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# Research defines public dental health promotion in youth

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**Abstract:** In the Netherlands, Dental Public Health Service workers work in the healthcare delivery system to promote dental health. Since 1994, research has been conducted in Flevoland on the condition of children's teeth. This research has shaped the content of the dental health promotion directed at children in this region. The research comprises two parts: questionnaires for parents and children above the age of 12 and a dental examination of children aged 6 and 12 in the regional primary schools. The dental examination registers the health of the children's teeth. Sound teeth are defined as being free of visible caries and/or restoration. Not sound teeth show at least one case of visible caries and/or restoration. The research results have shown great dental differences between the various schools and between municipalities. The percentage of children with sound teeth ranges between 28 and 100 per school. Based on the final results of the research, an information pack will be disseminated. In the case of high-risk schools the dental health promotion will be conducted more intensively. The Dental Public Health Service workers will give information sessions to groups of parents and children, the dentist and the dental hygienist will provide individual information and prevention. At the child health clinic (consultatiebureau), education will be provided to parents of children ranging in age from 0 to 4. This combined approach has proven to be effective on a large majority of the children. To ensure uniform dental health promotion, information protocols are used in these promotion activities within Flevoland.

**Key words:** collective prevention in dental hygiene; information on dental hygiene; research into children's dental state

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## Introduction

The Flevoland province is the youngest and fastest growing province in the Netherlands and, within its six municipalities, has a current population of more than 350 000 inhabitants. In the province of Flevoland much is done in the area of dental health by various professional groups and using various approaches. For example, individual educational sessions are provided during a visit to the dentist and dental hygienist, during consultations at the child health clinics (CHCs) with parents who have babies and toddlers and by nurses from the Municipal Public Health Service (GGD) during medical examinations at schools. In the Flevoland province, the Flevoland Public Health Service is involved in many preventive issues to ensure the health of the inhabitants remains optimal. In the Netherlands, the Municipal Public Health Services are responsible for the public healthcare of the inhabitants of their region; these institutions also take care of the dental public health promotion. The Municipal Public Health Services have employed a Municipal Public Health Service worker (DPHS worker) to fulfil this task and this position is usually occupied by a dental hygienist. The DPHS worker conducts this dental health promotion by providing information sessions to groups of children and parents at primary schools and kindergartens. To shape the content and direction of this promotion, research was begun in 1994 to acquire an overview of the dental health status of primary school children in Flevoland.

Since 1994, research has been conducted every year in one of the six municipalities into the dental state of the children. After 6 years, in 2000, all six municipalities had taken part once in the dental research. After the 6 years, from 2000 onwards, a repeated study was conducted in the same municipalities and at the same schools. The last repeat study is being conducted in the last municipalities: Almere and Zeewolde.

By repeating the research, it is possible to trace trends in the dental health status and behaviour patterns of children relating to their own teeth.

The article outlines the reasons and working methods, the implementation and the results of the dental research among children aged 6 and 12 years in the province of Felvoland. Also, a description is given of the interventions that were implemented to improve the dental situation of groups of children with poor teeth.

## Why conduct dental research in the first place?

The purpose of the dental research was to gain insight into the dental health of children in groups 2 and 8 in primary schools. These children are about 6 and 12 years old. The Dental Public Health Service opted for a simple measurement at a representative number of schools. In this way, a general insight in the dental state of children could be envisioned. A precondition for the research was that the available time would be kept as short as possible to render more time for implementing promotional activities.

The research study has made it possible to pinpoint certain groups of schools with children that lag behind in the area of dental health. Using the research results, implementing dental health promotion activities has been made more effective and more focused.

## Dental research methods

The questionnaire provides information concerning dental visits, the frequency and method of tooth brushing, extra brushing by parents, wearing a brace, whether or not parents have received dental information during visits to the CHC for 0 to 4-year-olds and the information requirements of parents concerning dental hygiene (Table 1). In addition, information about the cultural background of the parents is provided. Also, a dental examination is carried out by the DPHS worker in which the milk teeth of 6-year-olds and the permanent teeth of 12-year-olds are checked in terms of 'sound/not sound.' A sound set of teeth distinguishes itself from a not sound set by the presence or absence of visible caries and/or tooth restoration.

At this time in the province of Flevoland there are 195 primary schools. Of these 195 primary schools, 75 took part in the dental research. That means that a selection was made per municipality of a quarter up to a half of all 6 and 12-year-olds. The primary schools that were asked by the Municipal Public Health Service to participate in the research were selected on the basis of geographical location and social–economical status. In tandem with each research per school, an information lesson in dental health was given to the group being researched.

## Dental research results

The number of children with a sound set of teeth differed enormously from school to school. The percentage of children

Table 1. **The research comprises two parts**

| | Questionnaire | Dental research |
|---|---|---|
| Parents of children in group 2 | √ | |
| Parents of children in group 8 | √ | |
| Children in group 2 | | √ |
| Children in group 8 | √ | √ |

with sound teeth was between 28 and 100 per school. Extra preventive activities will be provided to high-risk schools immediately after the research is completed.

The average percentage of children with perfect teeth in the whole province of Flevoland is 62% for group 2 and 69% for group 8. It is worthy of notice that in the past 6 years the dental condition of the children in group 8 has (greatly) improved in all cases. This is unfortunately not the case for group 2 children, as can be seen in Table 2.

The answers to the questionnaire revealed that on an average 95% of all school children go for a check-up to the dentist every year. For many children with sound teeth, brushing behaviour was seen to have had a positive influence. In many cases, brushing twice a day had a positive effect on a sound teeth score. Cultural background was also shown to have an influence on the condition of the teeth; children of Dutch parents were judged to have sound teeth more often than children of immigrant parents.

On an average, a third of all parents would like to have more information on dental hygiene for their children. Parents would prefer to receive this information via the school their children attend.

In Table 2, it is shown that the number of children with sound teeth in the municipality of Urk lags far behind that of children in other municipalities. The percentage of children that brush their teeth twice a day is also low in this area. Among children in group 8, the brushing behaviour has even deteriorated during the past 6 years. Reasons for the deterioration of the teeth of the children could have to do with the amount of sweets consumed and the dental hygiene. Children in Urk consume a lot of sweets. In Urk, there are many large families (families with six or more children are no exception) where attention to dental hygiene is not always top of the list.

In light of the research results from 1994, the district council of Urk decided to partly finance a large-scale information project. This project was implemented by the Municipal Public Health Services between 1995 and 1998. Many information lessons on dental health were given to all primary school children and a lot of parent meetings were organized on the subject. The schools themselves also organized a lot of projects on dental hygiene and many schools continue to do so every year. Schools use lesson material from the Municipal Public Health Services for these projects. All the schools made exhibition posters on dental hygiene and these posters were exhibited in the library of the Urk municipality.

The organizers of all these activities worked in close collaboration with the CHC for 0 to 4-year-olds, dentists and dental

Table 2. **Tooth brushing and tooth condition percentage score among children in groups 2 and 8 per municipality**

| Name of the municipality | Group 2, tooth brushing 2× or >2× per day | | Group 2, tooth score perfect teeth | | Group 8, tooth brushing 2× or >2× per day | | Group 8, tooth score perfect teeth | |
|---|---|---|---|---|---|---|---|---|
| | First measurement (%) | Second measurement (%) | First measurement (%) | Second measurement (%) | First measurement (%) | Second measurement (%) | First measurement (%) | Second measurement (%) |
| Almere | 72 | | 72 | | 79 | | 76 | |
| Zeewolde | 72 | | 77 | | 75 | | 85 | |
| NOP | 62 | 69 | 68 | 64 | 62 | 80 | 64 | 84 |
| Dronten | 66 | 77 | 70 | 69 | 67 | 83 | 63 | 72 |
| Lelystad | 63 | 78 | 63 | 61 | 64 | 86 | 65 | 72 |
| Urk | 50 | 50 | 13 | 30 | 69 | 61 | 19 | 28 |

At this point in time the repeat research study is being conducted in Almere and Zeewolde. The findings in these municipalities are therefore not yet known. There is a period of 6 years between the first and second measurement.

hygienists and pediatricians. The research results of the repeated research that was implemented in 2000 has shown a clear rise in the number of children with sound teeth.

## Informing the risk groups

If the research results show that there are specific groups or schools in need of extra information this will first be discussed with the school in question. Figures from the research report often help to motivate the school in question to carry out extra activities in the area of dental health within the school. To maintain, and if necessary, improve the dental health of the children in Flevoland, the Public Health Service has developed the following information package. This information can be found on http://www.hvdf.nl (Municipal Public Health Service, Youth, Dental Health).

**1** Lesson boxes containing lesson material will be made available to primary schools, kindergartens and daycare centres. The teachers and carers can use this material to give a lesson or a project to the children on dental hygiene. This lesson box contains demonstration material such as a large model set of teeth, a tooth with caries, video tapes for different groups, books to read and various lesson packages for children ranging in age from 2 to 12 years.

**2** Information lessons on dental hygiene. The DPHS worker gives these lessons to all children in primary schools. Each lesson lasts an hour during which information is given to the class concerning dental hygiene, shedding one's teeth, healthy eating patterns, seven eating moments and the prevention of caries, tooth erosion and gingivitis. The content of this information will be adapted to the age group involved. After the information session, brushing instructions will be given, both with a manual tooth brush and an electric one. Next, each child will receive a tooth brush and goes into a group of five children under guidance of the DPHS worker to an available sink to brush their teeth. Children aged 9 check the brushing using disclosing fluid and after this a second tooth brushing session usually follows. Children waiting in the classroom for their turn at brushing their teeth are given a colouring sheet or a 'knowledge quiz' with 10 questions on dental hygiene and a brochure with information and assignments on 'the mouth'. To round off the lesson the children assess their own answers to the knowledge quiz.

**3** If so requested by the teachers at primary schools or employees at daycare centres, the DPHS worker can organize a parent meeting on dental hygiene. During this 2-h long meeting information on the dental hygiene of their children will be provided to parents via an interactive game that is specially designed for this purpose by the DPHS. Using dice and cards with 'questions, opinions and misconceptions', a lot of subjects relating to dental hygiene will be broached in this playful way.

**4** To ensure that problems in the mouth are signalled as quickly as possible, it is important that children go to the dentist for a check-up at least once a year. In addition to all the prevention activities the Municipal Public Health Service also does its utmost to register as many children as possible for a check-up at a dentist. The Municipal Public Health Service uses a special system for those children who have never been to a dentist or for the ones who do not go often enough to be registered as patients at a dental surgery. These children are traced by the school nurse for the Municipal Public Health Service who conducts the school research study among school children. In Flevoland, an average of 180 children a year are brought to a dentist using this system.

## Information for all target groups

The Municipal Public Health Service provides information activities to risk schools. It is also very important to ensure that the dental health of school children that is already good, remains so. The Municipal Public Health Service provides schools, daycare centres and kindergartens where many children have a good dental health, with an information pack that is an adapted form of the one outlined above for risk schools. The institutions that provide this information supply are kept informed in writing and schools, daycare centres and kindergartens must therefore apply for it themselves. All institutions can borrow the lesson box with lesson material on dental hygiene. The information classes can only be requested for children aged 6, 8 and 12. These lessons can best be combined with a project on dental hygiene for which the teacher can borrow the lesson box with lesson material on dental hygiene from the Municipal Public Health Service. The teachers use the lesson boxes with material every year and all the institutions get the DPHS worker to organize a parent evening.

Some figures: every year the DPHS worker organizes an average of 20 parent meetings on request of primary schools, daycare centres and kindergartens; these institutions request a lesson box with lesson material from the Municipal Public Health Service to give a class or a project themselves on dental hygiene. An average of 8500 children receive an information lesson from the DPHS worker on dental hygiene as described above.

## Harmonizing prevention for groups with individual prevention

The greatest chance of success lies in harmonizing individual-oriented prevention and the various forms of group prevention. For this reason it is important that all the professional groups that involve themselves in disseminating information should send out the same message (1). In Flevoland this was well regulated because the consultation structure 'FlevoTand' (Flevo Tooth) was set up. In 'FlevoTand' dentists, dental hygienists, Home Help organizations and the Municipal Public Health Service from the entire province of Flevoland participated in the programme. Within 'FlevoTand' agreements were made on a regional level on the nature of the information provided to the different target groups; and also within 'FlevoTand' there was a harmonization of the preventive and curative treatments. In order that the different bodies could harmonize their information campaigns 'dental health promotion protocols' were made to ensure all the information would be identical.

## Discussion

In light of the fact that a growing number of 12-year-old children have perfect teeth, we may presume that prevention and information have played a role in this happy development. In particular the activities in risk schools, that were signalled by the research, may have been influential in improving the state of the teeth of school children.

The condition of the teeth of 6-year-olds, however, has deteriorated. An increase in the consumption of sweets among these children could be a cause of this. Various professional groups have indicated that 6-year-olds are eating more sweets than before. In Urk, the consumption of sweets has always been high among children. This could be the reason why the state of 6-year-old children's teeth in this municipality has not deteriorated. The improvement of the state of 6-year-olds teeth in Urk could have been influenced by the various intensive preventive measures taken there. It is as yet unclear whether the adaptation of the fluoride advice has played a role here. From 1998 on, the fluoride concentration in toddler's toothpaste was increased from 250 to 500–750 p.p.m. (3) (e.g. 250 = 0.025%). In this period a great effectiveness in using fluoride toothpaste had been established. Unfortunately this effect is not visible among 6-year-olds in Flevoland.

There are indications that the information that is given directly to 12-year-olds is more effective than the information given directly to 6-year-olds. The information given to parents of 6-year-olds appears to be more effective than the information given to the parents of 12-year-olds. This raises the question whether the information provided in schools is sufficiently differentiated according to the target group and content. This is certainly a relevant question when it comes to the difference between indigenous and immigrant children. Since it has been shown that immigrant children have worse teeth than indigenous children it would be worth the effort to give extra attention to this group by disseminating information among both parents and children.

## Conclusion and recommendations

In light of the significant difference in dental health per school and per municipality, a focused dental information programme, especially for risk schools, is a good way to help improve the state of children's teeth. Our preference goes to a combined approach of individual-based information and prevention in practice, in combination with the information for groups provided by the Municipal Public Health Service. Mutual exchange of all the information elements and the following of information protocols by all intermediaries can help to improve the condition of children's teeth.

The great advantage of prevention and dissemination of information as practiced by the dentist and dental hygienists is that the instructions on dental hygiene and nutritional advice can be adapted to each individual. Dental public health activities have as their goal to raise awareness among children of dental hygiene in a short space of time and instructions on dental hygiene as well as nutritional advice can be learned and practiced by a group of school children. The strength of the information activities in Flevoland is the harmonization of this individual and dental public health approach whereby information protocols have been developed to facilitate this harmonization. Special activities focused on risk groups and in addition a standard package containing information activities for all children from 0 to 9 years can contribute to improving the condition of children's teeth and in the case that the teeth are already healthy, to keeping them that way.

If one compares the two research studies conducted in the same municipality then it is immediately noticeable that, with the exception of the municipality of Urk, the percentage of children with sound teeth among group 2 school children has deteriorated in the past 6 years. Conversely, the condition of the teeth of children in group 8 has improved in the same period of time. The various dental health information activities specially designed for risk groups and the repetition of the message by a diversity of professional groups in the dental care

sector may have been of influence in improving the state of 12-year-olds' teeth. The reasons behind the deterioration in the condition of 6-year-olds' teeth will be more closely studied. It will be even more important in the future to give extra attention to providing information to parents of 6-year-olds. Parent meetings should be arranged more often as these can be of great influence in stimulating parents to keep the teeth of their children as healthy as possible.

Since many Municipal Public Health Services throughout the country conduct dental surveys, it would be useful to have a frame of reference. It appears that the details acquired by the Municipal Public Health Services cannot be compared on a national level (2). The research results are used only by the inhabitants to set up and implement campaigns for the improvement of dental hygiene in their own region. The questionnaires used have not been nationally standardized which has meant that it is not possible to compare the various research studies. We recommend that the questionnaires and the dental examinations should be standardized to facilitate the harmonization and comparison of details at a national level.

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## Flevoland Municipal Public Health Service research reports

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**2.** C. van der Poel. Choose for your teeth, Lelystad. Research into the dental state and dental hygiene of primary school children in group 2 and 8 in the municipality of Lelystad, 1995.

**3.** C. van der Poel. Choose for your teeth, Dronten. Research into the dental state and dental hygiene of primary school children in group 2 and 8 in the municipality of Dronten, 1997.

**4.** C. van der Poel. Choose for your teeth, Noordoostpolder. Research into the dental state and dental hygiene of primary school children in group 2 and 8 in the municipality of Noordoostpolder, 1998.

**5.** C. van der Poel. Choose for your teeth, Almere and Zeewolde. Research into the dental state and dental hygiene of primary school children in group 2 and 8 in the municipality of Almere en Zeewolde, 1999.

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