It should include regular assessment of fluoride levels, both in the milk products and in the local drinking-water. Measurement of urinary fluoride excretion would provide an indirect indication of efficacy.

The results of monitoring should be used to update the protocol as necessary.

2.5 Evaluation

Evaluation – or measuring the extent to which the strategic objectives of the scheme have been achieved – will usually be based on assessment of improvements in oral health among participants.

2.6 Sustainability

Since sustainability of any community-based milk fluoridation scheme should be a primary aim, early consideration must be given to long-term development and to the availability of resources for funding the continuation and expansion of the scheme.

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Annex

Questionnaire

Use of a questionnaire can provide the information essential to a feasibility assessment. The questionnaire provided here covers the following topics:

— milk consumption by children

— details of the existing milk distribution system

— fluoride status at the national and local levels

— oral health in the target population

— organizational support and leadership.

Guidance notes are provided where appropriate, in boxed text beneath the questions. An electronic version of the questionnaire is available on request from the Borrow Dental Milk Foundation.

Questionnaire

Please tick the appropriate box in answer to each question.

Existing milk distribution system

Q.1 Is there an existing programme providing milk to children on an organized basis? Yes ☐ No ☐

If the answer is ***Yes***, go to **Q.2**.

If the answer is ***No***, question the viability of your proposal.

Guidance note for Q.1

To date, all community-based milk fluoridation schemes have used existing milk distribution systems. It is therefore important to identify whether there is such a system in the target location. If no system exists, it may be worth consulting nutritionists and others to determine the extent of milk provision for children.

Q.2 Is the milk regularly supplied through:

(a) the formal education system (schools, kindergartens, etc.)? Yes ☐ No ☐

If the answer is ***Yes***, please indicate in which part of the education system milk is provided (tick more than one box if necessary):

Kindergartens ☐ Schools ☐ Other ☐

If other, please specify:

.....

(b) outside the formal education system (e.g. in nutritional programmes) Yes ☐ No ☐

If the answer is ***Yes***, please outline the programme:

.....

Guidance note for Q.2

Most schemes have been established through the education system, but some have also been implemented through national nutritional programmes, feeding programmes, etc.

Q.3 How old are the children receiving the milk?

From ..... to ..... years

Q.4 How many children are receiving milk?

Guidance note for Q.4

The number of children involved is an important consideration in assessing the viability of a milk fluoridation scheme.

Q.5 Who is responsible for the provision of milk?

Guidance note for Q.5

Responsibility often lies with, for example, the local authority or other government agency, the education authority, whose cooperation is essential to the successful implementation of a milk fluoridation scheme.

Q.6 Who pays for the milk?

Guidance note for Q.6

This is a key factor in the implementation of a milk fluoridation scheme. The milk may be paid for by a variety of bodies, including local authorities, central government, charities, and aid agencies.

Q.7 Are the children's parents required to contribute towards the cost of the milk? Yes ☐ No ☐

If the answer is ***Yes***:

(a) please specify the amount contributed by parents

.....

(b) is this generally affordable for parents (please elaborate if possible)?

.....

Guidance note for Q.7

Parents are sometimes asked to contribute towards the costs, but this may lead to inequalities in the uptake of milk.

Q.8 Are any subsidies available for the milk? Yes ☐ No ☐

If the answer is ***Yes***, please provide details.

.....

Q.9 Are the long-term future of, and funding for, this scheme secure? Yes ☐ No ☐

Guidance note for Q.9

Milk fluoridation should be considered only when a sustainable milk distribution system exists.

Q.10 What is the source of the milk supply?

Guidance note for Q.10

Milk is often supplied to the point of consumption from a local dairy or purchased from shops, but it may also be delivered directly from a farm. Please specify the source of the milk in the target location.

Q.11 How is the milk delivered from the source to the point of consumption?

Q.12 What type of milk is supplied to the children?

Guidance note for Q.12

Typical milk products include fresh pasteurized, powdered, UHT, sterilized.

Q.13 How often is milk provided to the children?

..... days per week ..... weeks per year

Guidance note for Q.13

In order for a milk fluoridation scheme to be viable, milk must be provided for a certain minimum number of days per year. Please specify how many days per week and for how many weeks of the year milk is provided in the programme.

Q.14 What types of packaging material are used?

Guidance note for Q.14

Examples of packaging are plastic or cardboard cartons, plastic or glass bottles, plastic bags. The type of packaging used has implications for labelling (e.g. with instructions for use).

Q.15 What is the capacity of each package?

Q. 16 How is the milk served to the children?

Guidance note for Q.16

Please indicate how the milk is served (e.g. in individual cartons or bottles, or poured into glasses or cups from larger containers).

Q.17 How much milk is given to each child?

Guidance note for Q.17

To calculate the correct level of fluoride supplementation it is essential to know how much milk each child receives.

Fluoride status at the national level

Q.18 Does the Ministry of Health support the use of fluoride? Yes ☐ No ☐

Whether the answer is ***Yes*** or ***No***, please provide details:

.....

Guidance note for Q.18

Support may come from formal government policies or be based on the views of national expert committees, such as dental associations, that may advise central government.

Q.19 Are there any water or salt fluoridation schemes anywhere in your country? Yes ☐ No ☐

Fluoride status at the local level

Q.20 Is the attitude of local government favourable to fluoridation? Yes ☐ No ☐

Guidance note for Q.20

This information should be available from your senior local medical or dental officer.

Q.21 What is the level of fluoride in your water supply (please state as parts per million)?

Q.22 Is this the natural fluoride level or an adjusted level?

Q.23 Are there plans to introduce water fluoridation in the future? Yes ☐ No ☐

If the answer is ***Yes***, please provide details:

Q.24 Is there a salt fluoridation programmer in your district? Yes ☐ No ☐

Q.25 Are there plans to introduce salt fluoridation in the future? Yes ☐ No ☐

Guidance note for Q.21 - Q.25

This information can be obtained from the local water company, salt manufacturer, health authority, or environmental health department.

Q.26 Do the children in the target population drink the fluoridated water or consume fluoridated salt? Yes ☐ No ☐

If the answer is ***Yes***, please give details:

.....

Q.27 Are fluoride tablets available:

(a) over the counter? Yes ☐ No ☐

(b) only on prescription? Yes ☐ No ☐

(c) through organized programmes? Yes ☐ No ☐

If the answer to any of these questions is ***Yes***, please provide details, including the percentage of children using fluoride tablets:

.....

Q.28 Are fluoride mouth rinses available:

(a) over the counter? Yes ☐ No ☐

(b) through organized programmes? Yes ☐ No ☐

Guidance note for Q.27 and Q.28

"Over the counter" refers to fluoride tablets that are freely available and can be bought without prescription from local pharmacists or other suppliers. "Only on prescription" means that the availability of tablets is more limited; they can usually be obtained from a doctor or dentist or possibly a health visitor. "Organized programmes" refers to schemes in which fluoride tablets or fluoride mouth rinses supplied under the supervision of teachers or other responsible individuals in educational establishments.

This information should be available from the local health or education authority. It would be helpful to know the estimated uptake.

Q.29 Is fluoride toothpaste available? Yes ☐ No ☐

If the answer is **Yes**, please specify:

(a) concentration of fluoride in the toothpaste

.....

(b) the approximate age at which children start to use fluoride toothpaste

.....

(c) the approximate percentage of children using fluoride toothpaste

.....

Guidance note for Q.29

Some local research may be necessary – visiting local retailers for information on product availability. The age at which children start to use fluoride toothpaste is important: children under 6 years old may swallow a substantial amount of the toothpaste on their brushes, and this can be an important source of ingested fluoride.

Q.30 Are there any significant dietary sources of fluoride for children? Yes ☐ No ☐

If the answer is ***Yes***, please give details:

.....

Guidance note for Q.30

Dietary sources of fluoride vary from community to community. Fish and tea in some parts of the world are know to be high in fluoride. Further details are available elsewhere (WHO, 1994, sections 2.4 and 2.5).

Oral health in the target population

Q.31 What is the DMFT in 6-year-old children?

Q.32 what is the dmft in 12-year-old children?

Guidance note for Q.31 – Q.32

This information should be available from your senior dental officer. The relative importance of the different age groups clearly depends on the age of the target group; prevalence or dmfs/DMFS would be equally acceptable. If there is no detailed local information, figures may need to be estimated from national data. Where there are no local data at all, a small local survey may be necessary (for methods, see WHO (1997)) but will require expert advice.

Q.33 Is dental fluorosis a public health problem in the targeted population? Yes ☐ No ☐

Organizational support

Q.34 Which are the key organizations/authorities/political bodies whose support would be essential to the implementation of a milk fluoridation scheme?

Guidance note for Q.34

There are some organizations whose support is absolutely essential. For example, school-based schemes may be the responsibility of the local authority; infant nutrition programmes, however, may be administered by the health service or by a nationally funded agency.

Leadership

Q.35 who is/are the key individual(s) who could coordinate and lead the development and subsequent monitoring and evaluation of the scheme?

Guidance note for Q.35

Experience indicates that an individual (or a small group of individuals) will be needed to coordinate the scheme and provide the momentum to sustain it. Such individuals may not necessarily be employed by, but should be acceptable to, the key organizations identified in Q.34.

Thank you for completing this questionnaire

Once you have completed this questionnaire, you should be in a position to make a preliminary assessment of the feasibility of a milk fluoridation scheme. You will then move to the second stage, as outlined in section 2.2 of this document. First, however, you should seek further advice from WHO and/or the Borrow Dental Milk Foundation.