

Toward Meeting Dental Health Needs:  
A Project Involving Community Health Nurses  
Who Work With Parents of Preschool Children

Practicum Report  
Submitted in Partial Fulfillment of the  
Requirements for the Degree Master of Nursing  
Faculty of Graduate Studies of the  
University of Manitoba at Winnipeg.



by  
Barbara Lane  
February, 1986.

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TOWARD MEETING DENTAL HEALTH NEEDS:  
A PROJECT INVOLVING COMMUNITY HEALTH NURSES WHO WORK  
WITH PARENTS OF PRESCHOOL CHILDREN

BY

BARBARA LANE

A practicum submitted to the Faculty of Graduate Studies  
of the University of Manitoba in partial fulfillment of the  
requirements of the degree of

MASTER OF NURSING

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## ABSTRACT

The Renzulli method has been used in the assessment phase of a project to improve dental health care delivery to preschool children in Winnipeg's "inner city". The method is collaborative, allowing input from those with concerns in the area, in this case, parents, Public Health Nurses, Dentists, Dental Hygienists and Nurse Educators. Representatives of the groups were interviewed with regard to their views concerning special and unmet dental needs of young children. Written materials were also used in the assessment - records such as guidelines for the practice of nursing and patient files from the City of Winnipeg Health Department.

From the process and a review of the literature, a conclusion was drawn that a low level of information existed among Winnipeg parents about the dental needs of preschool children and that the Public Health Nurse is an appropriate person to do the necessary parent teaching. An exploration was also made of the dental health learning needs of the Public Health Nurses. An assumption was made that workshops with the nurses could alter their approach to dental health so that the concerns identified by the key informants would be met. Accordingly, in June, 1985, workshops were held with Winnipeg's Public Health Nurses to facilitate their learning about assessment of dental caries and other oral pathology, diet and dental care, counselling and referrals.

Five weeks following the workshops, examination of patient files in all of the district offices revealed an increase in nursing notes about dental matters. Comments from the nurses at this time confirmed the impression of greater knowledge and concern among the Public Health Nurses about the dental health of their preschool clients.

Implications of the project for nursing practice, research and education are discussed.

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## Chapter I

### STATEMENT OF THE PROBLEM

The Standards Committee of the Division on Community Health Nursing Practice (American Nurses Association) has defined the nature of Community Health Nursing as "... general and comprehensive... continuing, not episodic,..." and "with a responsibility to the population as a whole. Nursing actions related to areas such as health promotion, health maintenance, co-ordination and continuity of care are utilized in an holistic approach..." (1973). Today, the statement is broadly accepted as appropriate to Community Health Nursing (Leahy et. al, 1982; Stanhope and Lancaster, 1984). However, in spite of the mandate for holistic care in Community Health Nursing, not all aspects of care among all age groups may be adequately addressed: one area on which Community Health Nursing has not focussed has been that of dental health. In the case of young children, the omission is particularly unfortunate, as tooth decay is childhood's most common problem. By age twelve, about 90% of children in the industrialized world have one or more carious lesions. It may be, however, that if dental health takes on a higher profile when Community Health Nurses consider their health promotion and maintenance behaviors, the dental health of young children in their communities will improve.

Dental caries may be described as the demineralization of tooth enamel by acids formed from bacteria (primarily *Streptococcus Mutans*) acting on dental plaque. The direct causes have been identified as ineffective removal of plaque and harmful dietary habits, which may increase the sucrose in the oral environment. Important contributing factors are an inadequate knowledge base and/or motivation on the part of the individual with regard to diet or dental care. The problem is exacerbated by pleasure oriented advertising and ready access to candy, soft drinks and other sweet foods. Children in particular present a target population for the advertisement of the sucrose laden snack foods which abound in western culture.

In the case of very young children, the problem of dental caries may be compounded because these individuals lack the manual dexterity to clean their teeth effectively. To the extent parents are not concerned about the condition of deciduous teeth because they will eventually be replaced, or do not know about children's dental care, the risk to young children is heightened. Moreover, although tooth problems may begin as soon as the first tooth erupts, most Canadian children do not visit a dentist until they have passed their third birthday (Canadian Dental Association, 1984). Unless information pertaining to dental care has been given to parents by other health professionals, the danger exists that severe damage may occur to the child's teeth before the

parents have developed the knowledge or attitudes they need to protect the child from caries.

The families of these children are reached more often by other health professionals than they are by dentists. One of these, the Community Health Nurse, may be seeing the family on a fairly regular basis and may be a credible source of health information generally for the client. The nurse sees families in many settings: prenatal and postnatal home visits, immunization and child health conference appointments and home visits or consultations made for other reasons, such as "preschool checks". Through such opportunities, the Community Health Nurse is in an ideal position to inspect the children for tooth decay, and to share with the parents information regarding diet, teeth care and referral to the dentist. In doing so, the nurse may significantly lower the physical, psychosocial and economic consequences of caries for the children and facilitate their general growth and development. The dental health of children, therefore, is an important area of interest for Community Health Nurses.

There is a danger, however, that health professionals outside dentistry may overlook the importance of dental health in children, perhaps because dental caries is not a disease associated with mortality or obvious serious morbidity. As well, nurses and others may believe that

matters related to dental development and care properly fall only within the domain of dental health professionals. Programs for nursing students do not emphasize assessment, planning, interventions and evaluation for clients as they relate to teeth. Consequently, some nurses have an insufficient knowledge base for meeting the dental information needs of their young family clients.

In summary, the problem addressed by the practicum was that preschool children in Winnipeg, as elsewhere in Canada, are at risk for complications (such as abscessing and premature loss of primary teeth) as a result of caries-producing dietary and dental care habits in the home. Further, because children are not usually taken to the dentist in the early years, such problems may not be detected or treated soon enough to prevent serious damage or loss of teeth. Families with young children in Winnipeg are in contact with Public Health Nurses (as those practicing Community Health Nursing in Winnipeg prefer to be called). However, the nurses may not be taking full advantage of opportunities to address the dental health of the children, perhaps because they lack a sufficient knowledge base for assessment and parent counselling about dental health.

The focus of the practicum, therefore, was to explore the extent to which the dental needs of preschool children of Winnipeg were being met and to remedy any deficits in

Knowledge and skills of the Public Health Nurses in relation to children's dental health. Geographic boundaries were the limits of the 'inner city', which is School District #1, the territory managed by the City of Winnipeg Health Department. Activities involved assessment of needs and, related to the findings, workshops with the Public Health Nurses of the city of Winnipeg, Health of Health.

## Chapter II

### OBJECTIVES OF THE PROJECT

During the winter of 1985, as part of clinical practice in Community Health Nursing at the University of Manitoba (49:701), I visited the homes of children enrolled in Winnipeg's Munro Day Nursery. The purpose of the visits was to practice assessing young children's teeth and related counselling to parents, and to assess the feasibility of an increased dental health focus in the practice of the Public Health Nurses. Forty-nine children were visited, in 42 homes. Although the day nursery was not centrally located, the children were drawn not only from the immediate neighborhood, but also from a variety of locations in the city. Socio-economic status of the households varied as well.

The assessments revealed a general need for improved dental care among the children: a build-up of dental plaque was noted in almost half of the children, although the parents had been aware that the activities of the visit could include inspection of the children's teeth. In ten of the 49 children's mouths, remnants of food was evident; four had lost one or more teeth early due to advanced caries or injury; and seven appeared to have carious lesions advancing to brown or dark brown.



Regarding dental health behaviors in these children's homes, dietary or dental care habits were found which could present a risk to dental health: according to observation or the parents' report, many of the younger children often carried with them "comfort" bottles which contained Cool-Aid, apple juice or 2% milk. About half of the older children used peanut butter and jam or honey sandwiches and/or assorted "Kiddie candies" or sugar-sweetened bubble gum routinely between meals, usually with no brushing or rinsing of the mouth. Only one parent had ever brushed her child's teeth.

Parents were asked questions such as how old their child was when they first took him or her to the dentist, where they got their dental health information, and so on. Although the children ranged in age from two to five years, only one had had a professional visit to the dentist. As well, none of the parents interviewed listed their Public Health Nurse as one of their resources about dental health. The problem did not appear to be one of motivation on the part of the caregiver: most parents exhibited by their general receptivity and their questions and attention that they wanted information on how to foster the development of sound teeth for their children.

The dietary and dental care practices at the day nursery were good; that is, sweets were not allowed as treats, food

breaks were followed by assisted brushing of the children's teeth, and "cleaning fruits", such as apples, were encouraged over carbohydrate-rich snacks, such as crackers.

As a result of the home visits described above, the conclusion was drawn that a low level of "dental health knowledge" existed among the parents of the preschoolers. On the assumption that Winnipeg's children from "non-day nursery" homes would not differ markedly from these children with regard to dental matters, a nursing diagnosis was formulated that preschool children in Winnipeg are at risk for dental caries, compared to others in the population. Building on that base, the objectives of the practicum were as follows:

1. ...to use the elements of the nursing process (assessment, planning, intervention and evaluation) to assist families with preschool children to promote optimum dental health for the children, specifically in the areas of dietary habits and home dental care.
2. ...using a modification of the approach developed by Renzulli (1972), to evaluate the degree to which dental health care needs were being met through interventions by Public Health Nurses in the City of Winnipeg.
3. ...to plan, execute and evaluate a workshop with Public Health Nurses to strengthen their assessment skills and knowledge bases regarding dental health needs of preschool children.
4. ...through the workshops, to secure the commitment

of the Public Health Nurses in Winnipeg to include in their practice attention to dental health needs of their preschool clients.

From the viewpoint of the City of Winnipeg, the long term objectives of the project were to lower the incidence of dental caries among the inner city's approximately 12,000 preschool children, through facilitating their adoption of dietary and dental care habits known to provide a sound basis for the growth and development of teeth.

## Chapter III

### REVIEW OF THE LITERATURE

#### 3.1 CAUSES OF DENTAL CARIES

The modern concept of tooth decay originated with the work of W. D. Miller, a microbiologist; in 1890, he concluded that dental decay was caused by oral microorganisms forming acids which dissolve the calcified structures in the mouth (Newbrun, 1978). More recent writers on this 'chemoparasitic' theory have emphasized the multifactoral nature of dental caries, such that several factors have to be present for caries to result. They believe that occurrence and extent of caries are the result of interactions over time involving the host, agent and environment (Silverstone et al, 1981). This conception is similar to the epidemiological model, as may be seen by figure 1.

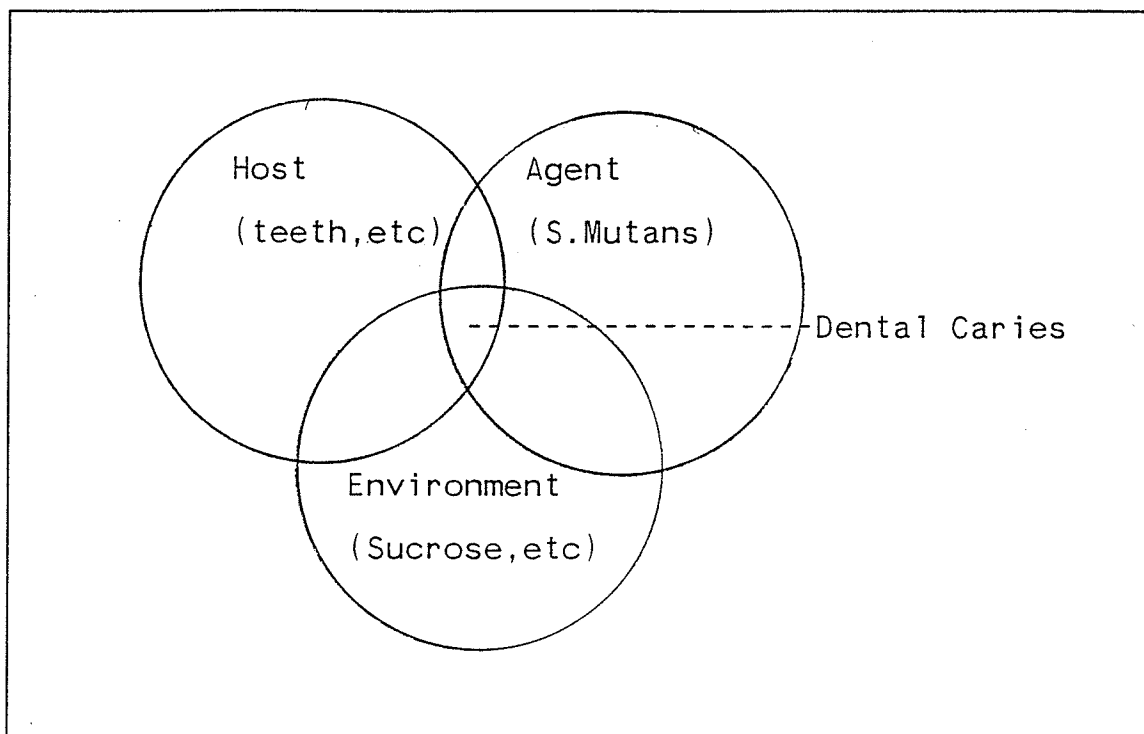


figure 1. Elements in the Chemoparasitic model

Several host factors affect an individual's resistance or susceptibility to caries. They include heredity, which influences the depth of pits and fissures; and nutrition, including fluoride status and vitamins, especially A and D, which allow for normal enamel and dentinal matrix formation and absorption of Calcium and Phosphorus. Saliva, which may vary in quantity and/or quality, is also a factor. According to Sweeney, salivary gland dysfunction will frequently result in marked increase of decay in teeth near the gland's duct orifice (Sweeney, 1981).

The agent factors related to dental caries are acid producing bacteria; perhaps the most important is

Streptococcus Mutans, which can replicate on smooth surfaces, form a mat-like plaque and initiate a carious lesion. Lactobacilli are also thought to be a major micro-organism culpable in dental caries, but only for lesions in the deeper grooves, or after the smooth surface of intact enamel has been disrupted by other micro-organisms. Plaque contains relatively few lactobacilli (Silverstone et al, 1981; Sweeney, 1981). To date, research has been unproductive with regard to reducing the virulence of Streptococcus Mutans or other decay producing bacteria.

Regarding environmental variables, the most frequently cited factor has been the fluoridation of community water supplies. Another is the availability and consumptive pattern of refined carbohydrates, notably sucrose. Not only the sugar content of the food is important, but also the stickyness of the substance and the pattern of eating. Between meal candy has been found to be a major factor in dental decay; in contrast, when sweets are restricted to mealtime, more modest increases in dental caries will result (Gustafsson, 1954; Harris, 1963; Sweeney, 1981).

Researchers in Oral Pathology have determined the mechanism by which dental caries arise: bacterial extracellular enzymes act on the salivary glycoproteins to produce a tenacious protein matrix on the tooth surface. This material, along with the oral micro-organisms, forms

dental plaque. If plaque removal is inadequate for even a few days, the polysaccharides in the plaque can be metabolized by the bacteria to form acid, primarily lactic acid, which initiates the demineralization of enamel (Newbrun, 1978).

Rule listed four types of dental caries - pit and fissure, smooth surface, root surface and deep dentinal caries - and described the appearance of carious lesions as they progress (1982). In the early stages, he explained, the lesions appear as dull, whitish discolorations on the clinically intact tooth surface, typically at sites inconvenient to clean, such as near the gumline or between the teeth or in developmental pits or fissures. These whitish lesions may be differentiated from naturally occurring developmental white lesions which, when the tooth is dried, are shiny, in contrast to the dull opacity of early caries. The white lesion stage ends when the surface enamel breaks away and a cavity forms. As the lesion progresses through the dentin, the process becomes more rapid, increasing to a rate of approximately 1.0 mm every six months, as dentin is less mineralized than the enamel surface. Eventually, irreversible pulpal changes may occur.

Although very early recognition of dental caries requires the use of a dental explorer, lesions that have entered the dentin can often be identified without the tool. The

cavities may range in color from the new yellow-tan lesions to a dark brown, indicating heavy deposition of bacterial pigmentation. About half of all dental caries occur on the occlusal, or meeting, surfaces of teeth, often within developmental pits or fissures. There are also proximal caries, anterior or posterior, which occur between contacting teeth and which account for about 30 per cent of all caries. Finally, caries which occur on the facial or lingual surfaces of teeth account for 20 per cent. These may be pit or smooth surface lesions. In the case of smooth surface caries, other than those on proximal surfaces, these usually occur on the facial surfaces of the upper molars and the lingual surfaces of lower molars, areas frequently missed by the casual brusher. (Rule, 1982).

Where a carious lesion develops has major implications for its progression. For example, cavitated anterior facial lesions in primary teeth are likely to result in irreversible pulpal changes because the dentin in primary teeth is very thin. Also, in all posterior teeth, where the dentin is thicker, caries may reach a considerable size without penetration into the pulp. (Rule, 1982).



### 3.2 PREVENTION OF DENTAL CARIES

Many ways have been investigated to reduce the incidence of dental caries. Two promising avenues, the implantation in the body of controlled-release devices for chemotherapeutic agents and protection based on immunization, are in the early stages. Simple methods already exist, however, which could be effective in reducing dental disease. These include fluoridation, diet regulation and plaque control. The last two of these, however, require that individuals have the information, skills and motivation to establish the habits needed to control dental caries.

#### 3.2.1 Fluoridation

Studies since the early 1940's have shown that fluoridation has resulted in a decrease of caries incidence by 60 to 65 per cent (Hayes et. al., 1957; Brown & Popove, 1963). Other modes of delivery of fluorides are possible, such as dietary fluoride supplements or mouthrinsing with fluoride solution, each of which has been found to reduce the incidence of children's dental caries by only 35 per cent (Horowitz, 1980). Fluoridation of community water is the most effective, practical and least expensive approach, and it confers protection against tooth decay to everyone regardless of age, socioeconomic status or education (Newbrun, 1980; Horowitz, 1980). By itself, however,

fluoride administration, even through communal water systems, will not eradicate dental caries. Diet control and prevention oriented oral hygiene are also required.

### 3.2.2 Diet and Dental Caries

An important method of reducing the incidence of dental caries concerns diet, defined as 'the habitual nourishment of an individual, group or population' (Webster, 1976). Dietary habits are woven deeply into the culture, influenced by geography, climate, tradition, economics and values. For example, the use of sweets as an expression of affection common in some cultures has profound implications for the dental health status of children.

The association between dental caries and the dietary practices of the host has been well established. Sreebny, for example, studied U.N. (Food and Agriculture) data from throughout the world and found a relationship between the availability of sugar in a country and the presence of decayed, missing or filled teeth in the population. The Canadian data, from the National Report, Nutrition Canada Dental Report, 1977, indicated a relatively high availability of sugar, at 141 g/person/day, compared to 137 in the U.S., and a decayed, missing, filled teeth (D.M.F.T.) index of 6.1 for twelve year old children, compared to 4.0

in the U.S. Data on actual consumption of sugar was not available for the study (Sreebny, 1982). Nor were data specific to the city of Winnipeg.

Other researchers have performed controlled human studies of institutionalized populations (Gustaffson et al, 1954; Harris, 1963). Both these and laboratory tests using experimental diets for animals have documented the cariogenicity of sucrose (Newbrun, 1974a). Not only is the sugar content of the foods important, but also the stickyness of the substance and the pattern of eating. 'Between meal' candy has been found to be a major factor in tooth decay; in contrast, when sweets are restricted to mealtime, more modest increases in dental caries have occurred (Gustafsson, 1954; Harris, 1963).

Newbrun explained the role of sucrose in the dynamics of caries. The synthesis of glucans, he said, is necessary for the second stage of the adherence of *Streptococcus Mutans*, and the extracellular synthesis of glucans is dependent on the metabolism of sucrose by glycotransferase. Where foods contain low levels of sucrose, however, no extracellular glucans are synthesized and the second stage of adherence does not take place. Glucose, which diffuses just as readily into plaque and produces acid just as quickly, is less cariogenic (Newbrun, 1967a, 1982).

One type of dental disease related to the diet of very young children is 'bottle caries', a phenomenon which occurs in some infants whose teeth have had prolonged contact with liquids containing cariogenic substances, usually milk or sweetened juices (James et al, 1957; Jenkins & Ferguson, 1966). Clinical experience and research has shown that widespread destruction may result on those teeth in prolonged contact with the fluids from the bottle: the upper incisors, especially the facial and proximal surfaces, and upper first primary molars. The pattern is related to two factors. First, the sucrose content of the food is important, such as when pacifiers dipped in sweeteners are given the youngster. The second factor concerns the infant feeding practices, such as, in the early months, "bottle propping", and later, allowing the child to carry a bottle about during the day and/or putting the child to bed with a bottle. These patterns promote prolonged contact of the teeth with sucrose and are not consistent with adequate cleansing of the child's mouth following feeding. Johnson (1982) has pointed out that bottle caries is usually associated with overindulgence of parents regarding sweets for their youngsters. Left untreated, the condition may lead to serious consequences: pain and infection, premature loss of teeth, "tongue thrusting", abnormal swallowing habits and speech difficulties (Forrester et al., 1981).

Interventions for bottle caries must deal with the overindulgence or children with the affliction will be at risk for dental caries later in their childhood as well. Bottle caries illustrates the general rule that only the use of non-food rewards and low decay producing foods between meals offer the best protection from dental caries.

### 3.2.3 Plaque Control

Since the micro-organisms that cause decay colonize the tooth surface in the form of dental plaque, caries should not occur in a mouth kept free of plaque deposits. In fact, research in Sweden has confirmed a relationship exists between plaque control and protection from caries: professional prophylaxis and education of experimental group children and their parents regarding the importance of home care, including brushing and flossing, resulted in significantly fewer carious lesions than found in the control group children (Lindhe et al, 1975). Effective removal of plaque is not simple, however, and according to Pinkerton and his associates, is impossible for the young child, whose dexterity is limited. For them, brushing and flossing must be done by others until manual dexterity has developed, usually about the age of seven (Pinkerton et al, 1981). Research has also been done regarding the optimal times for brushing. According to Silverstone (1981) the ideal time of tooth brushing is still a matter of opinion:

although many dentists advise cleaning the teeth after meals, he argued that brushing before meals should be as effective, as it removes potential acid producing bacteria from the tooth surface before exposure to fermentable carbohydrate (Silverstone, 1981).

Kegeles (1974) also discussed preventive dental behavior, applying the health belief model, which he had developed with Rosenstock and Hockbaum. He noted that seemingly prevention-oriented activities, such as brushing or visiting the dentist, may be based more on habit patterns than on concerns about health, even though the person doing so can give health related reasons for the behavior (Kegeles, 1974). The finding suggests that teaching interventions in the area should focus on establishing the psychomotor skills of brushing and flossing as routine behaviors.

For the past two decades, schemes of dental health education about the removal of plaque have been directed toward various target groups. Prominent among them has been "mothers of small children". Studies have indicated that these subjects are particularly receptive to dental health education, probably because patterns of dietary habits and hygiene practice are becoming established for their children at this time (Blinkhorn, 1981).

### 3.3 THE CONTRIBUTION OF NURSES AND OTHER HEALTH CARE WORKERS

Teaching in the area of dental care need not be carried out only by the dentist. The effectiveness of other health care personnel in dental hygiene has been established. Holt, for example, used dental health educators to conduct teaching home visits to 314 mothers of young children. She and her associates concluded there were improvements in attitudes and behaviors of the mothers with regard to their children's teeth (Holt et al, 1983). As well, Johnson suggested (1982) that nurses have been an underutilized resource in dental health teaching to children and their parents. They may be particularly useful, she contended, in developing teaching programs on brushing and flossing that are specific to the developmental stage of the child, and in carrying out follow-up visits to the home (1978).

The effectiveness of public health nurses and trained volunteers in detecting abnormalities of various kinds, including dental caries, was studied by Welch and Kessler (1982). They found that preschool screening programs staffed by these people were significantly more effective for detecting abnormalities other than height and weight than were visits to physicians. The authors contended that preschool screening tests could be effectively run by these personnel, resulting in lowered demands on the physician's time and increased detection of the dental caries and particular other health problems.

Whether a nurse accepts an emphasis on the dental needs of clients, however, has something to do with his or her philosophy of nursing, and what that nurse perceives to be nursing's legitimate domain. Current writers in the area of Community Health Nursing have focussed on the nurses' perspective and on the 'mandate' of Public Health Nursing. Talbot, stressing that the future of nursing depends upon choices nurses make today, maintained that Public Health Nursing must focus on values related to populations defined to be at risk and on prevention of disease and promotion of optimum health. In one projection, she described an increasing commitment of Public Health Nurses toward the year 2000 on the delivery of quality care to families and the community as a whole (1984, p 827).

Consistent with the above, and with the American Nurses Association statement which began this paper, Stanhope and Lancaster (1984) wrote about the mandate of Community Health Nursing for meeting the health needs of the community. They argued that Community Health Nursing must no longer be considered according to the narrow confines of role, but instead must be viewed according to the mandate for meeting health needs in the community (Stanhope & Lancaster, 1984). A focus on the role of the Community Health Nurse leads, they contended, to a preoccupation with provider orientation. A population based focus, on the other hand, can give the practicing nurse a firm basis for providing



clinical input to decision making at the program or agency level (Stanhope & Lancaster, 1984).

A tool for developing a community based "populations at risk" perspective is provided by the epidemiological approach and the Health Field framework, as visualized by Lalonde (1974). The framework provides for the Community Health Nurse a mandate for health promotion through attending to the learning needs of clients.

### 3.3.1 Health Teaching by the Nurse

Green's definition of health education fits the Community Health Nurse's involvement with the learning needs of clients: "Health education", he contended, is "any combination of learning opportunities designed to facilitate voluntary adaptation of behavior conducive to health" (1979). Somers (1976) identified the subsets of health education. He said they are activities which:

1. Inform people about health, illness, disability and ways in which they can improve and protect their own health, including more efficient use of the delivery system.
2. Motivate people to want to change to more healthful practices.
3. Help them learn the necessary skills to adopt and maintain healthful practices and lifestyles.
4. Help other health professionals acquire these

teaching skills.

5. Advocate changes in the environment that facilitate health conditions and healthful behavior.
6. Add to knowledge via behavioral research and objective evaluation concerning the most effective ways of achieving the above objectives (1976).

Health education of adults is particularly problematic, requiring client participation and teaching strategies focussed on the adult learner. Knowles has formulated precepts about adult learning, based on the principles of learning (1978). They are:

1. Behavior which is rewarded is most likely to recur.
2. Readiness to learn is promoted by a non-threatening environment.
3. Participation in the learning plan promotes learning, the rate of learning, flexibility and motivation.
4. The best learning takes place when what is to be learned is immediately useful.
5. A non-threatening atmosphere promotes initiative, creativity, self-confidence and independence (1978).

Notwithstanding the fact that health care workers who teach parents of small children are likely to meet a receptive audience, the precepts are relevant for nurses seeking the most effective approach with which to counsel about young children's teeth. As will be discussed later in

this paper, they were also pertinent when choosing a format for information-sharing with health care professionals.

In conclusion, a review of the literature concerned with reducing the incidence of dental caries has shown that the process which produces dental caries can be controlled, so that youngsters and others in the community may experience robust dental health. Fluoridation is an important tool for protection, but is not the only defense; in fact, to be effective, fluoride administration must be accompanied by dietary habits and home dental care that keep the oral environment as free as possible of plaque and caries producing bacteria. These 'causes' of dental caries suggest that health teaching is an integral part of any combat strategy, and the question arises as to which members of the health care field will be entrusted with the task. Research has shown that nurses can be effective teachers of parents about the dental health care needs of their children and, to the present, may have been an underutilized resource in this regard. Finally, for Community Health Nurses to assume a greater interest in dental matters is consistent with the current approach that the Community Health Nurse's mandate is to focus on populations at risk and be concerned about meeting their needs for risk reduction and health promotion.

## Chapter IV

### CONCEPTUAL FRAMEWORK

The epidemiological approach to community health, consistent with the 'chemoparasitic theory' of the etiology of dental caries, has provided an appropriate vehicle for an examination of the risk of dental caries among preschool children. Epidemiology is that field of science "...concerned with the various factors and conditions that determine the occurrence and distribution of health, disease, defects, disability and death among groups of individuals" (Leavell and Clark, 1965, p 40). Interventions based on the epidemiological model are usually concerned with increasing the host's resistance to the agent, decreasing the virulence of the agent and/or creating a barrier in the environment to protect the host. For the purpose of this study, an adaptation of the epidemiological approach is used based on Lalonde's A New Perspective for the Health of Canadians. Figure 2 shows the concepts and the interactive relations between them, as depicted by McCarthy and Daly (1984).

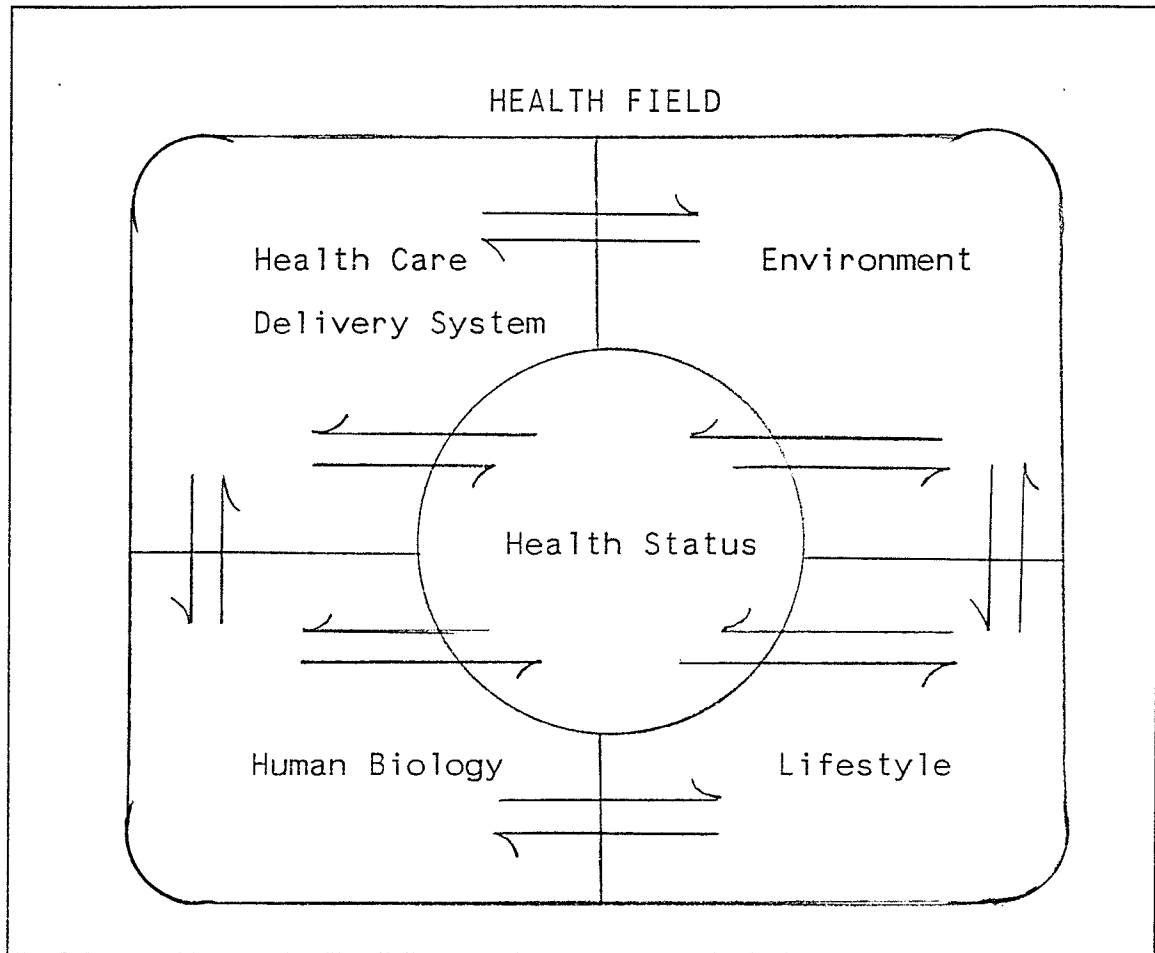


figure 2. Health Field Concepts

Lalonde has defined the elements of the health field. He distinguished the 'health field' from the 'health care system' by defining it more broadly, to include all matters pertaining to health (1974, p 5). The health field is comprised of health status, human biology, the environment, lifestyle and the health care delivery system, each of which will be discussed with reference to the aggregate of interest: preschool children residing in Winnipeg.

'Health status' has been defined as the 'range of disease, illness, health conditions outcomes occurring in a community within the recent past and/or present' (Lalonde, 1974, p 5). Outcomes, or indicators, contain mortality rates, incidence or prevalence of the specific condition, and morbidity rates. In the case of dental caries, precise indicators do not exist for young children, primarily because many of these individuals do not reach a dentist until they are nearing school age. With reservations, however, certain assumptions may be made about dental caries among the aggregate, based on information available for older children in Winnipeg. For example, school survey records from the Dental Services Branch of the City of Winnipeg Health Department revealed that, in the 1982-83 schoolyear, the DMFT index among seven year old boys and girls in school in Winnipeg was 0.40, slightly higher than any year since 1977. The figure may be a conservative measure of caries among preschool children because of the possible replacement of decayed primary teeth.

'Human biology', as defined by Lalonde, includes '...[a person's] biologic and organic make-up, including genetic inheritance, maturation, aging, age, sex and race' (1974, p 31). For example, the spacing of deciduous teeth provides some protection for children in the early years against the collection of plaque. On the other hand, the dentin of primary teeth is thin, providing less protection against

demineralization than will be present once the permanent teeth have taken over. These factors are generally consistent across the aggregate. Others, such as the propensity to pits and fissures in the teeth and the quantity and quality of saliva, are host factors conferred by the child's hereditary legacy, and may vary.

'Environment' refers to '...the influences on health which are external to the human body and over which the individual has little or no control' (Lalonde, 1974, p 31). The most striking example of effective intervention to control dental caries in childhood and later has been fluoridation of communal water supplies, as mentioned earlier. Studies since the early 1940's in Canada and elsewhere have indicated that fluoridation results in decreased carious lesions in children by 60 to 65 per cent (Hayes et al, 1957; Brown and Popove, 1963). As such, fluoridation of community water is considered by the dental community to be the most effective, practical and inexpensive approach, conferring protection against tooth decay to everyone, regardless of age, socio-economic status or education (Horowitz, 1980). Survey records of eleven year old children in the City of Winnipeg in the 1982-83 school term show a DMFT index of 1.65 per child, compared to 5.2 for eleven year old children in 1958, an improvement attributed largely to fluoridation of the water of Winnipeg, implemented in the late 1950's (Konyk, 1984).

Another important environment-related factor with the potential to affect caries in children has been the availability of sugar in the geographic or political environment, mentioned earlier. No data exist concerning sugar availability in Winnipeg.

'Lifestyle" is defined as 'the aggregation of decisions by individuals which affect health and over which individuals have more or less control'. Lifestyle risks may be conceived of as self-created risks. (1974, p 31). Since, except for fluoridation, the most effective defences against dental caries have concerned individual behaviors, interventions for dental caries often focus on effecting lifestyle changes to make the host less susceptible. Usually, these entail teaching interventions, on the assumption that a sound basis of information is a necessary, although not sufficient, component of dental health; and that clients will be receptive to teaching, an assumption that has been tested and upheld by research (Johnson, 1978). The Canadian Dental Association (1979) has maintained that, in communities where there is fluoridation of water, proper brushing and flossing of teeth and control of sweets in the diet should keep both children and adults virtually caries free. Most dental teaching, consequently, concerns dietary practices and/or home dental care.



The 'health care delivery system', has been defined as '...the sum of curative, restorative and preventive services provided to a community by health professionals and institutions, including their availability and accessibility' (Lalonde, 1974, p 31). The focus of this project is primarily on the dental health care system. A major difference in Canada between the medical and dental aspects of the health care system is the mechanism used to pay for the services. Schemes covering costs in the dental care system do not approach the comprehensive coverage offered through the various medical insurance schemes in Canada; the fact may have implications for the use made of dental services by the community at large. Moreover, dental surgery is inclined to be painful, which may further the avoidance of dental care, even among those able to bear the financial costs and convinced of the potential benefits of professional dental care.

There are approximately 400 dentists, including various specialists, who offer their services to the people of Winnipeg. The resulting population:dentist ratio of approximately 1500:1 is considered by the Manitoba Dental Association to be optimal, so that the needs of the population should be met by that number of dentists. There are several routes to professional dental care in Winnipeg. Usually, dental care takes place in the private practice setting. Individuals or families on social assistance may

attend dental clinics run by the Dental Services Branch of the City of Winnipeg. Provision is also made for care at these clinics for some people who are not on social assistance but whose discretionary income is such that necessary dental care would otherwise impose a heavy burden. To qualify for the service, persons must have passed a means test interview offered at various specified locations in Winnipeg. Also the Faculty of Dentistry at the University of Manitoba provides some dental care at a reduced fee for a limited number of clients willing to be practiced on by supervised dental and dental hygiene students. Finally, diagnostic dental services are provided school children from kindergarten to grade six as part of a school based program of the City of Winnipeg Dental Health Services.

Although many dentists undertake preventive dental teaching themselves or employ dental hygienists or nurses for the task, the focus of most dental care in Winnipeg, as in the rest of Canada, has been restorative, not preventive, partly because of the pattern of utilization by the public. The fact has particular implications for the dental health of children. As indicated above, a major contributor to the risk of dental caries for young children has been delayed contact with dental professionals.

Identification of the dental needs of preschool children in Winnipeg has been made on the basis of the literature.

Also the contention that a particular risk for dental caries exists among Winnipeg's preschoolers could be made on the basis of the visits, described earlier to the homes of some preschool children in the city. To the extent a generalization to "non-day nursery" children is valid, preschool children in Winnipeg may be considered to be at risk for dental caries. On the basis of the home visits, a conclusion was drawn that the situation has arisen due to a deficit in the care-givers' knowledge regarding home dental care and dietary habits, and delayed health teaching interaction between the parents and any health professionals regarding dental matters.

In considering how the children's risk of dental caries has arisen and how to reduce it, McCarthy and Daly's model is appropriate. As suggested by the authors, a search of the literature and a look at the factors specific to the community have indicated the area of the health field from which most of the risk arises: since the problem of dental caries stems mostly from habits concerning the removal of plaque from the teeth and dietary patterns, and since both of these are related to the home environment, 'lifestyle' is implicated. To the extent that less than optimal habits may be considered to have arisen as a result of the parents not having taken the children soon enough to the dentist, the health care system is also involved. The kind of contact that is essential is that in which the parents would receive

the information they require to fulfill their children's dental needs. In terms of reducing the risk, changes to the dental segment of the health care system, such as the provision of 'free' dental services to preschoolers to facilitate early visits, would likely improve the dental status of at least some of the children, but only if that interaction included guidance for parents in the area of their children's dietary and home dental care practices. For this reason, health promotion in the area of dental caries has focussed largely on health teaching about lifestyle.

A question which the above discussion raises is which members of the health care system constitute the best choice for aiding caregivers to meet the dental needs of small children. Clearly, the most appropriate health professionals are those with an adequate knowledge base and commitment to the well being of populations at risk, and those in early and frequent enough contact with families to enable them to do the ongoing assessment, teaching and reinforcement necessary for the task. The Community Health Nurse is such a person. However, because nursing has not traditionally given high priority to education of students regarding dental matters, and because some nurses may not consider the area legitimate or important for them, information sharing sessions with the nurses were expected to be necessary to enable them better to meet their young clients' dental health needs.

## Chapter V

### PROCEDURE

The practicum experience was divided into four phases, analogous to the nursing process: assessment, planning, implementation of the Public Health Nurse workshops, and evaluation of the results. Related activities took place over a period of seven months, with the final evaluation completed by early August, 1985.

#### 5.1 ASSESSMENT

The program evaluation tool used for initial assessment in the practicum was Renzulli's 'Key Features Model', developed for educational programs (1972), and adapted to health care delivery programs (Munro, 1983). The approach was chosen because it is comprehensive, using data from a variety of sources, and collaborative, involving active input from individuals with particular interest in a program. Not only is the information thereby likely to be valid, any program changes resulting from the process have a good probability of being supported by the persons involved. In the method, there are four stages: front-end analysis, the 'key features grid' stage, data collection and analysis, and conclusions. The assessment phase of this project about

dental health of preschool children in Winnipeg will be discussed according to these stages.

#### 5.1.1 Front-End Analysis

Renzulli has suggested that assessment of programs begin with a review of written materials from the institution or agency involved. Several documents from the City of Winnipeg Health Department were used: the file forms in which nurses' notes are charted, the Statement of Purpose and Beliefs and Values of the City of Winnipeg Health Department, Nursing Branch (revised Dec., 1984), the Public Health Nurse job description, and the Public Health Nursing Performance Appraisal and Development Tool. Consistent support was found for the inclusion of the dental health of young children among the concerns of the Public Health Nurses of Winnipeg. Regarding "substantive territory", support was found for a belief in the comprehensive nature of practice, with regard to populations served and to legitimate area of interest. Both the explicit and implied directions for nursing practice described the nurse as responding to a variety of needs identified by a systematic process (the nursing process) in the broadest range of age groups in the population in their Winnipeg districts. In the 'Characteristics, Duties and Responsibilities' section of the Public Health Nurse Job Description, assessments and actions in a wide variety of settings and programs is noted

as typical among the duties and responsibilities. Among the "interventions" listed, many apply directly to actions to be taken in meeting dental health needs of children: teaching, counselling, referring, screening, monitoring of health issues, as so on. Further, the 'Beliefs and Values' Statement referred explicitly to the nature of Public Health Nursing practice as "...general and comprehensive, not limited to a particular age or demographic group..." (Item 11, City of Winnipeg Health Department, 1984). Regarding the focus on groups at risk, item 14 declared: "We believe that our nursing service should be based on the identification of needs (individuals, family, community) and on responding to those needs within the framework of our mandate and available resources." The Public Health Nurse Performance Appraisal and Development tool was consistent with the above, emphasizing the definition of Public Health Nurse practice as comprehensive, based on the needs of groups in the nurse's care.

In short, the review revealed general support for an increased dental focus for the Public Health Nurses' practice, where necessary, and no statements which would preclude such a change. If the nurses could be convinced of the need for dental health assessment among children, and for dental health teaching among parents, therefore, they could be expected, on the basis of the review of the Department documents, to increase the dental component of their practice.

Consistent with the procedure outlined by Renzulli in 1972, a list was made of all groups with an interest in the particular area. For example, District Nursing Supervisors would be included because a major focus of the project would be the practice of nurses in their domain. Others specified included the Public Health Nurses, parents of preschool children, Dentists and Dental Hygienists and Nurse Educators. As developed by Renzulli, the Key Features Model called for a questionnaire to be devised and circulated to people from the list who would later be interviewed regarding their concerns (or "key features"). The questionnaire was omitted in the present case to reduce the risk that some prospective interviewees would decline the interview on the grounds they had already participated.

Three interest group categories were defined: parents of preschool children (two to five years), those in the nursing community and those in the dental community. Next, a convenience sample of ten interviewees was chosen from each category. (That the grouping and sample size were appropriate would later be confirmed by relative diversity in responses between the groups and similarity within them). The interview schedule (included as Appendix A to this paper) was administered over a ten day period commencing March 22, 1985. The 30 minute interactions were characterized by an apparent willingness on the part of interviewees to share their concerns regarding dental health



of young children and an appreciation of the opportunity to make input into the process.

Renzulli also suggested observation of the 'program in action' as a means of collecting data. In the present case, no identified program was in place. What was observed was the "interface" between dental health needs of preschool children in the inner city of Winnipeg and related facilities in the community for dental teaching and dental care, including the behaviors of the Public Health Nurses. The observation activity took place over the five months ending in March, 1985. An important component was the home visits made to Munro Day Nursery families, described earlier, the results from which indicated that the dental health needs of preschool children in Winnipeg could be better addressed by an increased dental health focus by Public Health Nurses. Later, visits with the Public Health Nurses to their client families substantiated the conclusion. Several homes were visited in each of the four districts: children were again found with observable deficits in dental health, and parents with profound related learning needs. In at least some of these cases, however, choice of which homes to visit had been made because of these factors.

### 5.1.2 The Key Features Grid

The second stage of the model involved organizing the participants' major concerns, or key features, determined by the interviews, into a grid format, as shown in Table 1, below. As may be seen by Table 1, both similarities and differences exist among the pictures presented by the interviewed groups. Prominent among all groups' concerns was a perception of a deficit about some aspect of parents' knowledge regarding optimum dental health of their children. Some concern is also shown across all categories for the prevalence of dental caries among particular ethnic groups (Phillipine, Vietnamese, Native Canadians). However, in contrast to the dentists, who were unanimous in contending that clients did not know to bring their children early for dental visits, few Public Health Nurses (PHN's) and no parents expressed such a concern. On the other hand, relatively more parents and nurses than dentists reported a concern for the costs of dental care for children. Both of these groups also reported that parents do not receive the information they need from Public Health Nurses. Consistently, the nurses indicated that dental health status of clients did not rank high among their priorities.

Table 1

Number of Interviewees who Identified Particular  
Key Features, Dental Care of Preschool Children  
in Winnipeg

Key Features	Nursing Group (n=10)	Dental Group (n=10)	Parent Group (n=10)
Parents lack knowledge			
- re dental care for ch.	5	9	7
- re (dental) food habits	8	8	7
- re early visits to dentist	2	10	-
Parents do not bring ch. for dental visits young enough	3	10	-
Parents do not get info. needed from the PHN's			
- re dental care and diet	7	3	6
- re lower cost care	7	2	6
Ethnic groups at risk (sweet diets)	7	5	6
Parents may believe primary teeth unimportant, temporary	4	6	6
Nurses can be better used in ch's dental health	8	3	4
Clients' teeth not a major priority for nurses	7	4	4
PHN's lack knowledge			
- re dental inspection	7	3	-
- re dental care and diet	3	-	1
- re care to trauma of mouth	7	2	-
- re referrals (low cost care)	6	-	-
Dental care too costly	7	2	8

They also believed that nurses could be more effectively used in the health care system, but maintained that they themselves lacked knowledge about dental health, and that if parents are to use the Public Health Nurses more as a dental resource, the nurses' knowledge would have to become more extensive. Examination of the grid suggested further study be made of the extent to which Public Health Nurses in Winnipeg were including dental health concerns in their practice and, what may be an underlying factor, of deficits in their knowledge in the area. Therefore, an audit of client files was undertaken, along with further questioning of selected practicing Public Health Nurses.

### 5.1.3 Data Gathering and Analysis

In the district offices of the Health Department, a check of 100 patient files was made, such that all 1985 nursing notes on 100 families with preschool children were searched for mention of dental assessments or interventions. There were documentations of two such events, or 2% of the charts checked, suggesting either that young children in Winnipeg were remarkably dentally fit or that dental concerns did not rank high among those areas about which the nurses believed it was important to chart.

Throughout the latter two weeks of May, 1985, the practicum experience included the opportunity to accompany

eleven Public Health Nurses (some from each of the district offices) as they carried out their practices. These home visits, referred to earlier, made it possible to practice building an increased dental health focus into home visits, thereby providing experience in dental inspection and parent teaching, working toward the first objective of the practicum (the improvement of the dental health of the children). For example, in one pre-natal home visit with two sisters and their young children, a question from one of the young mothers about the children's diet led to dietary teaching related to the building of sound teeth. (This was opportune, as two of the three toddlers had been observed nursing "Cool-Aid" bottles). Also, when the mothers expressed an interest in learning how to tell if their children had dental caries, they were shown the signs to look for and how to go about doing it. The possibility the learning would be lasting was suggested by the fact that both mothers appeared to have sound teeth and showed strong bonding with their youngsters.

During the two weeks, time was also spent checking with the nurses about how they saw dental concerns relating to their practice. Consistent with the review of written materials, the conclusions drawn from the 'day nursery' visits and the interviews with nurses in the front-end analysis phase, these nurses contended that dental health among young clients was within the scope of nursing

practice, but that the needs were not always attended to because of other priorities for care and/or because they have insufficient background in the area. Specifically, nurses reported knowledge deficits in the following: inspection of the child's mouth, including how to do the inspection and what to note as significant, what children's particular diet needs are as they pertain to dental health, and other points related to parent counselling, such as to referrals for dentist visits for low socio-economic status clients not on social assistance. These data would later provide the basis for selecting content for the sessions with the nurses.

#### 5.1.4 Evaluation Conclusions

The data collected suggested that a key concern about dental health for preschool children was that a low level of knowledge exists among parents about the dental health of their children, and that, although Public Health Nurses are professionals that could respond to the parents' learning needs, they are not being widely used as a dental health care resource.

An underlying factor may have been, as identified by some of the nurses, a lack of knowledge among nurses about dental health. That such a deficit was perceived was confirmed in interviews with representatives from the district offices.

Data gathered in the May interviews also provided the basis for the content of the June workshops, the next phase of the practicum.

## 5.2 PLANNING

### 5.2.1 Plan for Implementation

Implementation of the project began with the submission of the practicum proposal on March 11, 1985. Before that milestone, however, other events had to transpire.

Dr. Renzulli and his colleagues, authors of the Key Features Model, were written in March, 1984, for permission to use the process to evaluate dental health care delivery for preschool children in Winnipeg. A reply, granting permission to use the model, was received in April, 1985.

A decision also had to be made early about the format to be used in workshop sessions with the Public Health Nurses, if such events were found to be warranted. Informal workshops were deemed appropriate, the method being consistent with the precepts of adult learning, listed earlier. That is, such workshops should foster learning by facilitating participation, the giving of immediate rewards for creative thinking, and the connection of learned material to practice. Further, the informal atmosphere engendered by small groups could be expected to promote readiness to learn, which would also be enhanced by

inclusion of some of the nurses in the planning phase. As well, considering the Public Health Nurses were colleagues, the workshop format was appropriate in that it promoted a mutual exploration of ways to meet the dental needs of a population defined to be at risk. After the workshop format was chosen, negotiations with the Winnipeg Health Department were completed regarding number and dates of the sessions (4 half day events in mid to late June), and locations (the district offices of City Health). Dr A Nizil was approached regarding permission to use his "sweet score activity" as a diet assessment tool with workshop participants. (His reply to grant permission was received in early May.)

Arrangements also began early for funding, specifically for toothbrushes to be distributed to the children. After a January, 1985, meeting with the Executive Director of the Manitoba Dental Association (MDA), that organization made application to the Winnipeg Foundation for a \$12,000 grant. In April, the application was rejected; subsequent enquiries were made to other sources from whom toothbrushes were obtained: from the University of Manitoba Faculty of Dentistry (200 brushes) and the Canadian Red Cross (150 brushes). These were distributed to the district offices.

Part of the planning included testing the ease with which a dental health perspective could be integrated into "everyday practice". This task was approached through the



home visits with the nurses and, before that, to the families of the children in the day nursery. No matter how much an increased dental focus was needed by the families concerned, if related nursing behaviors could not be added easily to the Public Health Nurse's 'inventory' of behaviors, the chances of any change would be diminished. On the basis of all the home visits, however, the conclusion was drawn that dental assessments of children and related teaching to parents could be worked into the everyday practice of the nurses; visits with other priority objectives, such as prenatal visits, could include a focus on dental habits, when such needs are perceived by the nurse. In fact, as incidental teaching is inclined to be geared to readiness to learn, pertinent and non-threatening, incidental teaching may be a very effective way to teach about dental health.

A plan was drawn with deadlines set for the completion of the various activities of the practicum; as some of the activities were directly related to prerequisites, the model could be used to depict the relations and to provide a graphic reminder of progress. The method resembles PERT (Program Evaluation Review Technique), as described by Archer (1974). However, the devised scheme did not include probability estimates regarding the completion of activities as planned. Excepting the number 2 activity, funding, for the purchase of toothbrushes, all of the activities were completed by the target dates.

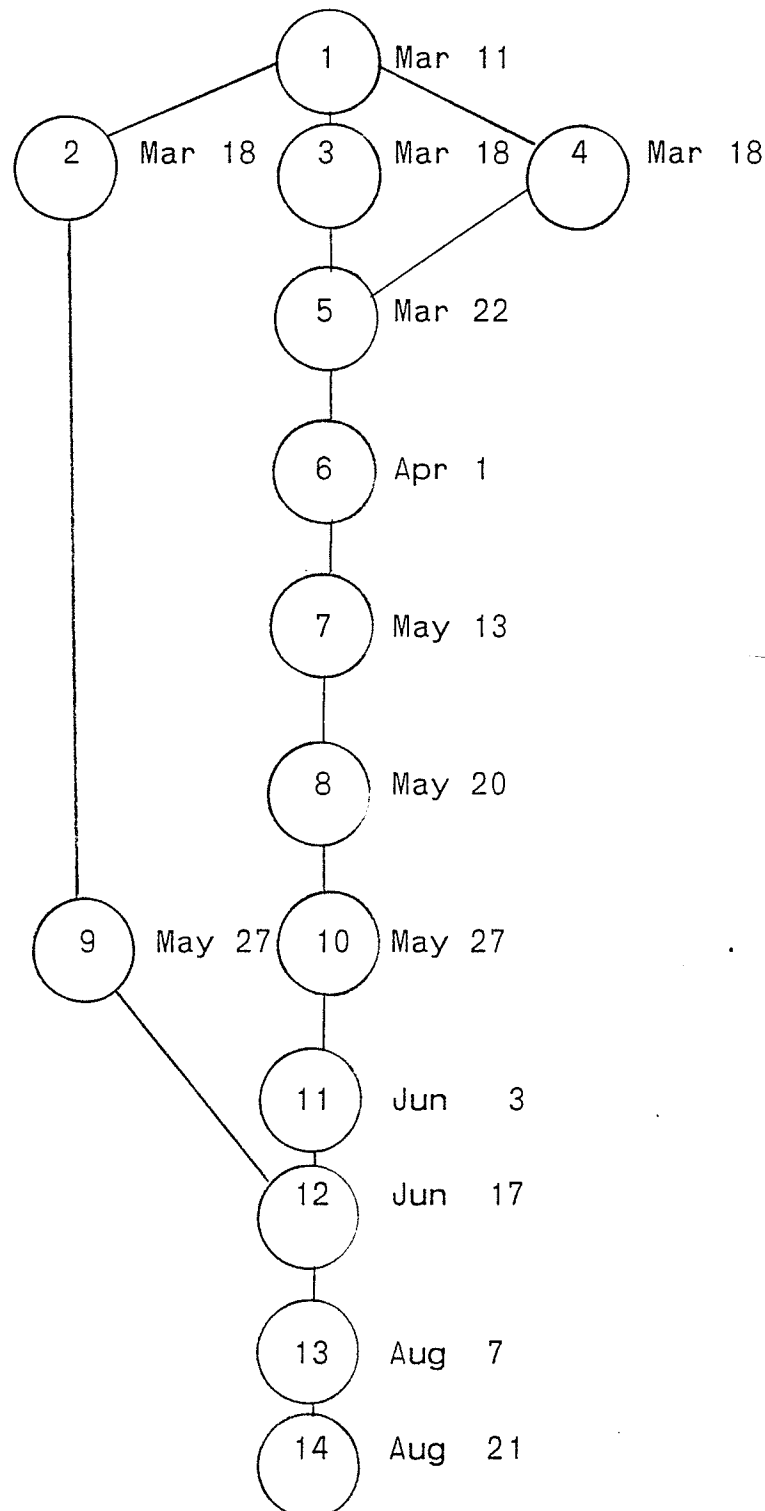


figure 3 Plan For Implementation

The numbers in Figure 3 represent the following activities:

1. Submission of proposal to Practicum Committee.
2. Award of grant for toothbrushes.
3. Reaching of agreement with City of Winnipeg, Health Department regarding participation and data gathering in district offices.
4. List completed of key informant individuals, including representatives from the following groups: Community Health Nurses, Nurse and Dental Supervisors from City Health, Nurse educators, Dentists, Pedodontists, and Dental Hygienists, and parents of Winnipeg children between the ages of two and five years.
5. "Front end Analysis" begun, with a review completed of written materials pertaining to the scope of nursing practice of Community Health Nurses in Winnipeg.
6. Interview schedule constructed and administered to key informants.
7. "Front End Analysis" completed, including conclusions.
8. "Synthesis" phase. A 'grid' constructed, outlining key features identified by informants, and a decision made about the kinds of information needed and the sources from which they may best be obtained. Tools are selected for data gathering.
9. Plans for workshops made final, including arranging

of A - V aids and machines, snack foods (appropriate for teaching) and handout and resource table materials, including a list of readings.

10. Data gathering and analysis, on the basis of the grid.

11. Construction of conclusions from Key Features Model.

Contents of workshops determined on that basis.

12. The Workshops

13. "Post" evaluation, using audit of client files

14. Submission of written report, as required by the University of Manitoba School of Nursing and the Faculty of Graduate Studies.

#### 5.2.2 Resources

Practice activities took place from the district offices of the City of Winnipeg Health Department. In June, the workshops were held in the same district offices. Various written publications were useful as adjuncts to discussion, some also included on a display table. For example, "Does Your Baby Have Brown Spots on the Teeth?", a recent Cree language publication of the Faculty of Dentistry, was distributed to the nurses, with the request that they report to the Department of Preventive Dentistry about its effectiveness for use with Winnipeg's Native population. Other materials included: 'Eating Properly for Dental Health', obtained from the Canadian Dental Association, and 'The Cavity Culprit', 'How Does Tooth Decay Happen?' and

'What is Your Dental I.Q.?', all from the Province of Manitoba Department of Health. Most of the 35 mm slides used for the sessions were produced by the presenter. Others were borrowed from the Faculty of Dentistry at the University of Manitoba. Posters and a teaching model of a set of teeth were contributed by H. Cross of the Faculty of Dentistry.

In terms of information resources, the University of Manitoba library system was useful, particularly the J. Neilson Library. So were the personal libraries of individuals in the School of Nursing and Faculty of Dentistry of the University of Manitoba, and the City of Winnipeg and Province of Manitoba Departments of Health.

### 5.3 THE WORKSHOPS

The three hour workshop sessions were held on the mornings of the following dates: June 20, 1985 (East District), June 21 (North), June 24 (West) and June 27 (South). Rationale for the decision regarding the workshop format has been given earlier. The choice of small work-group related meetings in the familiar surroundings of the district offices was made over the option of holding one larger session in order to facilitate questions and discussion, access to displays and literature, and incidental learning through informal interaction in the "snack break".

The gatherings were attended by all available Public Health Nurses in each district, along with staff working in the 'Healthy Parent/Healthy Child' program, and the Nurse Supervisors of the district offices. Attendance was: East District, 15; North, 16; West, 14; and South, 19. Professor J. Beaton, Co-ordinator of the Graduate Program of the School of Nursing at the University of Manitoba, was present at the final workshop, June 27, 1985.

### 5.3.1 Objectives

The objectives for the workshops, potentially different, depending on the learning needs of the nurses in each district, turned out to be similar. They were as follows:

1. Affective domain: Given the opportunity to discuss philosophy of nursing as it relates to the activities of practice, the Community Health Nurse will demonstrate interest in the area of dental care for children by participating in discussions and by specific comments solicited in a workshop evaluation form.
2. Cognitive Domain: Following a discussion of dental needs of children in the early years, the Community Health Nurse will describe elements essential to the following areas:
  - (a) Recognition of early and late signs of dental

caries, including how to do an inspection of the teeth of young children, and what to note in the way of pathology.

- (b) The prevention of dental caries, i.e., concerning dietary and home dental care habits.
- (c) The recognition of the 'bottle caries' pattern
- (d) Computing of 'Sweet Score', a counselling tool based on diet recall.
- (e) The counselling of care-givers regarding dental care for young children.
- (f) The making of referrals to a dentist, especially for those clients of low socio-economic status whose children need dental attention but require financial assistance for it.

In terms of the Key Features Model, the workshops may be viewed as a way of addressing concerns identified by the key informants: with the exception of the problem presented by cost of dental care for children, all of the key features may be seen as directly or indirectly related to deficits of knowledge among either the practicing nurses or their clients, so that any solution that improves the nurses' information base could have a marked impact on dental health care delivery as it related to the stated concerns.

### 5.3.2 Content

For the workshops, including a "background situation" familiar to the practicing nurses could promote discussion at the meetings and maximize carry-over of learnings into the work settings. Therefore, a 'home visit' was simulated, using 35 mm slides, to portray interaction between a Public Health Nurse and a young mother and her three year old daughter. Content in the cognitive domain, listed above, was approached in the context of possible questions posed by the mother about her child's teeth, dental habits, and so on. Prior to the discussion of each new area, participants were given the opportunity to respond to each question in writing. The slide presentation format had an advantage, besides making the simulated visit more "real", because slides are particularly useful for the illustration of various oral pathology, such as early or progressing carious lesions, the bottle caries pattern, fluorosis, black line stain, and structural defects.

As mentioned earlier, the workshop content had been arrived at partly through collaboration with some of the nurses and district supervisors. On the assumption that including content on the basis of the nurses' perceptions of need would promote discussion, time boundaries were flexible to accommodate discussion. As well, Participants were invited throughout to draw on their own behaviors, as when



they used their own dietary intake to compute the "sweet score", shown in Appendix B. They were particularly encouraged to share approaches they had found effective in health teaching with clients. Finally, concepts were discussed in relation to phenomena the nurses might see in their work. For example, fluorosis was discussed in the context of immigration to Winnipeg from the Scanterbury reserve, where water Fluoride levels are high. Throughout, the approach was to explore with the nurses dental elements appropriate to included in practice. Objectives in the affective domain were approached by the same route; that is, the nurses discussed together how the area of dental health needs of children fit what they considered to constitute their mandate as Public Health Nurses.

On the understanding that the nurses varied in their knowledge relating to the workshop contents, resource tables and distributed written materials included basic as well as technical information. The "hand-out package", included as Appendix C to this report, contained several items. First among them was a sheet containing "test" questions, referred to earlier. These were queries supposedly made by the client being visited in the simulated situation. The sheet included space for the participant to write an answer just prior to discussion of each point. Also included was an article, "Bottle Caries: A Nursing Responsibility", by B. Lane and V. Sellin, Registered Dental Hygienist. The paper

contained information that was too detailed or time-consuming to include in the workshops, but which was considered important for the nurses to have. There was also a ten page "information packet" of resource material on Fluoridation. This was included because, although the City of Winnipeg has been adding Fluorides to the drinking water since the late 1950's, and therefore answers to questions in the area would not be a high priority for the nurses, some client questions might arise which the nurses might be able to answer more correctly, or more fully, with the information. The material was presented in question and answer format for easy reference. Finally, there was one page of information on the mechanism to refer clients, particularly to the Faculty of Dentistry at the University of Manitoba, and a two page 'feed-back' evaluation tool, which most participants completed at the conclusion of the three hour session.

The workshop timetable is included below.

TIMETABLE OF WORKSHOPS  
DENTAL HEALTH OF PRESCHOOL CHILDREN

(June 20, 21, 24, 27, 1985)

Introduction of leader and group members. Background about dental care among children in Canada (30 mins)

Agreement on agenda. Review of resource table materials and "hand-out packages" (5 mins)

Agreement regarding workshop objectives (set tentatively earlier with district office representatives (5 mins)

Review of tooth development, anatomy and physiology, the process by which dental caries occur, causes of dental caries (20 mins)

Review of home dental care habits, how to inspect children's teeth, what to note as significant signs of pathology, particularly early or advancing carious lesions, proper technique of brushing and flossing children's teeth (15 mins)

Review of a special case: bottle caries. Slides illustrate cause, characteristic distribution of lesions, sequelae, treatment. Discussion includes underlying factor: ineffective parenting (30 mins)

SNACK BREAK (20 mins)  
(low caries potential foods)

"Sweet Score" activity, using 24hr recall (15 mins)

Dietary habits and their importance to dental health of children (30 mins)

Wrap-up - including self-evaluation using client questions and discussion of ways to implement changes in habits: for clients, concerning health behaviors, and for the nurses, concerning the inclusion of dental concerns into daily practice (30 mins)

Workshop feedback, using two page tool and overhead workshop objectives (10 mins)

### 5.3.3 Workshop Evaluation

In the final analysis, assessment of the usefulness of the project rests with the nurses' practice regarding dental health following the event. However, at the conclusion of each workshop, evaluation was made of the event, by the presenter and other participants.

During the workshops, participants seemed eager to tell about their experiences in the area of dental health and in health promotion. This was noted particularly in the discussion about whether dental health concerns were appropriate "territory" for Public Health Nursing, and, agreeing that they were, in the discussion of how they could assist clients to change behaviors related to dental health. To the extent the questions of how germane the topic was and how appropriate a discussion format was for the topic can be measured by lively participation and pertinent questions, the sessions may all be judged to have been successful.

The impression was corroborated by responses in the workshop evaluation tool, included as part of Appendix C to this report. By assigning each of the response categories a number, so that, for example, "Not at all" = 1, and "Lots" = 4, a summary score may be obtained for each of the 11, 13, 8 and 9 evaluation forms submitted by participants at the East, North, West and South district offices, respectively. The means of the responses are as follows:

- Bearing in mind the workshop objectives, (shown on

overhead) to what extent do you believe this workshop has facilitated your achieving these objectives?

(Ratings: East 3.5, North 3.6, West 3.5, South 3.4)3.4)

- To what extent were each of the following useful in assisting you to meet the objectives?

- Slide illustrations

(East 3.5, North 3.6, West 3.5, South 3.4)

- Attributes of presenter

(East 3.6, North 3.0, West 3.8, South 3.4)

- Visual materials

(East 3.4, North 3.2, West 3.9, South 3.4)

Snack break/Sweet score activity

(East 3.5, North 3.5, West 3.5, South 3.0)

Workshop format (Questions, discussion)

(East 3.3, North 3.5, West 3.2, South 3.0)

To the extent you have been able to explore them, how helpful do you believe the distributed materials will be in your practice?

Bottle caries article

(East 3.4, North 3.4, West 3.5, South 3.1)

Fluoridation information

(East 3.0, North 2.9, West 2.5, South 3.2)

referral information

(East 3.0, North 3.5, West 3.3, South 2.8)

To what extent do you see yourself putting content of this workshop into practice, where appropriate?

(East 3.2, North 3.3, West 3.5, South 3.2)

The evaluation form had also provided space for general comments from participants. Feedback information offered was both positive and helpful. For example, a participant of the June 27 session suggested written instructions be given the nurses for computing the "sweet score", a suggestion which will be followed if the workshops are repeated. In general, feedback suggested the hoped for strengthening of the nurses' information base in dental health had taken place: asked to review the client questions at the end of the workshop, the nurses reported greater confidence about being able to give more helpful responses. Of equal significance, they expressed a willingness to increase the dental component where appropriate in their practice. Among the nurses with whom the district office practice experience was gained (those most involved with the planning) the expression of such willingness was unanimous. One of those nurses wrote, "...the workshop...raised my awareness and motivation to increase my scope/involvement in this aspect of CHN..."

#### 5.4 EVALUATION

Evaluation of the project as a whole was both summative (terminal) and process; in the latter case, activities were tracked at every stage to assess the fact and extent of progress being made toward project completion. The 'Plan for Implementation' provided a convenient tool by which to measure progress.

Summative evaluation involved judgment of effectiveness of the project against objectives defined earlier. The first of these, utilization of the nursing process to focus on dental needs of preschool children in practice situations, was, as noted earlier, met during the phase in which home visits were made with district nurses.

The second practicum objective involved the application of Renzulli's Key Features Model to the delivery of dental health care to preschool children in Winnipeg, specifically as the delivery pertained to the practice of Public Health Nursing. As discussed earlier, results suggested room for an increased dental component in the practice of the nurses: an audit of 100 client files showed only two nurses' notes indicated attention to the dental needs of the preschool children in the household. On the other hand, at the end of the practicum experience, and after the dental health workshops, (the third objective of the practicum), an audit of "post-workshop" charting in 403 client files revealed an increase in the number of dental notes among nurses' charting. Details follow.

The "post-workshop" evaluation audit took place five weeks following the events. Because many of the nurses were taking their vacations in late July, the family file checking activities could take place with less disruption to the work flow in the district offices. Consequently, a more

comprehensive audit could be carried out than previously. The files checked were from the East District office (125 files), West (88), North (107) and South (83). In total, 403 "post-workshop" files were reviewed, with 17 references (4.3%) to dental matters. Some, such as "...briefly reinforced the importance of dental care. Proper method of brushing the [4 year old] child's teeth demonstrated", could be related directly to the key concerns identified early in the project and to behaviors demonstrated in the workshops.

With access to a greater number of files, the opportunity was taken to review also a larger number of "pre-workshop" nurses' notes: in 393 files, all 1985 "pre-workshop" notes were read; of these, 6 (1.5%) referred to dental assessment, teaching or referrals. When the "post-workshop" result of 4.3% is compared to this finding, a conclusion is invited that some progress has been made toward increasing dental care knowledge and interest among the nurses, and that a step has been taken toward meeting some of the 'key feature' concerns stated in table 1.

Charting in client files is likely an imperfect measure of the interaction actually taking place between nurse and client. However, the tool probably errs on the side of caution, such that charting casual teaching in dental care is more likely to be omitted than interventions noted which were not carried out. Comments from several of the nurses at



the time of the "post" check corroborated that their improved dental interest in their clients would not be fully reflected in the notes. Consequently, the increase of 2.8 per cent may be assumed to be valid in "direction" of the results, but may underestimate "degree".

## Chapter VI

## CONCLUSION

6.1 LIMITATIONS

Several limitations of the project require acknowledgement. The first, and major, one of these is that provision was not included for a file audit, or some other form of evaluation of the the effect of the workshops with the nurses, at a time more distant than five weeks following the events. This report cannot, therefore, include a conclusion that the effect of the practicum activities, as they stood at the time of the completion of this report, would last. Another file audit, at the six month or one year anniversary dates, for example, will be required for that prediction to be made with more certainty. The second limitation concerns the "one shot event" nature of the information sharing sessions, such that no record was kept, as with video-taping, for example, that could be used in future Department in-services. Finally, because respondents in the early data gathering phase may have considered the area of dental health for young children not to be a priority item for them, an adaptation of the Renzulli process was made so that a questionnaire was not

administered to respondents, but instead, they were interviewed only, on the basis that the interview had more potential for valid responses and that a choice had to be made between the two. The possibility exists, however, that omitting the questionnaire phase cost the project, in terms of receiving full data.

## 6.2 IMPLICATIONS

From the viewpoint of the City of Winnipeg, the longterm objective of the project was to lower the incidence of dental caries among the inner city's preschool children. The vehicle chosen was to set into motion Public Health Nurse behaviors which would facilitate the parents' learning about sound dietary and dental care practices for their children. The purpose was not to change the focus of the Public Health Nurse so that he or she becomes specialized in the area, but rather to increase the practicing nurse's ability to respond to dental, as well as other needs, of clients.

Changes attempted in the practicum may be labelled as 'first order', entailing no transformation of the structure or rules governing the overlying system, but rather an alteration of the elements, which were, as mentioned above, the nurses' ability to respond to dental needs of young clients. All indications - workshop feed-back, informal communications and client file audit - demonstrated that, at

the conclusion of the practicum, there existed among the nurses a greater interest in, and capacity to respond to, dental health needs of children. As mentioned earlier, a limitation of the project was that a measure was not obtained of the extent to which the changes lasted beyond the time of the chart audit, five weeks following the workshops. There are 'safeguard actions', however, which, if implemented by the City of Winnipeg Health Department, will increase the probability of a lasting effect. These are considered below.

The small group discussion workshops were shown to be successful in accomplishing their stated objectives, at least in the short run. Other, similar, sessions would likely prove as effective, either for staff joining the Division of Nursing or as a 'refresher' for others. These may be held in conjunction with Dental Services, in that case led by Dental Hygienists, or otherwise, perhaps by using students from the School of Nursing, or the School of Dental Hygiene at the University of Manitoba. In the case that such events are thought unworkable, because they are "one time solutions", or too expensive in terms of presenters' time and resources, as well as nursing staff time, there is a realistic alternative. That is the provision for staff to use an audio-visual aid, such as a video or slide-tape production. A video-tape would simulate the group experience better, although slides may be more

appropriate for presenting detailed pictures of oral pathology at a pace that could be set by each viewer. The latter are less expensive to produce, as well, and could be kept current, as script and slide changes are not difficult to make. If such a presentation were made part of the 'package' given in new staff orientation, and were made available to all the nurses for 'refreshing their memories', the expectation is that dental concerns would not become entirely lost among these nurses' other priorities.

Also in the interest of keeping staff members informed, if a nurse with special interest in the area is given the task of monitoring related events and informs the others, the chances will be increased that the Public Health Nurses will be a stronger resource for clients in the area of dental health. They could, for example, inform clients more specifically about when the Faculty of Dentistry chooses their patients for the following year's clinics; if chosen for the clinics, patients could receive dental care from students at substantial savings over private practice rates. The staff person could also inform others of elements that could be useful in their practice, such as workshops, publications or treatment breakthroughs. Except for the time involved in the process, the recommendation may be implemented with no cost, that is, with no implications for the budget of the department.

There are other reminders, visual ones, which should have the effect of keeping the practice of dental health care immediate for the nurses. Dental health posters, such as a few which now may be seen in the district offices, are one example. More directly related to practice is the suggestion that, if the family file or other forms on which the Public Health Nurses record behaviors contains a section in which the nurses know that they are expected to record dental health matters, then related nursing behaviors, such as oral inspections, diet and dental care teaching and referrals, may be more likely to occur. In the end, such a change may have a significant impact, since only by continuous attention to dental health may strides be made in preventive dentistry. A specific space for charting dental health matters would also reinforce for nurses that dental care is considered by the Division of Nursing to be a legitimate area of their practice. Moreover, it would facilitate the monitoring of dental health behaviors through future patient file audits, the feedback from which could help to keep the nurses' interest in the area alive.

A further 'visual' reminder may be useful. There were 350 toothbrushes donated in connection with the practicum. In the home visits in which there were toothbrushes to give the preschool children, the readiness of both the children and parents for learning appeared enhanced. The small, soft-bristled brush would provide a convenient tool to aid in

inspecting the child's mouth and in demonstrating brushing techniques, then would be left in the home, potentially as a tangible reminder to parents and children of the care that is needed. Moreover, having the brushes could act as incentive for the nurses, providing a reminder for them and a convenient item around which to teach and counsel. The children's brushes may be purchased at about 50 cents apiece; provision in the budget for brushes to keep on hand to give children, especially those who have none, could significantly enhance interest in dental health - among parents and among the Public Health Nurses.

There is another implication from the practicum for the Nursing Division of the Health Department. It is suggested by the response of the nurses regarding implementing their learnings from the workshops: those eleven who took part in planning content for the sessions indicated, by their workshop participation and by verbal and written comments following, a high degree of interest in including dental health in their practice. To the extent that result stemmed from active involvement with the process, "participative" program evaluation tools, such as the Key Features Model are appropriate for use with other programs in Public Health. The response should also confirm for senior management of the Division of Nursing that the collaborative approach they are currently using in bringing about far reaching internal changes is appropriate for securing staff support for the changes.

The practicum also raises questions for research. Field studies have shown that Public Health Nurses can be effective in carrying out dental screening for young children, and in doing related teaching with parents. A related question suggested by the present project is whether the general nutrition teaching which nurses so often do would receive more attention from parents if it were carried out in conjunction with an inspection of the child's mouth.

Another research question to explore involves what Community Health Nurses see as appropriate behaviors for them, vis a vis dental health. Also, with an increase of movement of Dental Hygienists into Public Health, the question arises as to the effect that this phenomenon has on "dental" activities of nurses. With the increased proximity, a facilitated opportunity to learn about dental matters may lead to an increased focus for nurses in dental health, or, conversely, to a decrease, as the practicing nurses relinquish related responsibilities to the "specialist" health care workers.

There are implications for educators of nurses as well. The future role of nurses in North America may include, especially for Community Health Nurses, a higher profile in the health care system. To enable those nurses to respond in the interests of the client's total well-being, attention may need to be paid by nurse educators to areas now under-



emphasized, such as dental health. In fact, this practicum has shown that, even now, nurses can play a part in helping parents learn the behaviors that should improve the dental health of small children, but that many have an inadequate knowledge base for the task. Community Health Nurses particularly have the opportunity to see young children at an age earlier than most parents consider taking them to the dentist. Those nurses who have been taught skills related to promoting dental health, and for whom the attitude has been fostered that their mandate includes a wide range of health matters for clients, will be more likely to respond in ways that lower the risk of dental caries among children.

## Appendix A

## KEY INFORMANT INTERVIEW SCHEDULE

## DENTAL HEALTH OF PRESCHOOL CHILDREN, MARCH, 1985

THIS INTERVIEW IS PART OF A PROJECT TO LOOK AT DENTAL HEALTH AMONG PRESCHOOL CHILDREN IN WINNIPEG. I HAVE JUST A FEW QUESTIONS TO ASK YOU. FROM YOUR PERSPECTIVE IN THE HEALTH CARE FIELD (OR AS A PARENT OF A YOUNG CHILD), I'LL ASK YOU TO FOCUS FOR A FEW MOMENTS ON WHAT YOUNG CHILDREN NEED IN THE WAY OF DENTAL CARE...

1. In your opinion, are there particular needs that preschool children have regarding dental care? (if yes, ask 'What are they?')

2. In your opinion, are there special characteristics associated with preschool children that make meeting these needs a particular challenge? (if yes, ask 'What are they?')

3. Focussing for a moment on the parents, do you have concerns regarding the children and their dental health needs? (if yes, ask 'What are they?')

4. Focussing for a moment on Public Health Nurses, do you have concerns regarding the children and their dental health needs? (if yes, ask 'What are they?')

5. Focussing for a moment on dentists, do you have concerns regarding the children and their dental health needs? (if yes, ask 'What are they?')

6. If you were evaluating how dental health needs of preschool children in Winnipeg are being met, what would you consider important to look at?

7. What would you do to get a look at it?

8. Other than any children of your own, about how often do you have contact with Winnipeg's preschool children or their parents?

9. ANY OTHER COMMENTS?

NAME .....STATUS .....

Appendix B  
SWEET SCORE ACTIVITY

DENTAL HEALTH FOR CHILDREN WORKSHOPS, JUNE, 1985  
(adapted from A. Nizel, "Oral Health Diet Score",  
Nutrition in Preventive Dentistry,  
Philadelphia, Pa.,: W B Saunders, 1981)

1. Recall and list all food items taken over the last 24 hours.
2. Circle those with obvious sugar content.
3. Identify each as "liquid or soft" (as with ice cream, yogurt or sweetened cool-aid) or "hard or sticky" (as with throat lozenges, brownies, or cookies).
4. Add all "soft or liquid" food events and multiply the number by 8. Add all "hard or sticky" food events and multiply the number by 16.
4. Add totals of both groups to get "Sweetness Score". (A score <30 is very low, >70 is very high)

Note: this measure does not take dental care, i.e., brushing or flossing, into account, nor the buffering effect of sweets taken in conjunction with other foods.

Appendix C

WORKSHOP HAND-OUTS

DENTAL HEALTH FOR CHILDREN WORKSHOPS  
JUNE, 1985

## CLIENT QUESTIONS IN DENTAL HEALTH...

1. Signs - of dental caries -  
  
- of other oral problems -
2. Should I insist he brush?
3. Best time for dental care -
4. Why limit sweet things for baby?
5. Fl supps for breast fed baby?
6. Fruit juice or water in bottle?
7. Teething and Arrowroot biscuits?
8. Raisins and peanut butter?
9. Start dental visits WHEN?

BOTTLE CARRIES: A NURSING RESPONSIBILITY

by

B.J. Lane

V. Sellen,

## Abstract

The future role of nurses in North America may include significantly greater participation of nurses as resources for people seeking care. Conscientious fulfillment of that obligation requires greater attention to areas which nursing has not traditionally fully embraced; not the least important of these is dental health. In many areas of dental health, community health nurses are in a unique position to decrease risks to the well-being of clients. This is particularly so for their very young clients, who may not visit a dentist until the health of their teeth has been compromised, often due to "bottle" or "nursing" caries. This article outlines ways in which nurses can enrich their practice and recognize, prevent and deal with bottle caries.



## BOTTLE CARIES: A NURSING RESPONSIBILITY

Probably because dental caries is such a common problem in childhood, and is not life threatening, it is not considered by many to be a serious threat to the well-being of children<sup>1</sup> However, one pattern of lesions, bottle caries, occurs that may lead to particularly serious physical and emotional sequelae if the disease process is not discovered and reversed early. About three per cent of Canadian children under four years meet with this disease<sup>2</sup> (also known as 'nursing bottle mouth', 'night bottle syndrome' and 'nursing caries') from which severely marred appearance and compromised dental functioning may result.

Bottle caries can be attributed directly to the stagnation of infant formula, breast milk or other cariogenic substances on teeth, as when the child nurses formula (or breast milk) frequently during the night, or habitually uses pacifiers dipped in honey or other sweeteners.<sup>3</sup> With the natural defenses overwhelmed by frequency of exposure, carious lesions ensue. The occurrence of this "lifestyle disease", according to Johnson, is usually associated with over-indulgence on the part of the parents about sweets for the youngster,<sup>4</sup> This contention is consistent with some early research which determined that certain children are predisposed to bottle caries: those associated with premature births, or abnormal pregnancies,

labour or delivery, or those afflicted with recurring illnesses early in their lives.<sup>5</sup> Children in low socio-economic groups are also at risk,<sup>6</sup> as are some ethnic groups: according to Milnes and Bowden, Native Canadian children have a prevalence of bottle caries approaching 50%.<sup>7</sup>

As the process affects all teeth in prolonged contact with the fluid, the lesions take on an easily identified pattern. First, the maxillary incisors become involved, perhaps initially showing dull, white decalcification along the gum line, and later developing into brown or black decay encircling the neck of the tooth. Frequently, the gingival tissues are inflamed. The four lower incisors are typically unaffected, at least initially being protected by the position of the lower lip and the tongue and the proximity of the lower salivary glands.<sup>8</sup> The carious process usually begins shortly after the tooth erupts - so soon, in fact, parents may report the teeth erupted "like that". Diagnosis is made by the typical clinical picture and by the history, which usually indicates a bottle fed, late weaned child, and unknowledgeable and/or over-protective parents.

Left untreated, the condition can lead to serious consequences: pain and infection, premature loss of teeth, "tongue thrusting", abnormal swallowing habits and speech difficulties.<sup>9</sup>

Treatment may vary. In severe cases, hospitalization is necessary with the child having to undergo extensive dental treatment under a general anaesthetic. Whatever procedure is chosen - extractions and spacers, full crown restorations of stainless steel or resin, fluoride gel applications - the health care professional must focus on the background factors of parents' lack of knowledge and/or over-indulgence, or these children will remain susceptible to caries even after the bottle has been abandoned. Once treatment is underway and better dietary habits implemented, there are often dramatic improvements for the child: less irritability (associated with better sleeping habits), improved appetites and weight gain, and an increase in the child's Iron status (deficiencies being common where milk is the primary source of nourishment).<sup>10</sup>

Upon learning the cause of bottle caries, the response from parents is often characterized by guilt, and by indignation about not having been warned about the cause sooner.<sup>11</sup> Public Health Nurses can do some of the warning: they come into contact with many families with young children. By watching for signs of bottle caries or its

concomitant feeding pattern, counselling parents on diet and dental care for the child, and encouraging early dental visits for all children, nurses could make a difference in the course of this disease.<sup>12</sup> The teaching is problematic, since not every child with the characteristic dietary habits will develop the syndrome. However, many situations, such as post-natal visits or prenatal classes, present "teachable moments", when parents are ready to learn about healthy dental habits for their child. Included below is information which nurses can impart to parents so they may more effectively care for the children's teeth.

#### Carbohydrates in the Mouth

All fermentable carbohydrates act as a substrate for bacterial plaque to metabolize and produce acid. Each time carbohydrates are ingested, the pH of the oral cavity is lowered, producing an "acid attack" on the teeth for a period of at least 20 minutes, during which time, demineralization of teeth will occur.<sup>13</sup> Even foods without high refined sugar content (such as natural unsweetened fruit juices) will create an acid environment for the teeth.<sup>14</sup> Foods with refined sugars will produce even more severe acid attacks as they are metabolized more easily by the bacteria in plaque.

In another way, carbohydrates play a role: diet influences the type of bacteria at home in the mouth. That

is, a diet high in carbohydrates will predispose the oral cavity to those bacteria that break down carbohydrates and produce the acid which demineralizes the teeth. Diets high in protein, on the other hand, foster a type of bacteria that breaks down protein. Therefore, sugar introduced to those generally on high protein diets will not have as detrimental effect on the teeth as it would for those on high carbohydrate diets.<sup>15</sup>

1. It is crucial that the child not be allowed to fall asleep nursing on a bottle that contains anything other than water, as the fluid will pool in the mouth causing an extended exposure time, during which the teeth will be demineralized if carbohydrates are present. Further, saliva is less abundant in times of sleep: ordinarily, saliva reduces the risk of caries, by causing an increase in the swallowing rate, and by diluting and buffering organic acids produced in the dental plaque.<sup>16</sup> But saliva flow decreases markedly during sleep. Therefore, behaviors such as "bottle propping", put the child's tooth enamel in jeopardy. Encourage all parents (even breast feeding mothers) to hold the child for feedings - not only does the practice promote bonding, but it helps prevent bottle caries. As well, the caretaker should wipe residual milk from the infant's mouth following each feeding.

#### Detection of Caries

The parents should be advised of the importance of taking the child for regular dental visits, beginning in the second year of life, and to inspect the child's teeth regularly themselves for dental caries. They should be advised such checks are not a replacement for taking the child for regular dental check-ups. In fact, the inspections may promote an interest among parents about the child's teeth and may lead them to seek earlier dental attention for the child once a carious lesion is discovered.

1. Inspect the teeth for unusual signs. Dull white or chalky areas may mean early decalcification. As the lesion progresses it will take on shades varying from yellow to brown and black and increase in size. In the case of suspect signs, the parents should have the child's teeth checked by a dentist.
2. Use a bright light to make any lesions easier to see.
3. Dry the teeth with a tissue or gauze while holding the tongue and cheeks away from the teeth with the fingers of the other hand to aid in detecting early caries.

#### Care of the Child's Teeth

Good oral hygiene will help to reduce caries formation and periodontal (gum) disease. Oral hygiene needs for the child begin at birth and care must be carried out by an adult until the child's co-ordination is sufficiently advanced for

the child to handle the task, usually about the age of seven.<sup>17</sup>

1. Wiping the infant's gum pads with gauze squares will remove debris and bacteria.
2. As the teeth erupt, they too should be wiped with gauze (and a tiny drop of fluoride toothpaste) until they have erupted fully enough that the gums will not be unduly traumatized by the use of a toothbrush.
3. When the erupted teeth can be brushed, the parent should brush them using a child's soft-bristled toothbrush. As the child is learning the skill of toothbrushing, the parent should supervise and check, brushing areas that have been missed.
4. Pediatric Fluoride supplements are available by prescription to extend the protection to infants where there is no fluoridation of the drinking water,<sup>18</sup> or for breast fed infants, since the Fluoride supply through breast milk is low, compared to other sources, such as drinking water containing Fluoride.<sup>19</sup>

### Conclusion

There may be an inclination among some nurses to overlook client problems associated with dental health. Perhaps some nurses believe that matters related to dental development and care properly fall only within the sphere of dental health professionals. The dentist, however, is not in a favorable position to prevent bottle caries: if parents

delay taking children for dental visits until three years of age or older, the disease may be well advanced by the time the dentist sees the child. The Public Health Nurse, however, is ideally suited for a greater role in preventive dentistry. Research has shown that they can be used effectively for detecting carious lesions,<sup>20</sup> and for teaching about diet and home dental care practices, and about the need for early and regular children's visits to the dentist.<sup>21</sup> And, as the only health care professional with whom some parents come into contact in their children's early years, Public Health Nurses have a particular responsibility in this regard.



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## FLUORIDES FACT SHEET

Compiled by B.Lane, University of Manitoba, May, 1985.

### WHAT IS FLUORINE?

Fluorine is known chemically as a halogen, the same family containing bromine and chlorine. Fluorine is the thirteenth most common element on earth. Compounds containing Fluorine are found in trace quantities in air, water, and many foods, such as tea, fish, eggs, fowl, and in rice and wheat (1)

### ARE FLUORIDES EFFECTIVE IN LOWERING INCIDENCE OF CAVITIES?

Yes. For example, studies done in Canada and elsewhere have shown that Fluorides in community water supplies at 1 part/million part water (1ppm) reduces dental caries by about 65%. The protection is carried through to adulthood. For example, teenagers not raised with fluoridated water acquire a reduction in caries after only one year of fluoridation (2). As well, Fluorides lower the incidence of root caries in adults.

### IS FLUORIDATION OF WATER SAFE?

Yes. Studies have found there is no difference between mortality and morbidity rates due to cancer, heart disease, etc., between fluoridated and non-fluoridated communities (3). In very large doses - twice the recommended dose over an extended period - dental fluorosis may occur, producing first a white, then brown mottling of the tooth enamel (4).

### HOW DO FLUORIDES WORK TO REDUCE DENTAL CARIES?

2 ways - systemically and topically.

#### Systemically

Fluoride, a natural constituent of tooth enamel, become available to the developing tooth bud through the blood stream and the tissues surrounding the tooth. "Uptake" of fluoride occurs both before and after the tooth has erupted. Fluorides in the tooth make them less soluble to the acids that are formed by carbohydrates and the oral bacteria (mostly Streptococcus Mutans) (5)

#### Topically

Fluorides inhibit the enzymes involved in the production of the acids responsible for dental caries (6).

IS FLUORIDATION OF WATER THE BEST WAY TO APPLY IT?

Yes. Fluoridation of community water supplies is considered the most effective and practical way, because it confers protection against tooth decay to everyone, regardless of age, socio-economic level or educational achievement (7). Fluorides provided through water are utilized by both the systemic and topical routes (8). Also, the method is cheap (less than 25 cents per person per year) and saves money (saves between \$60 - \$70 in care costs for every dollar spent to fluoridate the water) (9).

DO FLUORIDES PROVIDE COMPLETE PROTECTION?

No. Teeth formed under the influence of Fluoride are much more resistant to caries but it is still possible to overwhelm the tooth with excessive use of sweets, especially sticky or hard ones, and between meals. Also, even with fluoridation, children need to have their teeth brushed and flossed by adults until they are about 7 years old and their manual dexterity is sufficiently developed for the task (10).

WITH THE USE OF FLUORIDES, ARE PIT AND FISSURE "SEALANTS" NECESSARY?

Sealants, protective resin coverings applied to the tooth, are recommended, where available. The coating, which takes a skilled dental worker only a few moments to apply, is not so effective for primary molars (50%) as for permanent teeth, in which case reductions in caries of 65 - 100% have been reported. Sealants are useful because brushing and flossing cannot remove bacteria and debris from deep occlusal pits and fissures or incipient lesions (11).

#### HOW MUCH IS ENOUGH?

In temperate climates, the average daily intake of water is one quart, which, if the water is fluoridated at 1 ppm, will yield an intake of 1.2 mg fluorides from this source. The average intake from all other sources is 0.1 - 0.3 mg, making a total daily intake of 1.5 or less mg of fluorides, within the safe and effective doses (12). Where there is less than .7 ppm fluorides in the water, the Canadian Dental Association (CDA) recommends fluoride supplements according to the following schedule (13).

Fl. Content of Drinking water	Age (years)	Daily Dose of Fluoride
< 0.3 ppm	birth - 2	0.25 mg
	2 - 3	0.5 mg
	3 - 13	1.0 mg
0.3 - 0.7 ppm	birth - 2	-
	2 - 3	0.25 mg
	3 - 13	0.5 mg

#### BESIDES THROUGH THE WATER SUPPLY, WHAT OTHER WAYS CAN FLUORIDES BE EFFECTIVELY APPLIED?

1. Topical fluorides, applied in the dentist's office.
2. Fluoride supplements - pill, chewable tablet, lozenges, drops, etc.
3. Fluoride dentifrices - tooth pastes and tooth powders
4. Fluoride rinses

#### TOPICAL FLUORIDE APPLICATIONS: HOW EFFECTIVE ARE THEY?

Topical fluoride applications are believed to reduce dental caries by 30 - 45%. Stannous Fluoride, Acidulated Phosphate Fluoride or Sodium Fluoride may be used, although Stannous Fluoride is considered more effective than the others among both young children and older clients (14).

#### AT WHAT AGE SHOULD TOPICAL FLUORIDE TREATMENTS BE INITIATED?

When the teeth first erupt, at about 2 years of age, and twice yearly after that (15).

ARE THERE ANY PROBLEMS WITH TOPICAL FLUORIDE APPLICATIONS?  
Sometimes. The use of Stannous Fluoride may result in temporary brown pigmentation of carious tooth structures, thereby exaggerating an aesthetic problem. Also, Stannous Fluoride has a strong, unpleasant, metallic taste which the child or other client will need warning about (16).

FLUORIDE SUPPLEMENTS - HOW EFFECTIVE ARE THEY?

Pediatric fluoride supplements, available by prescription, have been developed to extend the benefits of fluoride to families without sufficient fluorides in the drinking water. To be effective, the supplements need to be started early in life and ingested daily for about 13 years - then the benefits may reduce the incidence of dental caries by 50 - 60% (17). Where there is fluoridation of the communal water supply, adding Fluorides by SYSTEMIC means is not advised.

WHY IS IT IMPORTANT THAT SUPPLEMENTS (IF THEY ARE NEEDED) BE STARTED EARLY?

Starting early facilitates the incorporation of Fluoride into the developing permanent teeth and protects deciduous teeth as well, preventing premature loss due to caries.

WHAT ABOUT PRENATAL FLUORIDE SUPPLEMENTS?

Although considered safe, with no adverse effect on the mother or the child, research has demonstrated no benefits in caries prevention by prenatal administration, as most calcification takes place after birth (18).

DOES FLUORIDE CROSS THE PLACENTAL BARRIER?

No (19).

DOES FLUORIDE CROSS INTO BREAST MILK?

No. Which is why Fluoride supplements may be prescribed for breast fed infants. The practice is only advised in those cases where the mother can be expected to adhere strictly to the prescribed dose, however (20)

#### DENTIFRICES: DO THEY ALL CONTAIN FLUORIDES?

Most dentifrices now contain fluoride. Some that do not are Pepsodent tooth paste, Pepsodent tooth powder and Sensodyne tooth paste. Fluoride dentifrices, recommended by the Canadian Dental Association, may contain Sodium Fluoride (as in Crest and Zendium), Sodium Monofluorophosphate (as in Topol, Aquafresh, Macleans and Pearl Drops) or a combination of the two (as in Colgates toothpaste).

#### WHAT ABOUT FLUORIDE RINSES?

Self applied fluorides by way of mouth rinses are practical and effective and more efficient than professionally applied protection. Often used in school based as well as home based prevention, they reduce the incidence of dental caries by 20 - 50%. Rinses are often prescribed to be swallowed after rinsing, but swallowing is contraindicated where there is fluoridation of the communal water supply. In this case, rinses should not be prescribed for small children or others who cannot rinse without swallowing (21). Rinses are useful for school age children undergoing orthodontic treatment and for whom maintaining proper oral hygiene is difficult. When used at home, patient education is needed to promote the habit of daily rinsing.



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REFERRALS: CHILDREN'S DENTAL HEALTH, WINNIPEG

SOCIAL ASSISTANCE:

If under provincial jurisdiction, (eg single parent, unemployable) private dental care costs are borne by the provincial department.

If under city jurisdiction, costs for city of Winnipeg dental clinics are borne by Winnipeg Social Services.

LOW INCOME:

Eligibility is worked out by formula using income allotted for a similar sized family + \$90/mo. (eg., if the family has an income of \$700/mo. and the allotment for a similar sized family in similar circumstances would be \$600, this family would exceed the boundary by \$10 and care would not be given at the city's dental clinics. Telephone City Social Services for a decision in each case.

UNIVERSITY OF MANITOBA FACULTY OF DENTISTRY:

At approximately 25% of the cost of private care, the Faculty of Dentistry takes patients who fulfill the teaching needs of the Faculty. Children likely to be accepted are those with multiple dental problems. A screening clinic for the coming year's clinics is held around July 15 of each year at the Faculty. An ad is placed in local newspapers prior to the date. Some patients are also accepted later in the year. Phone 786-3662 for information.

For children with bottle caries, extensive surgery involving general anaesthetic is often required. These children are referred to the Health Science Centre. Phone 787-2515 for appointment or information.

Advantages of using the Dental Faculty include cost, comprehensive care and continuity, the same student often carrying the patient for two or more years. Children are taken until 14 years of age. The students are well supervised and are collaborative in their approach to clients. Dental Hygiene services (scaling, cleaning, etc) are arranged if required.

Disadvantages of using the Dental Faculty include longer patient visits and the cost of travel and time off work, to accommodate appointment times over which the patient has no control. Clinics are held Friday mornings or afternoons. "Check-ups" are not given at the clinics.

FEEDBACK: WORKSHOP ON DENTAL CARE OF PRESCHOOL CHILDREN

1. BEARING IN MIND THE WORKSHOP OBJECTIVES,  
TO WHAT EXTENT DO YOU BELIEVE THIS WORKSHOP HAS FACILITATED  
YOUR ACHIEVING THESE OBJECTIVES?

Not at all      A little      Quite a bit      Lots  
                  

2. TO WHAT EXTENT WERE EACH OF THE FOLLOWING USEFUL IN  
ASSISTING YOU IN ACHIEVING THE OBJECTIVES?

- SLIDE ILLUSTRATIONS:

Not at all      A little      Quite a bit      Lots  
                  

- ATTRIBUTES OF PRESENTER (CLARITY, RECEPTIVITY TO  
QUESTIONS, DISTRACTING MANNERISMS, ETC.)

Not at all      A little      Quite a bit      Lots  
                  

- VISUAL MATERIALS (PAMPHLETS, POSTERS, READING LIST)

Not at all      A little      Quite a bit      Lots  
                  

- SNACK BREAK/SWEET SCORE ACTIVITY:

Not at all      A little      Quite a bit      Lots  
                  

- WORKSHOP FORMAT (QUESTIONS/DISCUSSION):

Not at all      A little      Quite a bit      Lots



4. TO THE EXTENT YOU HAVE BEEN ABLE TO EXPLORE THEM,  
HOW HELPFUL DO YOU BELIEVE THE DISTRIBUTED MATERIALS WILL BE  
IN YOUR PRACTICE?

- BOTTLE CARRIES ARTICLE:

Not at all      A little      Quite a bit      Lots



- FLUORIDATION MATERIAL:

Not at all      A little      Quite a bit      Lots



- REFERRAL INFORMATION:

Not at all      A little      Quite a bit      Lots



5. TO WHAT EXTENT DO YOU SEE YOURSELF PUTTING  
CONTENT OF THIS WORKSHOP INTO PRACTICE, WHERE APPROPRIATE?

Not at all      A little      Quite a bit      Lots



COMMENT(S):



THANK YOU

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