Health promotion and prevention of early childhood caries

A thesis submitted for the degree of Doctor of Philosophy

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Abbreviations
AAPD – American Academy of Pediatric Dentistry
AIHW – Australian Institute of Health and Welfare
APHA – American Public Health Association
CAFHS – Child, Adolescent and Family Health Services
DHE – Dental Health Education
ECC – Early Childhood Caries
FHS – Family Health Service
FMC – Flinders Medical Centre
IOHEP – Infant Oral Health Education Program
LMcEHS – Lyell McEwin Health Services
MoH – Modbury Hospital
M.S.treptococcus – Mutans Streptococcus
NIDCR – National Institute of Dental and Craniofacial Research
OHIP – Oral Health Impact Profile
PDP – Preventive Dental Program
QoL- Quality of Life
RCT – Randomised Controlled Trial
REC – Research Ethics Committee
S-ECC – Severe Early Childhood Caries
Std.Dev. – Standard Deviation
TQE1 – The Queen Elizabeth Hospital
WCH – Women’s and Children’s Hospital
WHO – World Health Organisation
WIG – Water – insoluble glucan
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Abstract

The prevention of avoidable diseases should be a key goal of health systems in developed countries. Health promotion is one of the strategies through which this goal could be achieved. The aim of this oral health intervention program “Cavity free children” was to prevent the development of severe early childhood caries (S-ECC).

Data about the prevalence of early childhood caries (ECC) among children younger than 4 years are not routinely collected in the child dental health surveys. However Wyne (1990) found the prevalence of ECC was 16.7% (non-cavitated lesions) and 2.6% (cavitated lesions) among 2-3 year olds in SA. Data from recent years of the Child Dental Health Survey indicate that caries experience is on increase. The figure for mean decayed, missing (due to caries) and filled primary teeth increased from 1.10 in 1997 to 1.44 in the year 1999 in 4 year olds (Armfield et al. 2004). Reports on hospitalisation for treatment of oral disease of children younger than 4 years indicate that this problem is ongoing.

Purpose: The purpose of the study was to test the efficacy of an oral health promotion program (OHPP) for the parents of infants, starting with pregnant women, using a randomised controlled trial. The OHPP used anticipatory guidance to focus on the needs of each child during the first 18 months of life.

Methods: In total 649 nulliparous women were enrolled in the study. During the enrolment they were randomised into test and control groups, using Zelen’s design. Mothers in the test group (n = 327) received the first round of oral health promotion information at their enrolment in the study. They received the second round of information when their child was 6 months old and the third round when their child reached 12 months of age. This written oral health promoting material was mailed to their home address. After the second round of information test group mothers were randomised on the test A and test B groups. In test group A the oral health promotion information was reinforced through a phone interview, in contrast to test group B where no reinforcement took place. There was no contact with mothers (n = 322) in the control group from the time of their enrolment. At the age of 18 months, all children were examined by a dentist. Baseline data at the enrolment to the study, refusal to participate in the study, retention of participants in the study according to the socio-economic factors, data from two questionnaires (First Maternal Oral Health Survey, second Child’s Oral Health Survey), medical history, dental
examination, and responses of participants to the oral health promotion information were analysed. The differences in outcomes between the test and control groups, and the test A and test B groups were calculated.

**Results:** From a total of 649 nulliparous women enrolled in the study, after exclusions and losses to the study since enrolment, 441 children were examined at the age of 20 ± 2.5 sd months. The number of examined children in the test group was 232 and 209 in the control group. There were no statistically significant differences between the test and control groups at baseline and follow-up according to socio-economic characteristics.

Using a case definition of S-ECC as one or more maxillary anterior teeth carious, the incidence of S-BCC in the test group was 1.7% and in the control group 9.6%. The overall incidence of S-ECC was 5.4%. The difference in the caries incidence between test and control group was statistically significant at p<0.001.

The phone call counselling to mothers in test group A received between six and 12 months of their child’s age did not influence the incidence of S-ECC (group A 1.6%, group B 1.8%).

The first-time mothers proved to be a group receptive to health information.

**Conclusion:** The statistically significant difference in the incidence of S-ECC between the test and control groups indicates high efficacy of the oral health promoting intervention provided in the form of anticipatory guidance periodically mailed to the mother’s home address.
Declaration

This thesis contains no material that has been accepted for the award of any other degree or diploma in any university, and to the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference has been made in the text of the thesis.

I give my consent to this copy of my thesis, when deposited in the University Library, being available for loan and photocopying.

Kamila Plutzer
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Chapter 1. Introduction

The crucial importance of early childhood for a child’s further development is recognised and fully accepted by all professions involved in developmental care. To foster general well being and quality in a child’s life, both health and a wide set of non-medical outcomes must be achieved. There is consensus in the literature that the quality of life is characterised by four - core domains (Rapoff, 1999):

- Physical symptoms (pain and fatigue)
- Functional status (ability to perform age-appropriate daily activities)
- Psychological functioning (affective states, adjustment indices and self esteem)
- Social functioning (the number, type and quality of social contacts and relationship).

While not all disorders which reduce the quality of a child’s life can be actively influenced, an effort should be made to address those disorders amenable to prevention. One of these disorders is early childhood caries, the consequences of which are associated with all core domains of the quality of life of a child.

The practice of preventive dentistry (such as the use of fluoride) in the last 30 years has dramatically reduced the experience of dental caries in industrialised countries, especially in the permanent dentition. The initial reduction was significant in the primary dentition as the number of teeth with caries experience, expressed in epidemiological studies as dmft (decayed, missing - due to caries, filled primary teeth) of 5 year olds dropped from 5.1 in 1963 to 1.97 in 1982, but from this time caries experience has declined only marginally (Downer, 1998; Armfield, Spencer, 2004).

In recent years caries experience in primary dentition in Australia is on the increase. In the period 1997 to 1999 the dmft among 4 year olds increased from 1.10 in 1997, to 1.44 in 1999, with sd 2.36 for 1997 and 2.87 for 1999. The proportion of 4 year old children with a dmft equal to zero during these years decreased from 70% in year 1997 to 64% in the year 1999.
A slight improvement in mean dmft compared to year 1999 was recorded in year 2000, when the dmft of 4 year olds dropped to 1.23 with sd 2.65, and 65.8% of children had a dmft equal to zero.

The dmft increased with the age of the child, reaching a peak at the age of 8 years (dmft 1.81), after which dmft started to decline due to natural exfoliation of primary teeth. However the highest ratio of untreated decay (d/dmft) was among 4 year old children (84.2%) (AIHW, 1997 / 1999 / 2000).

In South Australia in 2002 among 4 year old children the caries experience expressed as mean dmft was 1.45. In total 65% of children at this age had a dmft equal to zero (Armfield, Spencer, 2004).

Significant numbers of children still present with dental caries at the first dental visit (Sanchez, Childers 2000).

To prevent the development of the disease, the American Academy of Pediatric Dentistry (AAPD) recommends that infants (and parents) be scheduled for an initial oral evaluation visit within six months of the eruption of the first primary tooth but no later than 12 months of age. In addition the infant oral health care visit should be seen as the foundation upon which a lifetime of preventive education and dental care can be built to assure optimal oral health (AAPD, 1994).

In real life the preventive dental visit at such an early age is rare. Much of the experience of dental caries is among children from low-income and deprived families, whose access to dental care is limited by socio-economic circumstances. As the social inequalities in society are increasing, more families may be affected by this unwelcome trend, with far-reaching consequences for the child’s health and quality of life.

To prevent the development of disease or at least to reduce its progression, new effective strategies must be developed. There is growing recognition that a better quality of life can be achieved if we apply knowledge about the prevention and protection of health to our activities. This recognition reflects the broader understanding of healthcare, which is seen not only as a dominant top-down process by the health professionals, but as a dynamic interdependent relationship of individuals with the social and physical environment.
Individual behaviour plays an equivalent role in maintaining well-being and prosperity as professional care (Jacobs, 2004).

One of the strategies which can help people make healthy choices is health promotion. Health promotion is defined as “the process of enabling people to exert control over the determinants of health and thereby improve their health” (WHO 1984).

In the framework of health promotion, the majority of theories operate at the level of individual (not community) focus on disease, or accentuate the change of behaviour of the individual as the main outcome (e.g.“Health believe model”, “Transtheoretical model of change”, Social cognitive theory”) (Nutbeam, 2004).

The intention of this study was not to induce behavioural change, but provide information which would prevent the development of unwanted behaviour.

The concept of “Reasoned action and planned behaviour” (Ajzek, Fishbein, 1980) was selected as a guide for this study, as this concept best incorporated the intention of creating healthy habits rather than struggling to correct harmful habits.

This was based on the assumption that intention to act is the most immediate determinant of behaviour, and that all other factors influencing behaviour will be mediated through behavioural intention. Attitude is determined by the belief that a desired outcome will occur if a particular behaviour is followed, and that the outcome will be beneficial to health (Humphris, 2000; Nutbeam, 2004).

Early childhood caries can be avoided when healthy habits are formed early.

### 1.1 History of the disease and terminology

The possibility of an association between nutrition and the development of early childhood caries (ECC) was first mentioned in 1743 by Robert Bunon, in “Essay sur les Maladies des Dentes”. Bunon here discussed the connection between diet and health of pregnant women and the demineralisation of the child’s teeth. He emphasised the importance of good dietary habits for the prevention of dental disease (Koch, Poulsen, 2001).
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In 1862 Jacobi, in the work “Dentition and its derangements”, described ECC for the first time. Interested in the diet of infants, Jacobi recognised the connection between a child’s nutrition and development of tooth decay (Virtual American Biography). In 1884 Darby described ECC as “labial decay of childhood” in the work “The aetiology of caries at the gum-margins and the labial and buccal surfaces of the teeth” (Ismail et al., 2000).

The specific pattern of early childhood caries was recognised and described in the 1930s by Beltrami, who described the disease as the “black teeth of the very young”. In 1962 Fass introduced the term “nursing bottle mouth” (Reisine, Douglas, 1998). Since then, a range of other terms has been used to describe the disease e.g.: nursing caries, nursing bottle syndrome (caries), night bottle mouth, baby bottle tooth decay, (caries, syndrome), milk bottle syndrome, (caries), bottle mouth caries, prolonged nursing habit caries, sipper cup caries, rampant caries (Tinanoff, 1998; Ismail, Sohn, 1999; Haris, Garcia-Godoy, 2004).

All these terms refer to the nursing habit as the aetiological factor of the disease. However there are other, less often used names such as labial caries, or maxillary anterior caries (Ismail, Sohn, 1999), which describe the location of the disease rather than an etiologic factor.

1.2 Definition of early childhood caries.

Despite nearly 150 years from the first description of the aetiology of ECC (by Jacobi), the definition of disease still varies from study to study. The latest attempt to unify researchers in their diagnoses of the disease was formulated on the basis of a review of the current evidence on case definition and diagnostic criteria for dental caries in primary teeth at an NIDCR Workshop (1999) held in Bethesda (Drury et al., 1999). The recommendations from this workshop were adopted by AAPD and US National Institute of Health (1999).

According to the definition suggested by the US National Institute of Health, early childhood caries is the presence of one or more decayed (non cavitated or cavitated lesions), missing (due to caries), or filled tooth surfaces on any primary tooth in children up to 71 months of age.
In children younger than 3 years of age, any sign of smooth surface caries (non cavitated or cavitated) should be considered as severe early childhood caries (S-ECC) (AAPD, 2002).

1.3 Prevalence of early childhood caries

In epidemiology the occurrence of disease is reported as incidence or prevalence. Prevalence is defined as the number of affected persons present in the population at a specific time divided by the number of persons in the population at that time, while incidence of the disease is defined as the number on new cases of a disease that occur during a specified period of time (usually of a year) in the number of persons in the population at risk for developing the disease (Gordis, 1996; Daly et al., 2002).

The prevalence of the disease reported in literature varies broadly, which is understandable given the complexity of the disease and methodological shortcomings in its assessment.

The prevalence of ECC ranges from 1-12 % in developed countries, to 70% in developing countries and within disadvantaged populations in developed countries (Milnes, 1996).

The prevalence of ECC increases with the age of the child even in developed countries. In Sweden the prevalence among 1 year olds was less than 1%, by age 2 it increased to nearly 8%, and by age 3 to 28% (Wendt, 1995).

ECC is a lifestyle disease with biological, behavioural and societal determinants, including ethnic and socio-economic determinants. Furthermore, the definition of the disease, case definition, diagnostic criteria for identifying a carious lesion, dental examination procedures and the methodology used, are characterised by a lack of consistency from study to study, which makes the comparison of studies unreliable.

Therefore this review is limited to studies of incidence / prevalence of ECC in Australia on children up to 4 years of age. However there is lack of epidemiologic data on the prevalence of ECC during the first three years of child’s life (similar to other developed countries), as they are not routinely collected through dental surveys, especially due to the difficulty of accessing children in this age group.
The first epidemiological data about the prevalence of ECC are from the year 1980 (Spencer, Storey - unpublished) obtained from a convenience sample of 100 pre-school children attending an infant welfare centre in Thomastown, Victoria. The prevalence of ECC was 18%.

In 1985 Brown conducted a study in Brisbane examining the level of M. streptococci in infants with bottle caries and their mothers. A total of 112 children under two years were examined. The overall prevalence of ECC was 7.1%, with the relation to the nursing pattern of 5.4% (Brown et al., 1985).

In 1989 Wyne examined 160 children aged between 2 and 3 in a stratified random sample in Adelaide, South Australia. The prevalence of nursing caries in the study sample was 21.9% (Wyne, 1999). After data were weighted, using the 1986 population census to represent the South Australian population, the prevalence of the disease was estimated to be 2.6% for cavitated lesions and 16.7% for non-cavitated lesions (Wyne, 1990).

While experience of early childhood caries is usually measured as prevalence, in this study the caries experience was measured as the cumulative incidence, as the period of time during which the disease developed was known.

1.4 Clinical appearance of early childhood caries

1.4.1 Susceptibility of primary teeth to caries

The enamel of newly erupted teeth is immature (with lower concentrations of calcium, phosphate and, if available, fluoride compounds) and thus provides a unique risk factor for the onset of dental caries when the etiological factors for development of the disease are favourable (Seow, 1998).

Furthermore, the requirements for a child’s nutrition during the first year, characterised by rapid physical growth and immaturity of many other vital organs, are different than later in life. The physiological requirements for calories often result in a higher frequency of food intake than in the adult population. Feeding methods and proper oral hygiene are thus of primary importance in the prevention of ECC (Sayegh et al., 2002).
1.4.2 Clinical appearance of ECC

The disease involves a definitive pattern on particular teeth, to which the definition of ECC is related. The clinical appearance of early childhood caries is characterised by early carious involvement of the maxillary anterior teeth, the maxillary and mandibular first primary molars, and sometimes the mandibular canines. The mandibular incisors are usually unaffected by caries (McDonald, Avery, Dean, 2004).

The first clinical signs of ECC appear on the smooth surfaces of maxillary front primary teeth, in the region close to the gingival line, where plaque can accumulate and remain stagnant for long periods. The demineralisation of the enamel results in its increased porosity, which alters the refraction of light. Optically this appears as a white line or spot in the area where plaque has accumulated.

If demineralisation continues, the early lesion develops into a cavitated lesion, with loss of the enamel. A cavity is formed. The colour of the cavity changes to yellowish, brown due to the presence of bacteria. In addition, the cavity becomes the place for further retention of food and bacteria, leading to further demineralisation and destruction of the tooth.

1.5 Significance of early childhood caries

The disease is an important public health problem, as if left untreated it can affect all aspects of quality of life of a child and cause society unnecessary health expenditure for its treatment.

While strategies to prevent ECC from a public health perspective have been widely discussed and include recommendations such as community water fluoridation, community-based interventions, screening for disease linked with immunisation, change of insurance reimbursement, practical and systematic approaches to the prevention of the disease (except water fluoridation) on a community basis, these strategies have not been widely implemented (Weintraub, 1998).

It seems that the significance and consequences of ECC from a public health perspective are still not fully recognised and documented. One reason could be that the difficulties
caused by ECC are treated by various medical and non-medical specialities, and that a treatment is not recorded as the consequence of ECC in the fractional health-care system.

1.5.1 Influence on a child’s quality of life

Damage to the child’s health due to improper feeding (e.g. frequent intake of sweetened food, feeding on demand during the night) and oral health habits (neglected oral hygiene) may be seen very early. The child experiences a variety of adverse effects caused by the disease. The manifestation of the disease may include:

Physical symptoms such as discomfort, pain, infection, abscesses, gastrointestinal disorders, malnutrition, including retarded growth associated with pain and reluctance to eat. The consequences of ECC thus can reach well beyond the dental problem and negatively influence the general health and development of the child.

Functional status – chewing difficulty, malocclusion and restriction of communication due to poor speech, loss of space for succeeding teeth.

Psychological functioning – aesthetic dissatisfaction resulting in compromising a young child’s smile, low self-esteem, intellectual limitation and handicap.

Learning difficulties – as a consequence of physical and psychological symptoms.

Social functioning – The dental pain and necessary treatment can have adverse effects on the developing psyche of a young child and cause fear and aversion towards future dental treatment (Graves et al., 2004).


1.5.2 Risk factors for future dental caries

Caries on the primary maxillary anterior incisors is associated with the increased incidence of caries on posterior primary teeth (O’Sullivan, Tinanoff, 1993; al – Shalan et al., 1997) and in the permanent dentition (Li, Wang, 2001). The earlier the caries develops, the greater the risk for development of further caries in the future (Yonezu, Machida, 1998).

In general children experiencing caries as infants or toddlers have a much greater probability of subsequent caries in both primary and permanent dentition (Horowitz, 1998; Peretz et al., 2003).

1.5.3 Adverse effect of hospitalisation

If hospitalisation is required to treat the child, that also has negative consequences. Hospitalisation traumatises both the child and the child’s family. The adverse effect of hospitalisation on a child can be psychological trauma, drug reactions, medical errors and nosocomial infections (Flores, 2005).

In 2002–03 the hospital admission for dental extractions or restorations of teeth was a leading cause of hospital separations of children in age groups <1 and 1-4 year olds in Australia, and it represented in total of 8,457 children, hospitalised in public and private hospitals. The percentage of hospitalised children increased in the age group of 5–14 year olds to 16,226 per year (AIHW, 2004).

1.5.4 Cost of treatment

The cost of treatment of ECC is high, as the treatment usually requires general anaesthesia, as children at early age are unable to cooperate during the dental procedures.

In Australia the public cost of ECC is enormous with over 8,000 1–4 year olds being hospitalised yearly for treatment under general anaesthesia, as a direct consequence of ECC, with an associated cost of $1 million (AIHW, 2000). This cost is avoidable if the prevention of the disease is addressed early.
Moreover, the treatment usually doesn’t bring the disease under control, as the treatment doesn’t change the caries-promoting feeding practices and established reservoir of M. streptococci (Graves et al., 2004).

All the above mentioned symptoms, difficulties and inconveniences which the child and child’s family experience as the consequences of S-ECC contrast with the meaning of being orally healthy, that is being able to eat, speak and socialise without discomfort or embarrassment, and without active disease in the mouth.

1.6 Aetiology of early childhood caries

ECC is characterised as an infectious and communicable disease of multifactorial character, where interaction of biological, behavioural and social variables creates the conditions for development of disease. The disease is manifested by the demineralisation of dental tissues. While aetiology of the disease is similar to the other types of caries, the onset of the disease can be different, as the young individual has biologically immature systems and organs (immune system, immature enamel).

Cariogenic microorganisms (M. streptococci), fermentable carbohydrates (sucrose), teeth (non-shedding tooth surface) and sufficient time for the interaction between the factors to occur are necessary to induce dental caries.

Other factors may contribute to a child’s susceptibility to disease, which include: the child’s genetics, genetics of the child’s parents, genetics of the infectious organism, mucosal immunity of the child, biofilms and microbial ecology, salivary flow and its pH buffering capacity (Slavkin, 1999).
1.6.1 Cariogenic microorganisms

The presence of bacteria is necessary for development of disease. Caries will not occur in the absence of bacteria, even if child is on a high carbohydrate diet (McDonald, 2004). A number of acidogenic and aciduric microorganisms are responsible for development of enamel decalcification, with mutans streptococci being the major and the most virulent microorganism.

The time of transmission of bacteria (M. streptococci) traditionally designated as the "window of infectivity" is thought to occur from 19 months to 31 months of age (Slavkin, 1999). However the transmission could occur earlier as the bacteria have been identified in predentate infants as young as 3 months, or 6 months (Wan et al., 2001; Wan et al., 2001; McDonald, 2004). There is evidence that the bacteria can be attached independently from the sucrose, which acts as a facilitator for the adherence of bacteria, interacting with the salivary proteins, which form the pellicle on tooth surfaces (Bowen et al., 1991; Schilling, Bowen, 1992). This led to the assumption that the colonisation by bacteria could occur during the first year of life, after the eruption of teeth. The earlier the colonisation occurs, the higher the risk for developing caries (Kohler et al., 1988).

The source of the cariogenic bacteria mutans streptococci usually the mother, who transmits the bacteria through saliva to an infant/child. The evidence is based on the homology of genotypes of M. streptococcus strains between mothers and their infants (Caufield et al., 1993; Li et al., 1995).

1.6.2 Tooth surface and host factors

After eruption, the enamel of the newly erupted tooth undergoes post-eruptive maturation (hardening) by incorporating ions, such as fluoride, into the enamel. In the period prior to maturation, the tooth is most susceptible to caries.

In a well-nourished population fluoride is the only nutrient that has any pre-eruptive influence on a tooth's future caries susceptibility (Welbury, 2001).
However, evidence from underdeveloped countries with poor nutrition shows that developmental defects (enamel hypoplasia) of the primary teeth are common (Davies, 1958; Sweeny et al., 1966). The prevalence of dental caries in children with enamel hypoplasia is reported to be 2.5 times higher than in children who don’t have such a defect (Davies, 1998). Enamel hypoplasia has been reported among children born pre-term (Seow, Perham, 1990).

The concentration of calcium and fluoride in the enamel surface is not stable but dynamic, influenced by the quality of the environment through use of fluoride, nutrition and oral hygiene.

1.6.3 **Substrate – fermentable carbohydrates**

While *M. streptococci* induce dental caries, the cariogenicity of these organisms is related to their ability to colonise and accumulate on the tooth surfaces in the presence of sucrose (Mattos-Graner et al., 2000). Sucrose is regarded as the most cariogenic sugar, but other dietary sugars as glucose, fructose and maltose are also involved (Welbury, 2001).

Sucrose facilitates the adherence of *M. streptococci* to the tooth surface, as the *M. streptococci* use sucrose to synthesise water-insoluble glucans (WIG). Synthesis of WIG is an important virulence factor in initial caries development as it increases *M. streptococci* adherence and accumulation in the plaque of young children (Mattos-Graner et al., 2000).

Frequent intake of meals and liquids which contain fermentable carbohydrates (milk, formula, juice, cordials, soda, soft drinks), including breast-feeding at night on demand, produce an excellent culture medium for acidogenic micro-organisms (Caufield et al., 1993; Li et al., 1995; Wan et al., 2003).

Therefore intervention needs to be initiated after the eruption of the first teeth and should target not only the child, but the mother as well, as a child’s dietary intake is significantly correlated with the dietary intake of their mother (Ismail, 1998).
1.7 Social and behavioural issues in the development of nursing caries

The biological risk factors for the development of dental disease are expressed through various social, demographic, economic and behavioural factors, such as ethnicity, family income, education, toothbrushing habits and health beliefs.

Low family income, diet, ethnicity other than Caucasian, lifestyle habits (sleeping with the bottle, sipping from the bottle) are social and behavioural variables usually associated with the presence of ECC (Hallet, 2003; Pine et al., 2004).

It is assumed that nearly 60% of prevalence of ECC in a population is contributed by only 20% of the population and that in very young children without dental history sociodemographic factors are important in the prediction of caries development (Powel, 1998).

ECC appears early as a health problem, however there is often a range of problems related to the health habits of the mother which influence the child's health before the child is born. Harmful lifestyles like alcoholism, smoking and poor nutrition are more prevalent in low-income communities, causing birth of children with lower birth weight, impaired growth and mental retardation (Pine et al., 2004). Other health problems aggravated by poverty include injuries, hospital admissions, asthma, behavioural problems, child abuse, poor nutrition and obesity. Poor housing and lack of parenting skill may also adversely affect child development.

1.8 Conceptual framework of societal influence on child's oral health.

The development of a child is usually measured with changes linked to specific chronologic ages. Even if the child's physical and cognitive development during the first years of life is exceptional, the child is totally dependent on the care of the mother (parents). Figure 1.1 highlights the interplay of factors which influence the mother's health and wellbeing and consequently the child's health. Mothers are traditionally described as facilitators of health habits in the family and generally they carry the major responsibility for parenting.
A mother’s knowledge, attitude and beliefs and subsequently her health behaviour often reflect her education and psychosocial characteristics, which include self-efficacy, proactive attitude and ability to cope with stress. Such psychosocial characteristics may include propensity to deal with dental anxiety. Other socio-economic conditions as employment, income, housing and social support affect the mother’s health and thus the dependent child’s life chances as well.

A mother’s access to dental care, especially before or during pregnancy, and her dental care habits influence not only her oral health, but also independently her general health and in turn directly or indirectly the child’s general and oral health. There is growing evidence of the association of periodontitis and preterm/low weight birth with its associated negative influence on child’s health through life (Lopez et al., 2002; Jeffcoat et al., 2003). There is evidence for the transmission of cariogenic bacteria M. streptococci from the mother to a child and the subsequent development of ECC. Infants and toddlers whose mothers have a high level of M. streptococci as a result of untreated caries are especially at a greater risk of acquiring microorganisms that those children whose mothers have a low level of MS (AAPD, 2004-5).

The evidence emphasises the interplay of biological and social factors on the development of disease. The social impact of the mother’s living conditions thus has a profound effect on the child’s health. Deprived socio-economic experiences in childhood may negatively influence not only physical health, but may lead to the development of unhealthy personality factors and coping strategies. Rather than blaming individual parents, poor parenting skills should be seen as a public health problem, as they may be a product of poverty and social exclusion rather than the fault of the individual parent. There is evidence that poor parenting skills have adverse effects down the generations, causing problems to individuals and society (Poole, 2003).

The consequences of poor parental skills may be seen in relation to the development of ECC. Specific communication between the mother and young child is needed as the child’s limited verbal communication and comprehension must be supplemented with the communication that occurs through the sense of touch and voice modulation rather than through the spoken word. Primarily it is the mother who is able to communicate with the child in this manner, and she must provide the child’s home dental care. The importance of
mother's role in the child's dental care continues beyond the home. While habitual dental care involves a one-to-one relationship, dental care for young children should form the paediatric dentistry triangle (McDonald, Avery, Dean, 2004), which include the dentist, mother and child.

The conceptual framework of societal influence on child's oral health (Figure 1.1) illustrates the interdependence of factors influencing the child's oral health.
Figure 1.1 The conceptual framework of societal influence on a child’s oral health.
Overview of interventional preventive programs and their significance to the current study

The multifactorial aetiology of ECC, influenced by sociodemographic characteristics, means that any intervention (preventive) program has to target more than one risk factor to produce positive results. Along with the aetiological factors of the disease, the individuals at risk of developing the disease must be identified and targeted through the program. As different risk factors could be involved in the development of ECC, different types of intervention may prove equally successful.

The interest in conducting preventive programs has increased in recent years, as can be seen from numerous published scientific papers. In general, the published programs were oriented to the suppression of growth and transmission of bacteria from mother to child (M. streptoccoci, Lactobacilli), and behavioural changes through health education, including use of fluoride.

During the formulation stage formulation of our preventive programme, two different long-term preventive programs were published, which inspired the development of the program “Cavity free children”.

- Kowash MB, Pinfield A, Smith J, Curzon MEJ. Effectiveness on oral health of a long-term health education programme for mothers with young children, published in BDJ in year 2000, (Kowash et al., 2000), and


The aim of the first program was to determine the effect of dental health education (DHE) on caries experience in infants in a low socio-economic/high caries experience area, through regular home visits by trained dental health educators over a period of 3 years.
A randomly selected cohort of 228 children was divided into subgroups. Education in subgroup A focused on diet and briefly on oral hygiene, in subgroup B on oral hygiene using fluoride toothpaste and briefly on diet, and in subgroup C on the combined education given in A + B subgroups. DHE was conducted through interviews and counselling for at least 15 minutes at home every three months for the first two years and twice a year in the third year of the study. In total 10 visits were made per household in the period of the study. In the fourth group D the education targeted diet and oral hygiene, but there was only one visit a year, in total 3 visits per household. A fifth group E (control) was established, in which participants did not receive any education, but children were examined at the age of 3 years.

In the groups of children visited regularly two developed caries and three had gingivitis (all in group A). In group E 33% of children had caries and nine (16%) had gingivitis. The differences were statistically significant (p < 0.001). Mothers in the educational groups also showed improvement in their own levels of gingivitis, debris and calculus. There were no differences (in number of children with decay or gingivitis) between the groups B, C, D.

The second program (prospective, but not randomised), focused on prevention of ECC by controlling the transmission of M. streptococci from mother to child. Eighty six pregnant women from various social backgrounds were enrolled in the program, during which they were recalled every 6 months to receive individual prophylactic care until their child reached 4 years, which consisted of oral hygiene instructions, professional tooth cleaning, topical fluoride varnish application, chlorhexidine mouth rinsing, and dietary counselling plus instructions on how to prevent the transmission of cariogenic microbes to their infants. The participants (mother-child couples) were controlled for DMF S, dmf s, proximal plaque index and the salivary level of M. streptococci. A control group was established. At 4 years of age dmft-s in the study group was 1.5, while it was 7.0 in the control group.

Most published programs focused on prevention of transmission of bacteria from mother to child. They included dietary counselling as an important strategy for decreasing the level of M. streptococci.
Brambilla et al., (1998) published “Caries prevention during pregnancy: results of a 30-months study”. The purpose of the study was to lower the level of M. streptococci through minimal intervention. The intervention was tested on pregnant women enrolled in the study at the end of the sixth month of pregnancy. The mothers in the study group rinsed daily with 0.05% sodium fluoride and 0.12% chlorhexidine until delivery. The level of M. streptococci was monitored at six and nine months of pregnancy and at 6, 12, 18 and 24 months after delivery. The children’s saliva was sampled at 12, 18 and 24 months. Statistically significant differences (p <0.01) were found between the study and control groups. The acquisition of M. streptococci was 34.4% lower in the experimental group than in the control group and the mean age when children acquired the bacteria in the experimental group was 22.5 months, compared with 18.2 months for children in the control group.

Kohler and Andreen (1994) developed a program directed towards mothers and their first child, the purpose of which was to assess the longterm influence of a preventive program on colonisation by M. streptococci. The program focused on mothers (n = 59), and consisted of dietary counselling, professional tooth cleaning and oral hygiene instruction, fluoride treatment and treatment of dental caries. The program was discontinued when the children were 3 years old. At the age of 7, the children were examined to assess the impact of the caries-preventive program. The results showed that the children of test mothers had lower salivary levels of M. streptococci (p < 0.05), and 23% of them were caries free, compared with children from the control group, where only 9% were caries-free (p <0.01).

Gomes, Weber (2001) published a paper titled “Effectiveness of a caries preventive program in pregnant women and new mothers on their offspring”. The women were enrolled in the preventive dental program (PDP) in the fourth month of pregnancy. The program later operated as a mother and child preventive program, and consisted of three parts: 1. baseline examination at enrolment, including individual prophylactic treatment, 2. an educational part, aimed at mothers and children, concerned with oral hygiene and dietary habits and the prevention of bacterial transmission, 3. preventive treatment consisting of tartar removal, fluoride prophylaxis, and the daily use of antimicrobial mouth-rinses. Education and counselling relating to oral hygiene and diet were reinforced every six months. The randomly selected control group was not involved in any preventive program. At the
clinical examination at the age of 3.5 years, 97.0% children in the PDP group were
caries-free, compared to 77.0% in the control group. The evaluation of the program
continued through examinations of children at age 5 and 6.

  prevention program in pregnant women and their children five and six years of age”.
The program consisted of three parts: mothers’ and childrens’ dental examinations,
mothers’ education related to oral hygiene and dietary habits and mothers’ preventive
treatment. Statistically significant differences (p < 0.05) were found in the prevalence
of caries between the test and control groups. In the group consisting of 5 year old
children, 87% of children in the preventive dental program (PDP) group were caries-
free compared to 50% in the control group. In the group of 6 year olds, 89% of
children in the PDP group were caries-free compared to 62% in the control group.

The other group of preventive programs focused solely on the education of parents,
without therapeutic preventive interventions involving the mothers.

caries”. The program was organised through health visitors. Randomly selected
mothers, who attended an 8–month health check for their babies, received a pack
containing a feeder cup, baby toothpaste and toothbrush, and health information
relating to dietary and oral health habits. A Chi-square test determined the
differences in habits between baseline and post-program questionnaires. In all the
behaviours that were examined, including the use of feeder cups, fluoride toothpaste,
restriction of sugary foods and drinks, use of sugar free medicine and registration
with a dentist, the differences between baseline and post program behaviours were
significant (p < 0.001).

- Cohen et al. (2001) in the article “Community - oriented oral health promotion for
infants in Jerusalem: Evaluation of a program trial”, evaluated infant bottle-feeding
practices and toothbrushing practices after the delivery of structured health
education. This education was delivered through telephone to a group of parents
whose infants were 6 to 12 months of age at baseline, and again six months later.
Parents reported a 32.5% increase in toothbrushing for infants with no intervention,
45.1% increase for infants receiving toothpaste and toothbrushes, 43.7% increase for
infants receiving only health education program and 60.4% increase for infants receiving health education together with toothpaste and toothbrushes.

Nurko et al. (2003) published the study “Infant oral health educational program” (IOHEP). Parents with children 1 to 12 months of age were enrolled in a program that was run annually once a week for 12 weeks in a period of five years. The program included dietary counselling, recognition of early enamel demineralisation, use of fluoride and oral hygiene instruction. The mean dft among children whose parents participated in study was 0.37 and for children of non-participants it was 1.23 (p < 0.04).

Several other studies have examined the combination of risk factors associated with the development of disease in children before the age of three years. Social determinants, ethnicity, fluoride exposure, dietary habits, oral hygiene factors and occurrence of M. streptococcus were all variables associated with the development of disease (Grindefjord et al., 1995).

An educational program focused on motivating parents in the prevention of childhood caries was described by Weinstein et al. (2004). This study was designed as an RCT, and reported the mean dmc scores in the experimental group after one year as 0.71, while in the control group the dmc was 2.37. The control group received limited health education (a pamphlet and an 11 minute educational video), while the experimental group received pamphlets and a 45 minute educational video, plus motivational counseling, reinforced through phone calls (6 in total).

All the aforementioned programs achieved good results in decreasing the prevalence of ECC. However they all (according to the mode they were implemented) involved a large number of staff making them costly. Limited resources and the need to reach as many people as possible in large geographical areas led to the development of this alternate program.
1.10 Overview of the current study

The study operated under two titles. To the Research Ethics Committee the study protocol was submitted under the title “Health promotion and early childhood caries”. To the mothers the study was presented under the title “Cavity free children”.

The study was conducted in the form of anticipatory guidance (Nowak et al., 1995; Nowak, 1997; Behrman et al., 2000), which is defined as a proactive, developmentally based counselling technique that focuses on the needs of a child at particular stage of life. The program was aimed at nulliparous women, as it was assumed that due to their inexperience with child upbringing they would be the most receptive to the program. (The term nulliparous women refers to women who had no previous pregnancies resulting in a live birth.)

It was hypothesised that information on prevention of early childhood caries, delivered when the need for such an information arises, would help new mothers to adopt healthy oral care habits for their child, preventing the need to change deleterious habits at a later stage.

According to numerous literature sources mothers are regarded as the “key figures” in their child’s dental health as they are usually the principal carers and gatekeepers between the family and outside world (Humphris, 2000). From a developmental perspective, the maternal (parental) influence remains important throughout childhood, even if societal influence increases as the child ages (Lockyear, 2004).

Failure to adequately educate mothers at an early stage can lead to subsequent dental problems in children (Sanchez, Childers, 2000). It is also believed that good oral habits introduced to the child during the primary stage of socialisation are likely to stay with it into later life (Blinkhorn et al., 2003). It was assumed that information received by the mothers would increase their confidence in childcare management.
A short interview with all expectant mothers eligible to participate in the study was carried out during the enrolment. The aim of the interview was to inform and motivate them to take part in the study. The central motive for participation emphasised the importance of healthy babies’ teeth and maintaining babies’ healthy teeth through participation in the study. A special questionnaire for mothers not willing to participate in the study was prepared, to examine the reasons for non-participation.

The core intervention consisted of three rounds of written oral health promotion material, which was provided to the mothers in test group.

"Information“ is defined as basic data set in a relevant context. Information provides something that is understandable and has the potential to become knowledge when it is viewed critically and added to what we already know. Information reduces the recipient’s uncertainty (The Sheridan Libraries).

The expectant mothers received the first round of information material at the time of their enrolment in the study. The material covered these topics: a) Why are baby teeth important, b) Oral health in pregnancy, c) More about oral hygiene, d) Healthy eating during pregnancy (based on the Australian Guide to Healthy Eating), e) Sleeping habits, f) Dummies. Existing additional leaflets were included in the package of information on “Breastfeeding” and “Food for the first 12 months” based on the NHMRC “Dietary Guidelines for Children and Adolescents”, produced by the Anti-Cancer Foundation, South Australia. These leaflets were prepared by of health professionals specialising in paediatric care in South Australia. They detailed the dietary factors relevant for the prevention of early childhood caries. All mothers enrolled in the test group obtained a bottle of antiseptic mouth-rinse “Savacol”.

The second round of information was sent to mothers at their home address, once the infant reached 6 months of age. In this round of information the following topics were discussed: a) Teething, b) Sleep problems, c) Tooth anatomy, d) Acquisition of bacteria, e) Nutrition, f) Oral hygiene, g) Self care for parents. Two leaflets were also included. The first “Spot the differences”, described the development of early childhood caries with the help of four colour photos. Another leaflet, designed in the shape of the mouth, allowed the upper lip to be lifted. This was to inform mothers about areas on teeth where tooth decay usually starts, and to draw their attention to monitoring these areas when they are cleaning their child’s
teeth. The finger toothbrush for infants was added to the packages, as well the existing leaflet “Food for toddlers”.

The third round of information was again mailed to the mother’s home addresses when the child reached its first birthday. This package included the following information: a) Baby’s development, b) Nutrition for toddlers, c) Child’s oral hygiene, d) More about fluoride, e) The role of bacteria, f) Sleeping habits, g) When injury occurs. A toothbrush for mothers was added to the package. After the infants’ delivery, the medical records were checked for the outcome of the pregnancy. Mothers whose pregnancies were terminated after their enrolment in the study through miscarriage or intrauterine death; or whose child was born with malformation of the oro-facial area, were excluded from the study.

The test group mothers of healthy infants were then randomised, using random numbers, into test group A and test group B. Mothers in test group A were contacted via telephone in the period between 6 –12 months post-natally. A structured interview, the purpose of which was to reinforce the information they received in the form of written material was conducted with mothers in test group A. The topics of the interview reflected the material that was received in the first and second round of information. Emphasis was on oral hygiene as well as the eating and sleeping habits of the infants. There was no contact with mothers in the control group between the time of enrolment and the examinations.

To motivate mothers to increase their interest in oral hygiene, especially concerning of the transmission of cariogenic bacteria to their child, some written information targeted mothers’ personal oral health habits.

During the enrolment process, all mothers received the contact phone number as well as the names of researchers in case they needed to clarify any information. An additional toll free telephone number (1800 333 370) was established later for mothers in the test group, in case of concerns about their baby’s oral health.

All children were examined at the age of 18+ months by the dentist, to establish the incidence of early childhood caries in the test and control groups, and thus assess the efficacy of the intervention. For all children involved in this study the dental visit was their first visit to the dentist.
The program and dental examinations were free; however there was no payment for participation or reimbursement of travel costs.

The city of Adelaide has adjusted fluoride level in the water supply from 1971 to a level of 0.9 ppm (DPERU, 1997).

1.11 Hypothesis

The null hypothesis stated that the planned intervention will not have an impact on test group, and that there will not be differences between the test and control groups. By convention we established the rejection of the null hypothesis at a probability $p < 0.05$. The alternative hypothesis stated that the intervention led to significant differences between the test and control groups.

1.12 Rationale for the study

As the parenting style can influence the child for the rest of its life, parenting is the most important role many people perform with the least preparation, education and support. This may have far-reaching consequences for the individual and for society (Poole, 2003). Empowerment of new mothers with information which allows them to establish for their infant / child proper oral hygiene habits, diet and feeding practices early in the life and thus to give them the opportunity for disease free life, underlined the rationale of the study.

1.13 Purpose of the study

The purpose of the study was to test the efficacy of an oral health promotion program targeting nulliparous women to reduce ECC at 18 months of age, which if successful, could be implemented in the wider population.

1.14 Aims of the study

The study was aimed at the prevention of ECC among infants.

The primary aims were:
HEALTH PROMOTION AND EARLY CHILDHOOD CARIES

- to test the efficacy of the health promotion program, which if successful would result in decreased incidence of early childhood caries among children in the test group;
- to gain knowledge about the incidence of decay in a population of 18 month old children, as these data are not routinely collected in the child dental surveys;

The secondary aim was:
- to collect additional information about oral status and general health of nulliparous women.
1.15 References to Chapter 1


DPERU (Dental Practice Education Unit) The University of Adelaide, Fluoride information sheet No.4; 1997.


The Sheridan Libraries of the Johns Hopkins University.  

Virtual American Biographies. Abraham Jacobi;  
http://www.famousamericans.net/abrahamjacobi


Chapter 2. Methods

Several methods and techniques were used to design the research, to collect and analyse data. This chapter outlines these methods in chronological order as they were used in the study.

The design of the study, including the ethical consideration, recruitment of the subjects, calculation of the sample size and pilot testing are described in this section, followed by a description of methods through which the intervention was applied. Data were collected through four questionnaires, medical history, and clinical examinations. Some sections of the questionnaires used in the study were standardised, some were developed for the purpose of this study. Appropriate statistical methods were used to describe the finding of the study.

2.1 Research design: Randomised Controlled Trial

A randomised controlled trial (RCT) was selected as the research method for the intervention study. An RCT is defined as a formally planned, prospective study in human beings that compares the effect and value of an intervention, with that achieved by a control treatment (or no treatment) (Stamm, 2004). An RCT is traditionally referred as the "gold standard" in research studies for the strongest design for evaluating the intervention.

In health care the RCT can be either explanatory or pragmatic. The differences are methodological. Explanatory RCTs measure the efficacy of the intervention, which is characterised with high internal validity (increased through randomisation of subjects and baseline data collection before randomisation) at the expense of generalisability of results. It measures benefits of the intervention in an ideal situation.

Pragmatic RCTs (or community trials) measure the effectiveness of a trial and the degree of benefit gained in real clinical practice. Pragmatic RCTs focus on external validity of the study (few exclusion criteria, flexibility in interpretation of results). A balance between external validity (generalisability of the results) and internal validity (reliability of results) needs to be achieved (Godwin et al., 2003).
Evaluation of a health promotion intervention usually involves effectiveness rather than efficacy. By testing the efficacy there must be awareness of the limitation of findings (for the group to which the intervention was targeted) (Sricker, 2000). This study was conducted as an explanatory trial.

The following RTC flow diagram (Cakir et al., 2003; Friis & Sellers, 2004) describes the particular phases of the RCT (Figure 2.1).

A. – Enrolment
B. – Baseline data collection
C. – Intervention
D. – Follow-up data collection
RCT phase:

A. Nulliparous women assessed for eligibility
   \[\xrightarrow{\text{Exclusion Refusals}}\]
   Random allocation
   \[\xrightarrow{\text{Test group}}\]
   \[\xrightarrow{\text{Test group B}}\]
   \[\xrightarrow{\text{Test group A}}\]
   Control group

B. Baseline data collection
   1st Questionnaire

C. Information round 1
   (pregnant women)
   \[\xrightarrow{\text{Medical history Exclusion}}\]
   Information round 2
   (6 months old babies)
   \[\xrightarrow{\text{Randomisation}}\]
   Test group A
   Test group B
   Telephone intervention
   (6 –12 months old babies)
   Information round 3
   (12 months old babies)
   Follow-up data collection
   2nd Questionnaire
   18 month examination

D. Follow-up data collection
   2nd Questionnaire
   18 month examination
   Follow-up data collection
   2nd Questionnaire
   18 month examination
   Follow-up data collection
   2nd Questionnaire
   18 month examination

**Figure 2.1 Flow diagram of the phases of the randomised clinical trial.**

2.1.2 Subject allocation

To include all eligible participants in the study, Zelen’s design (Zelen, 1990; Jadad, 1998; Torgerson, 1998) with double consent was chosen as the method for enrolment. In this type of design the randomisation precedes the consent, and the group allocation (test or control) is offered to the prospective participant. If the participant does not agree with the group to which they were allocated, they have the opportunity to switch to the other group (Figure 2.2).

Lack of blinding (Day et al., 2000) and potential loss of statistical power (if many participants refuse the allocated group) were the main disadvantages of the design. (The influence of this form of randomisation on the results of the study are discussed in Chapter 4 - Discussion section 4.2.3). The main advantage was that the Zelen’s randomisation removes the waiting time and the intervention could be applied immediately after the consent form was signed (Snowdon, Elbourne, 1998).

A table of random numbers (Hadley, Mitchell, 1995) was used to allocate participants to test and control groups (even numbers – test group, uneven numbers – control group).

Figure 2.2 Zelen’s design with double randomised consent.

2.1.3 Justification of the sample size

The population prevalence of the early signs of ECC among 18-month olds was estimated at 16.7% (Wyne et al., 1990). A case of ECC was defined as being when at least one of the maxillary primary central incisors had either labial caries or demineralisation.
In order to detect a 50% difference between the test and control group with a two-sided significance test, a 5% critical level and power of 80%, a sample of 250 children was required in each group at the 18-months follow up examination.

In order to achieve these final group sizes, it was anticipated that 590 mothers would need to participate and 983 would need to be approached to participate. Positive response to participation was expected to be 60% and 15% of participants were expected to be lost to the study across the 18 months of follow up.

2.1.4 Hospitals selection

As the target group for enrolment into the study was nulliparous women, the number of deliveries by nulliparous women in Adelaide’s teaching hospitals was examined. According to data published by the “Pregnancy Outcome Statistic Unit” (Chan et al., 1999), 31.0% of all women giving birth in these hospitals were nulliparous women. Based on these data, it was planned that the enrolment of 590 women expecting their first child would be completed in a period of three months.

The Adelaide teaching hospitals participating in the study included:

1. Women’s & Children’s Hospital (WCH)
2. Flinders Medical Centre (FMC)
3. Lyell McEwin Health Service (LMcEHS)
4. The Queen Elizabeth Hospital (TQEH)
5. Modbury Hospital (MoH)

2.2 Ethical considerations

The Research Ethics Committees (REC) from University of Adelaide and 4 hospitals approved the project. The TQEH and LMcEH hospitals had one combined REC. All RECs granted approval for the project for three years. The application for ethical approval of the project stated details of the selection of participants for the study, including the inclusion and exclusion criteria for the subjects.
Exclusion criteria were applied to women with high-risk pregnancies (if this condition was known at the enrolment), multiple pregnancies, children born with congenital abnormalities in the oro-facial area (as they need a more aggressive approach to the prevention of oral disease to optimise the clinical outcome), other serious developmental defects, and stillborn infants. Improperly completed questionnaires and the mother's inability to comprehend written text in English were the other exclusion criteria, as the interventional program was based on written material in English only.

The inclusion criteria for participation were the completion of two main questionnaires and the dental examination at the age of 18 months.

The recruitment to and enrolment in the study took place in the waiting rooms of antenatal clinics of the 5 hospitals. An extra approval to accommodate the study in this environment was required from the director of the Department of Obstetrics and Gynaecology and from the midwife in charge in each particular hospital. Before the prospective participants signed the consent form, they had the opportunity to read the information sheet (Appendix A1), which described the background, purpose of the study, aims and methods, including the differences between the test and control groups (Stuijvenberg et al., 1998; McIntosh et al., 2000).

Each consent form (Appendix A2) signed by the participant enclosed the declaration that the participant was over the age of 18 years, as persons under age of 18 are legally considered to be children in most jurisdictions. However in NSW and SA the age for making medical decisions is 14 and 16 respectively (NHMRC, 2001).

The option to withdraw from the study at any stage was given to the participants. Similarly, the researcher retained the right to exclude any participant from the study at any time. Special attention was given to the child's safety during the dental examination. The risks associated with the examination of the children were no greater than the risks associated with a routine dental examination.
2.2.1 Privacy protection

Personal and health information are categorised as “sensitive information” for the purposes of privacy legislation. This means that patient consent is generally sought to collect health information. The storage and use of personal information must be undertaken in a secure manner that protects patient privacy (AMA, NPPs, 2001).

During the enrolment each participant received a specific ID number under which all subsequent data and information were collected and maintained. To maintain the confidentiality of the information obtained through questionnaires, the pages containing the participants’ personal details were separated and stored independently from the remaining parts of questionnaires in a secure filing cabinet. Personal and health related data entered into the database were de-identified and protected by a password.

2.3 Pilot testing

It is highly recommended that a mini version of a study, the so called “the pilot study”, be conducted prior to the final version. The purpose of this is to assess the feasibility and competence of the study, to test the research instruments and thus increase the probability of success (Hardly, Mitchell, 1995; Van Teijlinen, 2001).

In this case two “key instruments”, the questionnaires, were tested. There were two stages in their development. First, they were presented for assessment at the departmental seminar. Then, after the adjustments, the revised version of the questionnaires was tested in the hospital setting.

The volunteers who completed the “experimental” (the pilot) questionnaires were aware of their purpose. They were asked to assess the questionnaires critically for their readability, the adequacy of topics covered and the length of the questionnaires.
The testing of the first questionnaire took place under field conditions, as the actual questionnaires were planned to be completed in the waiting rooms of antenatal clinics. Twelve women expecting their first child completed and assessed the first questionnaire. Eight mothers of 18 – 24 month old children completed and assessed the second questionnaire during their visit to a paediatric clinic. Some changes to the questionnaires were implemented after the mothers' comments. None of the mothers participating in the testing of the questionnaires were included in the study.

2.4  Methods of health promotion intervention

The intervention is defined as the activity or experience to which those in the targeted population are exposed or in which they will take part. The term intervention describes all activities that occur between two measurement points.

In 1987 a set of criteria that serve as guidelines for establishing the feasibility and appropriateness of health education and promotion programs were developed by the American Public Health Association (APHA). A health promotion program should address one or more risk factors that are defined, measurable, modifiable and prevalent in the targeted groups. Interventions that include several activities are more likely to have an effect on the targeted population than those that consist of only a single activity (McKenzie, Smelzer, 1997).

The intervention in this study consisted of three rounds of written material, tailored to the developmental stage of the child and phone calls to half of the mothers in the test group. The content of the material is described in section 1.10. The written information presented current knowledge about the prevention of early childhood caries. It was based on the literature from various scientific fields. The information was taken and adapted from textbooks and journals from dentistry, obstetrics, paediatrics, psychology and valid Australian guidelines, e.g. The Australian Guide to Healthy Eating. Emphasis was placed on consistency and readability of material, its presentation, usefulness, and credibility. An attempt was made to prepare enjoyable reading.
The large geographical area from where the sample was drawn and consequently the large distances between the subjects' places of residence, necessitated that the information be mailed to the mothers and follow up phone calls made. This presented a more feasible strategy for the implementation of health information than the original proposal of home visits. The distances between the subjects' places of residence also reduced the possibility of contamination of test and control groups through the passing of information between subjects.

2.4.1 Mailed written health information

Mailing the health information presented several advantages.
First the information can be mailed according to the particular stage of child development (general developmental schemes), hence the mother receives the information at the most useful and relevant time.

Second there is evidence that society puts excessive pressure on women to adapt to the role of motherhood with ease, and that women fear asking for parenting advice or assistance, as it will be viewed as a sign of weakness (Renkert, Nutbeam 2001). Following this assumption we expected that the information would be well received as the privacy of the mothers was maintained.

This assumption is supported by the research finding of Newman (2004), which was conducted at the University of Adelaide and thus refers to the same population which was targeted through the intervention. According to this study lack of babycare knowledge and "intensive" parenting in the first 12 months after birth causes coping difficulties for mothers, particularly in the transition to parenthood for the first time. There is a missing link in Western culture in the chain by which the childcare experience is passed down. The crucial issue is to know how to handle a baby’s sleeping, feeding and crying. Inadequate handling of these problems can be directly linked to dental problems.

Third, the information is delivered without intruding on family life, and can be read by the mother (father, or other family member) at a time convenient to them. They can access the information whenever the need arises.
2.4.2 Telephone intervention

During the enrolment, prospective participants were screened for phone ownership (home, work, mobile phones), including the phone numbers of contact persons. The phone numbers were noted within the questionnaires.

The use of the telephone as an educational medium is not employed very often. It has been used in psychotherapy to provide relief from depression (Tokarski, 2004), for motivational intervention to promote mammography participation (Ludman et al., 1999; Taplin et al., 2000) and to motivate volunteers for physical activity (No autor, JAMA, 2001). A Counselling Health Line where health information and promotion services were provided over the telephone was developed in Singapore (Vijayalakshmi et al., 1999). In dentistry the brief follow-up telephone calls were used to reinforce and later to maintain the changes in parents behaviour related to the oral health of their children, after motivational interviewing of parents in an “experimental group”(Weinstein et al., 2004 – 20a).

In this study the purpose of the telephone intervention was to investigate the perception of the study by the mothers, and to establish or reinforce their interest in the study. It also served to reinforce the written oral health material, which they received through mail.

2.5 Data collection

There were four methods employed to collect data:

Questionnaires

1st Questionnaire: Maternal oral health survey (Appendix A3)
2nd Questionnaire: Refusal to participate (Appendix A4)
3rd Questionnaire: Child’s oral health survey (Appendix A5)
4th Questionnaire: Evaluation of the oral health intervention (Appendix A6)

Medical history

Telephone intervention

The clinical dental examinations.
2.5.1 Questionnaires

Two "key questionnaires" were used in the study: the baseline questionnaire: the first — baseline questionnaire (Maternal oral health survey) and the follow-up questionnaire — 3rd (Child's oral health survey). There were two additional questionnaires. The 2nd questionnaire examined reasons why some prospective participants refused to participate in the study and the 4th questionnaire evaluated the oral health intervention program.

1st Questionnaire: Maternal Oral Health Survey

The baseline questionnaire focused on health habits of expectant mothers, their perception of their general and oral health as well as their psychological well-being. It used a combination of standard questionnaires e.g. Corah's dental anxiety scale, standard questions e.g. Washington home care index (Weinstein, 1985), questions validated in other settings, and questions developed for the purpose of the study. The questionnaire contained 90 focal items in total.

Response formats

While standard questions employed in the study used a standard response format, the responses to the "others" items were written to reflect all possible answers. As such, the answer option varied for each particular item from eight possible responses (e.g. what has shaped attitude towards health) to two (e.g. did you use dental floss last week?).

1st Questionnaire themes

Health information (11 items)

To exercise a degree of control in their decision making over health care issues, an individual needs to have the necessary information. The health information questions examined the sources of this information, which helped to form each mother's attitude towards health during their formative years as well as the current sources of health information.

A combination of long-established questions (e.g. Washington home care index - 5 items), questions adapted to determining children oral health and questions relating to the
influence of modern technology as a source of health information, were used in this section. A total of 11 questions examined this topic. The answer options ranged from 2 to 8 possible responses.

Care habits (10 items)
Established health promoting habits are fundamental in preserving oral health. An individual has to be willing to adopt certain patterns of behaviour in order to prevent health problems, including caries. Oral health behaviour of parents (mothers) could have direct or indirect influence on children oral health behaviour (Okada et al., 2002). Again, a combination of established questions (Washington home care habits – 4 items) and other questions relating to daily routine were used to study this issue. Answer options varied from two to six possible responses.

Nutrition (23 items)
Nutrition plays a vital role in the health and well-being of all people. Maternal nutrition is critical during pregnancy. Nutritional inadequacies at this time can lead to developmental problems of the child, as well as a low birth weight with possible health problems later in life. The mother’s dietary pattern during the pregnancy was examined in this section of the questionnaire. The leading source of information from which the questions were formulated was The Australian Guide to Healthy Eating (1998). The questions examined not only the quality and quantity of nutrients (e.g. amount of proteins, fruit, vegetables consumed), but also negative habits like the consumption of soft drinks and other sweets (biscuits, lollies, etc). There were 23 items in this part of the questionnaire (the highest number for all the sections) and the number of possible responses varied from two to eight.

Health risk behaviour (4 items)
Concern about the effect of alcohol and smoking during pregnancy on the unborn child is not a recent phenomenon. However routine data collection on smoking during the pregnancy has been collected in South Australia only since 1998 through a supplementary birth record, and data relating to alcohol consumption is not collected at all (Chan et al., 1998). In the baseline questionnaire two items were related to smoking and two to the use of alcohol. I was aware of the recall bias in alcohol consumption reports, as alcohol consumption is often underreported or is reported differently by different persons (O'Leary, 2002).
Dental problems & access to dental care (15 items)

Dentist visiting patterns including the reason for the visit, the frequency of visits, as well as reasons which limit access to dental care (eg: financial, territorial - apart from anxiety) were examined in this section of the questionnaire. It consisted of 14 items, and the responses, which varied from two to nine response options, investigated this pattern.

Anxiety (3 items)

Dental anxiety can cause a significant element of distress to a patient and affects about 5% - 20% of the population. It is the most important reason for non-attendance of the dental surgery. Predictors of dental anxiety were measured using Corah’s dental anxiety scale (four-item measure, with 5 possible response options giving rise to a single score ranging from 4 to 20). Corah’s dental anxiety scale first published in 1969, and is characterised by its high internal consistency for the limited number of items: 0.86. A score of 13 or 14 indicates a potentially anxious person, a score between 15 and 17 indicates a highly anxious person, and a score above 17 indicates a patient with dental phobia (Corah, 1978). Two additional questions supplemented Corah’s dental anxiety scale to assess the reason for non-attendance of the dental surgery. The responses were assessed on a five-point Likert scale (never, once or twice, a few times, nearly every time).

Self-reported general health (4 items)

Health surveys often include a general question on self-assessed general health (Lauridsen et al., 2004). Subjective health assessment has become a critically important component of health research (Albrecht, 1994), which some argue is as reliable as, and perhaps more reliable than, biomedical measures (Epstein, 1990).

The current perception of general health, past health problems and pregnancy issues were questioned in four items. The question “How would you rate your general health” was examined on an ordinal scale with five response categories from ”Very poor”, “Poor”, “Average”, “Good”, “Very good”, ”Excellent”. The past medical history was examined in two items with two and eight possible responses. The focus of our interest was the occurrence of depression, cardiovascular and respiratory diseases, diabetes, premenstrual tension, and pregnancy planning.
Self-reported oral health
The self-assessment of oral health through self-reported questionnaires is not an unknown phenomenon in dentistry. The validity of these questionnaires has been studied by epidemiologists, especially as an alternative to large and expensive time consuming epidemiological studies (Vered et al., 2003; Christensen, 2003; Lydon-Rochelle, 2004). It was found that self-reports provide reasonably valid estimates for the number of teeth and dental work (elements “permanently” visible in mouth), but less precise estimates for dental caries and periodontal disease.

Four questions, examining the dental condition of the maxillary and mandibular teeth, assessed the number of teeth and reasons why teeth were missing (e.g. never erupted, extracted because of crowding, decay, pain, lost through injury), the number of restoration including crowns, and an estimate of decayed teeth. To answer this question each participant was provided with a scheme (diagram) of the teeth in the maxillary and mandibular jaws. In case the participant needed to confirm their dental status, a small mirror was offered to justify their estimate. The participants had the opportunity to complete this task in the rest room, to validate their estimates. The question “How would you rate your dental health” had the same response rate as the question that examined perception of general health.

OHIP – S (1) (14 items)
“Quality of life “ (QoL) in the literature is characterised as a multidimensional construct that for the adult includes three core domains: physical symptoms (pain and fatigue), psychological functioning (affective states, adjustment indices and self-esteem), social functioning (the number, type and quality of social contacts and relationships) (Rapof, 1999; Arnold et al., 2004).

A sequel to the previous general construct is the measurement developed by Slade, Spencer (1994) “Oral Health Impact Profile” (OHIP), which measures seven - dimensions of impact (functional limitation, pain, psychological discomfort, physical, social and psychological disability and handicap) related to the oral health problems. The complete instrument has 49 items, with 5 categories of the Likert response format (very often = 4, fairly often = 3, occasionally = 2, hardly ever = 1 never = 0), which means that higher score indicates poorer oral health. The shortened version of the instrument the OHIP
known as the OHIP 14 was used in the study, with the same response format as the full version (Allen et al., 2001; Inglerhart et al., 2002; Robinson et al., 2003).

Family functioning was examined through questions related to the stress (economic, marital) and social support.

Stress (2 items) (Pearlin: economic, marital)
Pregnancy creates specific life circumstances, which can place increased strain on the coping ability of an expectant mother. The relationship with a husband or partner, and financial situation of the mother to be (indicator of socio-economic status) were examined from the view of coping. Only one standard item with six possible standard responses was directed to each matter (Pearlin, 1978).

Social support (5 items)
Social bonds and supportive interactions have been widely recognised as important factors for psychological well-being and general health. Social support may be seen as an effective buffer or mediator of life stress (Turner, 1981). The stress alleviating effect of social support was found especially among low-income pregnant women, who received lay visitors (Sheppard et al., 2004).

There is a limited literature addressing the association between social support and oral health and it is limited to its impact on older people (McGrath et al., 2002) and adolescents (Ostberg et al., 2002). Social support is seen as an important factor influencing dental treatment among older people and adolescents. There was no information in the literature about the association between social support and oral health in pregnancy.

Five questions, each with Likert response format (strongly disagree = 1, disagree = 2, neither disagree or agree = 3, agree = 4, strongly agree = 5) with higher score indicate better social support have been previously used in the study of social determinants of health (Sanders, Spencer, 2003).

General perceived self-efficacy (1 item)
Prospective motherhood greatly increases the scope and diversity of coping demands. The parenting efficacy plays a key role in adaptation to parenthood.
Perceived self-efficacy (Bandura, 1977) is defined as people’s beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their life. General self-efficacy refers to a person’s coping abilities across the wide range of demanding or novel situations e.g. before and after surgery, or to assess change in quality of life (Jerusalem, Schwarzer, 1993).

A reduced 10-item version has been used in numerous research studies (for two decades), including this one. A 4-point response format (1 = Not at all true, 2 = Hardly true, 3 = Moderately true, 4 = Exactly true) made up a score with a range from 10 to 40. The internal consistency in previous research varied between Cronbach’s alpha = 0.76 and 0.91, with the majority in the high scale 0.80. The scale correlates positively with self-esteem and optimism, and negatively with anxiety, depression and physical symptoms.

Proactive attitude (1) (Schwarzer 8 items)
This is a personality characteristic, which has implications for motivation and action (Schmitz, Schwarzer, 1999). It is the belief in the rich potential for change that can be made to improve oneself and one’s environment. This includes various facets such as resourcefulness, responsibility, values, and vision. The scale is the same as for the “General perceived self-efficacy”. A correlation of \( r = 0.56 \) between general self-efficacy and proactive attitude has been found.

Demographic (11 items)
One of the elements that affect quality of health is the social difference, known as social gradient, according to which disease (incidence or prevalence) increases with the level of social deprivation. The influence of socio-economic factors on the health of an individual was examined through traditionally used demographic questions (e.g. place of birth, main language spoken at home, marital status, education, employment, income). In total 11 items addressed the social determinants of health with answers varied from two to seven responses for a particular item.

2nd Questionnaire: Refusal to participate
To investigate the reasons which influenced prospective participants to refuse their involvement in a study an 18-item questionnaire (including 7 socio-demographic
questions) was developed. Space was allowed for non-participants to express their views through further comments. The questionnaire was based on the article by Hayman et al. (2001) “Participation in research: Informed consent, motivation and influence” which examined parents’ reasons for consenting or declining to enrol their babies in a SIDS study. The other source of information was based on the work of Caldwell et al. (2003), which examined the attitude of parents who were less likely to participate in trials. The questionnaire was simple, containing responses only in yes / no format, so as not to discourage refusing participants.

3rd Questionnaire: Child’s oral health survey

A person’s practical health career starts at birth and so family attitudes and behaviours are the first influences upon an individual’s health perception - termed primary socialisation (Freeman, 1999). It is generally accepted that the behaviour which is learnt during the child’s earliest years becomes deeply ingrained and resistant to change (Blinkhorn, 1981). Proper dietary practices, sleeping habits, and early establishment of good oral hygiene can have a significant impact on further development of the child.

As the study was conducted in the form of an anticipatory guideline, the items (if applicable) followed the child’s habits at 6, 12 and 18 months. To avoid asking irrelevant questions, some items were formulated as contingency questions.

Feeding practice (18 items)

Using a developmental perspective, the genetic predisposition for food preferences (the unlearned, reflexive reaction to basic tastes) include the preference for sweet and salty tastes and the rejection of sour and bitter tastes. Food preferences are learned via experience with food and eating (Birch, 1999), so parental and societal influence is of increasing importance. Recent studies on the diet of infants in the US identified the change from infancy to toddlerhood (9 -18 months) as the most critical period for developing food preferences and consequently for determining the intake of nutrients and calories (Locker, 2004).

While nutrition during the pre-eruptive stage can influence tooth development, the most important nutritional impact on caries development is the post-eruptive local effect of
dietary habits (Moynihan et al., 2004). Dental disease most often results from improper feeding practices (e.g. bottles containing fluids high in sugars at night time, frequency of sugar intake). Dietary practices were examined through 18 items at 6, 12 and 18 months of child age.

To avoid asking non-relevant questions some were applied as a contingency questions. The choice of responses in a particular question varied from two responses per question to 20 (e.g. name of formula brand from birth to 6 months) to cover all possible answers.

**Oral hygiene** (12 items)
The acquisition of bacteria M. streptococci and fermentable carbohydrates in the diet create favourable conditions for development of dental caries. In addition the teeth are most susceptible to dental carries shortly after they erupt. As M. streptococci have difficulty colonising an oral cavity already colonised by mature oral flora, to establish proper oral hygiene habits early is of crucial importance in preventing the development of dental caries (Harris, Garcia-Godoy, 2004).

Twelve items in the questionnaire examined oral hygiene practices and changes in these practices from the time when the first tooth appears in the mouth until 18 months of the child’s life. The items were usually specified for the period of time 6–12 months and over 12 months. The responses varied from two responses per item to nine responses to cover many possible answers.

**Sleeping patterns** (3 items)
With the neurological maturation of the child, the sleeping requirements, and consequently sleeping patterns, are dramatically changing during the first years of a child’s life (Nelson, Textbook of Pediatrics, 2000).

From the time the first tooth erupts in the mouth, the child’s sleeping habits will become a concern for the dentist. Even at 1 year of age, infants rarely sleep through the entire night without awakening (Burnham et al., 2002). Serious disturbance of sleep is often associated with the use of a bottle or on demand breast-feeding during the night (Shantinath et al., 1996), which could become more common as the practice of sharing one’s bed with the child becomes more prevalent.
Three items questioned sleeping arrangements of the child during the night. The items were arranged as contingency questions, as it was not expected that they would be relevant to all participants.

**Non-nutritional habits (3 items)**

Non-nutritive sucking (e.g. finger, pacifier) is considered normal for infants and young children and is associated with the requirement to satisfy their need for contact and security (AAPD, 2003). While this behaviour does not cause concern up to three years of age, we examined this habit especially due to the potential for the dummy to be sweetened. Three items examined this habit.

**Teething (3 items)**

Teething is a natural physiological process, however parents often relate tooth eruption with discomfort and health disturbances of a local and even systemic manifestation. Only 3 items examined this problem. Nevertheless up to seventeen “problems” connected with teeth eruption could be reported.

**General Health (4 items)**

The health status of the children after birth was checked through medical records. The children born with health problems included in the exclusion criteria where excluded from further participation in the study. The mothers themselves reported on the health status of the child (four items) from birth up to the dental examination. One item required a rating to be attributed to the child’s general health, with the same response options as for the mother’s general health. The characteristic health problems of infants in the first months of life were examined, including the history of hospitalisation and medication. Space was provided for any other health complications that may have occurred.

**Demographics (4 items)**

The follow-up demographic questionnaire was concerned with the socio-economic position of the child. Only four items examined this situation. Items assessed included the mother’s employment, age of the child when she started work, type of childcare currently used and the residency of the child’s father.
4th Questionnaire: Test group: Evaluation of the intervention

The purpose of this questionnaire was to assess the impact of the written oral health intervention program on the mothers. The questionnaire consisted of 21 items, of which six items were concerned with the content and usefulness of the intervention material, four with the mother's reaction to the material, two with the credibility of the material, four with the readability of the material, three with the impact of the material on mother's behaviour, and two with the evaluation of the program. The majority of responses followed a yes/no format of answer. The items that assessed the overall quality of the program were given a rating from 1 to 5 (1 represented very negative, while 5 represented very positive rating). The questionnaire included three open questions, concerned with the further improvement of the program. Space was allocated for suggestions.

2.5.2 Medical history

After the child's delivery, medical records were checked for the pregnancy outcomes, prior to making any further contact with the mother. The medical history relating to the infant's and the mother's health was collected. Information relevant to the infant's health included: Date of delivery, gestation at birth, birth weight, sex, race, live/stillborn, congenital abnormalities, Apgar score, resuscitation at delivery. Information relevant to the mother's health included: Gestation at the first visit, booking blood pressure, hospitalisation during pregnancy, onset of labour, analgesia for labour, postnatal stay days, laboratory tests.

2.5.3 Telephone intervention

The telephone intervention was conducted as a scripted interview with randomly selected mothers from the test group. At the time of the interview the infants were between the 6 and 12 months of age. After the arrangement of suitable time for an interview 18 questions examined the developing pattern of oral hygiene and eating habits of the child. Up to six attempts, at different days and time slots were made to reach the selected participant by phone.
2.5.4 The clinical dental examination

At 18+ months of age children were examined by a dentist to determine their oral health outcome. The children were all examined by a single dentist (Kamila Plutzer) who completed a training session at the Women’s and Children’s Hospital Paediatric Dental Unit in Adelaide, prior to conducting the examinations.

The dental examination took place between the 30 September 2003 and 27 July 2004. Dental clinics at four locations across Adelaide were secured for dental examinations. These locations were: Women’s and Children’s Hospital Paediatric Dental Unit, Flinders Medical Centre Dental Unit, Community Dental Clinic Salisbury and Adelaide Dental Hospital.

Mothers had an opportunity to choose the most convenient location for dental examination. An appointment was arranged through a phone call and confirmed by letter (Appendix A7). An orientation map of the hospital, or how to access the hospital was included.

The examining dentist was blinded as to which test group each child belonged to.

Procedures appropriate for young children were used during examination. The children were examined in non-threatening manner, in the “knee to knee” examination position on their mother’s lap in the clinical environment.

A new toothbrush was used to clean the surface of the tooth when plaque or debris covered the surface to confirm or to refute the diagnosis of caries. (This practice served well as a demonstration of proper tooth brushing for mothers).

Standard procedures for infection control were used during the examinations e.g gloves, the fibro-optic light with disposable mirror and disposable barrier sleeves to cover the handle during the examination. Diagnosis was based on direct vision only. No sharp instruments were used during examination.

It is important to mention that for all the examined children this dental visit was their first visit to the dentist. The lesions examined were thus genuine lesions not manipulated by previous dental treatment.
2.5.4.1 Diagnostic criteria

The study focused on the earliest manifestation of ECC. A case of early childhood caries was defined as being when one or more of anterior teeth were carious. The labial surfaces of the teeth were recorded in the field dental record form developed for this purpose (Appendix A8).

Initial non-cavitated (white spot) and cavitated lesions were recorded for all teeth by visual examination with the aid of the fibro optic light source. The lesion was diagnosed as non-cavitated, if an area of demineralisation could be visually detected (without loss of surface continuity).

The lesion was diagnosed as cavitated if a loss of continuity of the enamel was detected (Ismail, Sohn, 1999).

The lesion was further examined according to the extension of the affected labial surface by the demineralisation. Three levels of extension were recorded: affected area less than 1/3 of labial surface, area 1/3 but less than 2/3 of labial surface and area larger than 2/3 of labial surface.

The depth of the lesion was assessed on three levels, as demineralisation–no cavitation, cavitation, and gross cavitation–decay.

2.5.4.2 Recording of present caries

The record form was based on those of Backer Dirks et al. (1961) and Moller and Poulsen (1973).

Two stages of caries were distinguished: “caries white” and “caries cavity”. Tooth surfaces were scored as sound - normal (code 0), non-cavitated (code 1) and cavitated lesion (code 2).

2.5.4.3 Counselling

The dental examination was further viewed as an opportunity to communicate and discuss the problems related to dental care with mother and thus to individualise the child’s dental care, so that the child will receive the proper dental care despite the differences in the lifestyle of a particular family.
The technique of brushing a child's teeth was demonstrated during the visit, and tactics to help motivate the child towards tooth brushing were discussed. This was also an opportunity to show to mothers the areas of teeth where tooth caries usually starts and to which they have pay attention, while brushing the child's teeth. This information was later reinforced with the help of a large poster containing four photos demonstrating the caries prone areas and stages of development of caries.

Attention was given to the child's eating habits, as the presence of the child at the clinic gave an opportunity to assess the quality of the food - snacks and drinks with which the mothers usually equipped the child for the trip to the dentist. The quality and the frequency of food intake were discussed with the mother, especially eating and drinking during the night.

Other oral health related problems brought up by the mothers were discussed, as were the non-nutritional habits, medications, some diets prescribed by paediatricians, and so on. The counselling took between 15 – 30 minutes, according to the problems which arose during the discussion.

2.6 Criteria for age calculation

The following universal rules have been adopted to calculate the age of participants.
The age of each mother was recorded at the birth of the child (method used in Obstetrics).
The age of each child at the dental examination was calculated in full months reached by a child at time of examination.
The term “baby” or “infant” was used for a child from birth to one year of life. After the first birthday the term “child” was used.

2.7 Data management

During enrolment each participant received a specific ID number under which all subsequent data were collected e.g. data obtained from the first questionnaire, through medical records, from the third and fourth questionnaires, and data from dental examinations.
Variables obtained through questionnaires were coded and entered into Excel spreadsheets and then analysed using the Statistical Package for Social Sciences (SPSS for Windows, Version 11.0). The information obtained through medical records and dental examinations recorded in field dental records were managed in the same manner as the information from the questionnaires. The same person entered all data into the spreadsheets.

Universal rules were developed for each question, where more options were possible, e.g. mother's, child's age, or when the response to some categories e.g. "other" was not specified by the responded.

### 2.8 Data analysis

The primary focus of the study was to measure the differences between the incidence of the ECC in the test and control groups. In the study the S-ECC was identified as the dependent variable.

Statistical methods used for data analysis varied according to the purpose of the analysis. To describe the distribution (means, standard deviation, percentages) of the independent variables in the sample, univariate analyses were used.

Bivariate analyses were used to analyse the probability of occurrence of S-ECC in relation to each independent variable. The test for measurement of statistical significance was chosen according to the character of the variables. Pearson’s chi-square test was used to analyse categorical data, and One-Way Analysis of Variance (ANOVA) was used to analyse continuous data. Yates’ correction of Pearson’s chi-square was used when the cell frequency was less than five in a 2 by 2 table.

A P-value of less than 0.05 was considered significant.

Multivariate analysis, including a dependent variable and several independent variables, was used to adjust the influence of confounding variables. By entering variables (significant and non-significant from this study) for development of S-ECC in binary logistic regression, a predictive model for incidence of early childhood caries was developed.
2.9 Missing values

Missing data can seriously affect results of the study, if ignored or excluded. The variables were examined for missing data using the SPSS missing value analysis.

2.10 Sponsorship

Opportunities for sponsorship of the program were investigated immediately after the formulation of the project. Three organisations were involved in the support of the project.

1. Channel 7 Children’s Research Foundation of SA Inc. contributed to the program with an amount of $14,500 paid in two instalments in years 2001/02 and 2002/03. The money was used for printing of questionnaires, health promotion materials, postage, participation incentives, and telephone contact with the mothers.

2. Colgate Oral Care contributed to the program by donating Savacol chlorhexidine mouth rinse, which mothers in the test group received during enrolment.

3. Further sponsorship was found during the operation of the program, as it was found that even small incentives related to the aim of the intervention were welcomed by the mothers. Up to 17 organisations in Adelaide and interstate were contacted through sponsorship letters, with one positive response from Johnson & Johnson Pacific company. The organisation donated children’s toothbrushes, which were used not only as a gift for a child, but significantly helped during the dental examination by demonstrating the proper cleaning of the teeth to mothers, and prepared teeth for examination.
2.11 References to Chapter 2


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2. METHODS
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66
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Chapter 3. Results

3.1 Overview of presentation of results

The results of an RCT are presented in 12 separate sections, each of which presents analysis of particular stages of the trial.

Section 3.1 presents an overview of the results, including the flow diagram of the phases of a randomised controlled trial.

Section 3.2 presents results from the recruitment of participants to the study, including the reasons for exclusion of prospective participants from the study, reasons why some participants refused to participate in the study, and the allocation of participants to test and control groups.

Section 3.3 compares the test and control groups at the baseline. The groups were compared according to the following demographic factors: mother’s age, country of birth, the main language spoken at home, marital status, education and income. The groups were further compared according to the mother’s self-perception of her general health, dental health, types and frequencies of her usual non-alcoholic drinks, habits related to oral health, such as frequency of tooth brushing and use of toothpaste, dental floss and mouth-rinses. Habits harmful to health, e.g. use of alcohol and smoking habits, were examined, as well as the intention of pregnancy and importance of healthy baby teeth to mothers.

Section 3.4 presents the characteristics of the sample at 18 months follow-up. The test and control groups were compared. The exclusions, losses and reasons for losses of participants were analysed according to the demographic characteristics outlined in section 3.3.

Section 3.5 compares children in the test and control groups, according to the demographic factors specified in previous sections.
Section 3.6 describes the randomisation within the test group which formed the test group A and test group B. The numbers of children examined in test A and test B and control groups are compared. The comparability of the test A and B groups was analysed according to the demographic factors used in previous sections.

In section 7 the differences between of test and control groups were examined according to the dental developmental characteristics of children (age of child at examination, time of eruption of the first tooth, time which elapsed between the eruption of the first tooth and examination).

Section 3.8 describes the frequency and extent of demineralised lesions on the labial surfaces of maxillary incisors and the distribution of demineralised lesions in the test, test A, test B and control groups.

Section 3.9 analyses the impact of the intervention on incidence of S-ECC.

The teeth of children in all groups were compared according to the presence of carious lesions on the labial surfaces of maxillary incisors. The incidence of caries was compared across the test group, test groups A and B and control group. The gestation age at birth, weight and gender of the child were other variables according to which the incidence of S-ECC was compared.

The occurrence of S-ECC was analysed against demographic factors used across the study, with addition of new variables such as employment of mother, and family structure at the time of the dental examination.

A multivariable logistic model was developed to describe the relationship between the development of S-ECC and explanatory variables.

Section 3.10 evaluates the perception of the written health promotion program by the mothers in test group.

Section 3.11 evaluates the missing values and non-responses.

Section 3.12 summarises mothers' suggestions for further improvement of the program.

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3. RESULTS
Flow diagram of the progress through the phases of a randomised controlled trial

Progress through the phases of a randomised controlled trial including the numbers of participants in the particular stage of the study is described in the flow diagram (Figure 3.1.).

The diagram clearly demonstrates the numbers and the timing of the interventions in the test group, and no contact with the participants in the control group from their enrolment until the 18 months dental examination.
Enrolment: Nulliparous women from 5 centres assessed for eligibility (n = 814)

Allocation: Randomly allocated (n=649)

Test group (n=327)
- Baseline data collection
- 1st Questionnaire
- Information Round 1 (pregnant women)
- Medical history
- Exclusion (n=6)

Control group (n=322)
- Baseline data collection
- 1st Questionnaire
- Medical history
- Exclusion (n=4)

Follow up: (n=321)
- Information Round 2 (6 months old babies)
- Randomisation

Test group A (n=165)
- Telephone intervention (6–12 month old babies)
- Information Round 3 (12 month old babies)
- Exclusion (n=6)
- Lost (n=36)

Test group B (n=156)
- Information Round 3 (12 month old babies)
- Exclusion (n=3)
- Lost (n=44)

Analysis:
- 2nd Questionnaire 18 months examination
  (n=123)

- 2nd Questionnaire 18 months examination
  (n=109)

- 2nd Questionnaire 18 months examination
  (n=209)

Figure 3.1 Flow diagram of participants through key stages of a randomized trial.

3. RESULTS
3.2 Enrolment, allocation and characteristics of subjects

3.2.1 Recruitment of subjects

Recruitment of subjects occurred in selected hospitals between 21/01/02 and 31/07/02. The recruitment of participants took longer than was expected, because after the first visit at a hospital pregnant women can choose between several models of antenatal care (e.g. various form of shared and combined care: combination of midwife, GP and specialist-obstetrician care) that are accessible outside hospitals. This reduced the availability of pregnant women at selected hospitals to less than that implied by the numbers of women giving birth at those hospitals.

At total of 814 pregnant women expecting their first child in year 2002 were approached in the waiting rooms of antenatal clinics while waiting for a routine-check up and asked to participate in the study “Cavity free children”. From the women approached, 649 women responded positively and were enrolled in the study. The response to the invitation to participate in the study represented 79.7% response rate.

3.2.2 Exclusions

Only 21 women (2.6%) did not meet the inclusion criteria and were excluded from the study. Exclusion was based on the women’s inability to comprehend written text in English, not having properly completed the questionnaire or on their unfavourable medical condition during the pregnancy.

3.2.3 Refusals

From the women approached 144 women (17.7%) refused to participate in the study. The reasons for refusing participation were examined through a special short questionnaire, which was completed by 37 non-participants. Table 1 summarises the reasons for non-participation.
The majority of non-participants reported that the reason for their non-participation was that they were too busy (80.5%), or that they perceived that participation in the study was inconvenient (71.4%). A third 33.3%, of non-participants felt that they did not have enough information about the study.

Only a small percentage (5.4%) of non-participants expressed a worry or concern about some part of the study, and only 5.4% expressed a fear that they might be criticised about their parenting skills if they were to participate.

Table 1. Reasons for refusing participation in the study (from 37 mothers who completed the non-participant questionnaire out of a total 144 mothers who refused to participate). Questions used a Yes/No format

<table>
<thead>
<tr>
<th>Reason for refusal</th>
<th>n</th>
<th>%</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not enough information about study</td>
<td>12</td>
<td>33.3</td>
<td>1</td>
</tr>
<tr>
<td>Felt that she will be controlled</td>
<td>7</td>
<td>20.0</td>
<td>2</td>
</tr>
<tr>
<td>Afraid that she will be criticised</td>
<td>3</td>
<td>8.8</td>
<td>3</td>
</tr>
<tr>
<td>Too early start with prevention</td>
<td>10</td>
<td>28.6</td>
<td>2</td>
</tr>
<tr>
<td>Felt pressured to take part in the study</td>
<td>11</td>
<td>32.4</td>
<td>3</td>
</tr>
<tr>
<td>Inconvenient</td>
<td>25</td>
<td>71.4</td>
<td>2</td>
</tr>
<tr>
<td>Understanding of the purpose of the study</td>
<td>28</td>
<td>80.0</td>
<td>2</td>
</tr>
<tr>
<td>Worried about some parts of the study</td>
<td>2</td>
<td>5.4</td>
<td>0</td>
</tr>
<tr>
<td>Too busy</td>
<td>29</td>
<td>80.5</td>
<td>1</td>
</tr>
</tbody>
</table>

To explore reasons other than those addressed in the questionnaire for non-participation in the study, an open-ended question at the end of questionnaire was added.

The negative responses to the study were characterised by the comments:
- too soon (before the birth of the child) to consider participation;
- already participated in the other medical studies;
- not interested, pre-occupied with other things;
- didn’t want to complete the personal questions about self and partner finances;
- dentist in the family;
- early return to work after the delivery;
- baby’s father refused for personal reasons;
- just because I’m young doesn’t make me inexperienced.

From 109 non-participants who did not complete the questionnaire, 42 non-participants (39%) explained their reasons for not participating in the study as currently living in the country, or planning to move to the country, interstate, or overseas after the delivery of the child.
Socio-demographic characteristics between the participants and non-participants were examined to clarify if the cause of non-participation was related to some of the socio-demographic variables.

Table 2. Characteristics of participants and nonparticipants

<table>
<thead>
<tr>
<th>Variable</th>
<th>Participants</th>
<th>Non-participants</th>
<th>Chi-square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>Missing</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>279</td>
<td>44.4</td>
<td></td>
</tr>
<tr>
<td>De facto</td>
<td>196</td>
<td>31.2</td>
<td></td>
</tr>
<tr>
<td>Separated/Never married</td>
<td>153</td>
<td>24.4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>628</td>
<td>100.0</td>
<td>21</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>13</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td>Some secondary education</td>
<td>226</td>
<td>35.8</td>
<td></td>
</tr>
<tr>
<td>Completed secondary</td>
<td>150</td>
<td>23.8</td>
<td></td>
</tr>
<tr>
<td>education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college, university</td>
<td>103</td>
<td>16.3</td>
<td></td>
</tr>
<tr>
<td>Completed tertiary education</td>
<td>139</td>
<td>22.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>631</td>
<td>100.0</td>
<td>18</td>
</tr>
<tr>
<td><strong>Employment</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>177</td>
<td>28.0</td>
<td></td>
</tr>
<tr>
<td>Part time</td>
<td>138</td>
<td>21.9</td>
<td></td>
</tr>
<tr>
<td>Not employed</td>
<td>316</td>
<td>50.1</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>630</td>
<td>100.0</td>
<td>19</td>
</tr>
<tr>
<td><strong>Student</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Full time</td>
<td>34</td>
<td>5.4</td>
<td></td>
</tr>
<tr>
<td>Part time</td>
<td>50</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>No student</td>
<td>543</td>
<td>86.6</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>627</td>
<td>100.0</td>
<td>22</td>
</tr>
<tr>
<td><strong>Health card holder</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>214</td>
<td>33.8</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>419</td>
<td>66.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>633</td>
<td>100.0</td>
<td>16</td>
</tr>
<tr>
<td><strong>Private insurance</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>113</td>
<td>17.8</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>521</td>
<td>82.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>634</td>
<td>100.0</td>
<td>15</td>
</tr>
</tbody>
</table>
Table 2 compares the participants and non-participants who completed the questionnaire according to marital status, education, employment, study, holding a health card or private insurance. The only significant difference (p< 0.05) was found with the variable employment. A higher percentage of non-participants were employed full-time. This characteristic supplemented the response of some non-participants that they were too busy to participate, or felt their participation in the study would be inconvenient (see Table 1).

3.2.4 Enrolment of subjects

Maternal age is an important risk factor for perinatal outcomes as adverse outcomes are more likely to occur in teenage and older mothers. Table 3 presents comparisons of nulliparous women enrolled in the RCT with nulliparous women who gave the birth in year 2002 in the participating teaching hospitals.

<table>
<thead>
<tr>
<th>Age group</th>
<th>All</th>
<th>%</th>
<th>In the study</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 - 19</td>
<td>544</td>
<td>15.9</td>
<td>115</td>
<td>17.8</td>
</tr>
<tr>
<td>20 - 24</td>
<td>893</td>
<td>26.2</td>
<td>184</td>
<td>28.4</td>
</tr>
<tr>
<td>25 - 29</td>
<td>1065</td>
<td>31.2</td>
<td>202</td>
<td>31.1</td>
</tr>
<tr>
<td>30 - 34</td>
<td>662</td>
<td>19.4</td>
<td>103</td>
<td>15.9</td>
</tr>
<tr>
<td>35 - 39</td>
<td>201</td>
<td>5.9</td>
<td>33</td>
<td>5.1</td>
</tr>
<tr>
<td>40 - 45</td>
<td>48</td>
<td>1.4</td>
<td>12</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>3413</td>
<td>100.0</td>
<td>649</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The 649 mothers expecting their first child who enrolled in the study represent just less than 1/5 of all nulliparous women who gave birth in 2002 in the teaching hospitals where recruitment occurred.

Teenage pregnancies represented 17.8 % of pregnancies of all women enrolled in the RCT and 15.9% of “all” women giving birth in year 2002 in the participating hospitals. The largest proportion of women enrolled was in age group 25-29 years and was nearly identical in both groups (31.1% in the RCT group and 31.2% in the “all” hospital group). The differences in other age groups were minimal, with women who gave birth in the teaching hospital being slightly older than women enrolled in the RCT.
Table 4. Comparison of the age of the women in the trial to women who gave birth in participating teaching hospitals in 2002

<table>
<thead>
<tr>
<th>Descriptive statistic</th>
<th>All</th>
<th>Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>25.9</td>
<td>25.4</td>
</tr>
<tr>
<td>Median</td>
<td>26.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Std.Deviation</td>
<td>5.7</td>
<td>5.7</td>
</tr>
<tr>
<td>Variance</td>
<td>33.0</td>
<td>32.9</td>
</tr>
<tr>
<td>Range</td>
<td>31</td>
<td>31</td>
</tr>
<tr>
<td>Minimum</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Maximum</td>
<td>45</td>
<td>45</td>
</tr>
</tbody>
</table>

According to the South Australian Health Commission in 2001, the mean age in South Australia for primigravidae was 27.0 years and in 1999 it was 27.1 years. The mean age of “all” women giving birth in 2002 was 25.9 years and for women in the RCT 25.4 years. The overall South Australian ages are a little older because these perinatal statistics combine data from both public and private hospitals. Women who opt for private hospital delivery are a little older than women giving birth in public hospitals.
3.2.5 Random allocation of participants to test and control groups

During enrolment into the study the participants were allocated to test or control groups. Zelen’s double consent procedure was used for randomisation, according to which the eligible individuals are randomised before they give consent to participate in the study. In this study only five mothers (0.8%) requested changed from the group to which they were randomly allocated. In total three mothers assigned to the control group requested to be assigned to the test group, and two mothers assigned to the test group requested to be allocated to the control group. It is possible that the high percentage of agreement with the allocated group was due to the fact that at the end of the study all children who participated in the study were to be examined by a dentist.

Table 5 describes the proportion of participants enrolled from participating hospitals and their proportion in the test and control groups.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Test group</th>
<th></th>
<th>Control group</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Lyell Mc Ewin</td>
<td>43</td>
<td>13.1</td>
<td>43</td>
<td>13.4</td>
<td>86</td>
<td>13.2</td>
</tr>
<tr>
<td>Modbury</td>
<td>10</td>
<td>3.1</td>
<td>9</td>
<td>2.8</td>
<td>19</td>
<td>2.9</td>
</tr>
<tr>
<td>Queen Elizabeth</td>
<td>22</td>
<td>6.7</td>
<td>22</td>
<td>6.8</td>
<td>44</td>
<td>6.9</td>
</tr>
<tr>
<td>Flinders Medical Centre</td>
<td>85</td>
<td>26.0</td>
<td>87</td>
<td>27.0</td>
<td>172</td>
<td>26.5</td>
</tr>
<tr>
<td>Women’s and Children’s Hospital</td>
<td>167</td>
<td>51.1</td>
<td>161</td>
<td>50.0</td>
<td>328</td>
<td>50.5</td>
</tr>
<tr>
<td>Total</td>
<td>327</td>
<td>100.0</td>
<td>322</td>
<td>100.0</td>
<td>649</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The randomisation produced two groups: a test group with a total number of 327 participants and a control group with a total number of 322 participants. The proportion of mothers enrolled from each hospital was uneven. The differences were caused by two factors: the size of maternity units and access of the researcher to particular hospitals. The proportion of enrolled mothers reflected the number of confinements in each hospital in 2002. The highest enrolment from the Women’s and Children’s Hospital (WCH) formed 51.1% of the women in the test group and 50.0% of the women in the control group. These women represented 8.9% of total confinements in WCH, which was 3700 in 2002.
Flinders Medical Centre (FMC) with a total of 2119 confinements provided 26.0% of the participants in the test group and 27.0% in the control group, and a total of 26.5% of all participants in the trial. These women represented 8.1% of all confinements in FMC. Lyell McEwin Hospital provided 13.1% of participants in the test group and 13.4% of participants in the control group, a total of 13.2% of all participants. The Queen Elizabeth Hospital (QEH) provided 6.7% of participants in the test group and 6.8% of participants in the control group, a total number of 6.9% of all participants. The proportion of enrolled women from these hospitals was lower (6.0% from LMcE hospital and 5.9% from QEH in relation to the number of total confinements). One of the reasons was that women in areas around these hospitals have higher numbers of children, which reduced the probability of encounters with women expecting their first child.

The lowest enrolment was from Modbury Hospital, which provided 3.1% of participants in the test group and 2.8% participants in the control group. This low percentage reflected the total number of confinements in this hospital, 570 confinements in 2002, and the fact that Modbury Hospital was the last hospital from where approval from the ethics committee was received.

3.3 Baseline data analysis

The baseline test and control groups were compared according to the mother’s demographic factors, the self-perception of mother’s general, dental health and according to the habits related to mother’s oral health. Lifestyle habits, which could be potentially harmful such as use of alcohol and smoking were examined, as well as the intention of pregnancies and importance of healthy baby teeth to mothers.
3. 3.1 Demographic factors

Table 6 compares mothers enrolled in the test and control groups according to age group.

Table 6. Comparison of test and control groups by age at enrolment.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Test group</th>
<th></th>
<th></th>
<th>Control group</th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 - 17</td>
<td>18</td>
<td>5.5</td>
<td>20</td>
<td>6.2</td>
<td>38</td>
<td>5.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 19</td>
<td>38</td>
<td>11.6</td>
<td>39</td>
<td>12.1</td>
<td>77</td>
<td>11.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 - 24</td>
<td>85</td>
<td>26.0</td>
<td>99</td>
<td>30.4</td>
<td>184</td>
<td>28.4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 - 29</td>
<td>108</td>
<td>33.0</td>
<td>94</td>
<td>29.2</td>
<td>202</td>
<td>31.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 - 34</td>
<td>56</td>
<td>17.1</td>
<td>47</td>
<td>14.6</td>
<td>103</td>
<td>15.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 - 39</td>
<td>19</td>
<td>5.8</td>
<td>14</td>
<td>4.3</td>
<td>33</td>
<td>5.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 - 45</td>
<td>3</td>
<td>0.9</td>
<td>9</td>
<td>2.8</td>
<td>12</td>
<td>1.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>327</td>
<td>100.0</td>
<td>322</td>
<td>100.0</td>
<td>649</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean age 25.5 (Std. Dev. 5.6) and in the control group 25.3 years (Std. Dev. 5.8), with mean age of all women enrolled in trial 25.4 (Std. Dev. 5.7).

Comparison of mean age in the test and controls groups using one-way ANOVA, with a 95% confidence interval for means, showed no significant difference between the test and control groups.
A Chi-square statistical test (with $p < 0.05$) was used to compare the distribution of women in test and control groups according to the age groups. No significant differences were found between the test and control groups.

Table 7. Comparison of test and control groups according to the country of birth

<table>
<thead>
<tr>
<th>Country</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Australia</td>
<td>264</td>
<td>82.7</td>
<td>258</td>
</tr>
<tr>
<td>Subset of Australia:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Non-Indigenous</td>
<td>253</td>
<td>95.9</td>
<td>251</td>
</tr>
<tr>
<td>- Indigenous</td>
<td>11</td>
<td>4.1</td>
<td>7</td>
</tr>
<tr>
<td>Overseas</td>
<td>55</td>
<td>17.3</td>
<td>57</td>
</tr>
<tr>
<td>Total</td>
<td>319</td>
<td>100.0</td>
<td>315</td>
</tr>
<tr>
<td>Missing</td>
<td>327</td>
<td></td>
<td>322</td>
</tr>
</tbody>
</table>

Chi-square ns; $p = 0.778$

Table 7 provides the distribution of mothers by country of birth. There are similar proportions of women born in Australia and overseas. The vast majority of women in the test group were born in Australia (82.7%), and a minority (17.3%) overseas. In the control group 81.9% of women were born in Australia and 18.1% overseas. Indigenous Australians in the test group constituted 4.1% of women and in control group 2.7% of women born in Australia. The comparison between the test and control group using the Chi-square statistical test with $p < 0.05$ showed no significant differences among the test and control groups.
The distribution of women according to the main language spoken at home is provided in Table 8. Most women in the test and control groups spoke English at home as the main language (94.4% and 93.0% respectively). Only 5.6% women in the test group and 7.0% in the control group spoke other languages than English at home. The high percentage of the use of English as the first language at home was expected, as communication in the English language was a requirement for the enrolment in the study.

The proportion of mothers in de facto relationships was similar; 31.0% of mothers in the test group and 31.4% of mothers in the control group were in de facto relationships and the proportion of separated / divorced mothers in both groups was the same with 2.2% in each group. There was a higher number of married women in the test group, 47.2%, compared to the mothers in control group, 41.7%, and there was a higher number of never married women in control group 24.7% compared to the mothers in test group, 19.6%. The number of mothers who did not state their relationship was nearly the same, 11 in the test group and 10 in the control group.

When the Chi-square statistical test with \( p<0.05 \) was used to assess the differences between the groups no significant differences were found.
Table 10. Comparison of test and control groups according to the level of education

<table>
<thead>
<tr>
<th>Education</th>
<th>Test group</th>
<th></th>
<th>Control group</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Primary school</td>
<td>8</td>
<td>2.5</td>
<td>5</td>
<td>1.6</td>
<td>13</td>
<td>2.1</td>
</tr>
<tr>
<td>Some secondary education</td>
<td>112</td>
<td>35.2</td>
<td>114</td>
<td>36.4</td>
<td>226</td>
<td>35.8</td>
</tr>
<tr>
<td>Completed secondary education</td>
<td>77</td>
<td>24.2</td>
<td>73</td>
<td>23.3</td>
<td>150</td>
<td>23.8</td>
</tr>
<tr>
<td>Some college, university</td>
<td>45</td>
<td>14.2</td>
<td>58</td>
<td>18.5</td>
<td>103</td>
<td>16.3</td>
</tr>
<tr>
<td>Completed tertiary education</td>
<td>76</td>
<td>23.9</td>
<td>63</td>
<td>20.1</td>
<td>139</td>
<td>22.0</td>
</tr>
<tr>
<td>Total</td>
<td>318</td>
<td>100.0</td>
<td>313</td>
<td>100.0</td>
<td>631</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>327</td>
<td></td>
<td>322</td>
<td></td>
<td>649</td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.458

Table 10 presents the comparison of test and control groups at baseline according to level of education. There was no significant statistical difference in education using the Chi-square test between the test and control groups.

The largest group from the enrolled mothers (35.8%) had some secondary education, with the proportion being 35.2% in the test group and 36.4% in the control group, followed by completed secondary education 24.2% in the test group and 23.3% in the control group.

Completed tertiary education had 23.9% women in the test group and 20.1% in the control group. Only 2.5% women in the test group and 1.6% women in the control group stated the completion of primary school as the highest level of education.

Table 11. Comparison of test and control groups according to the total household income

<table>
<thead>
<tr>
<th>Income (yearly)</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>$</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>up to 12,000</td>
<td>46</td>
<td>16.1</td>
<td>47</td>
</tr>
<tr>
<td>12,001 - 20,000</td>
<td>35</td>
<td>12.2</td>
<td>32</td>
</tr>
<tr>
<td>20,001 - 30,000</td>
<td>51</td>
<td>17.8</td>
<td>70</td>
</tr>
<tr>
<td>30,001 - 40,000</td>
<td>52</td>
<td>18.2</td>
<td>48</td>
</tr>
<tr>
<td>40,001 - 50,000</td>
<td>33</td>
<td>11.5</td>
<td>24</td>
</tr>
<tr>
<td>50,001 - 60,000</td>
<td>26</td>
<td>9.1</td>
<td>20</td>
</tr>
<tr>
<td>60,001 +</td>
<td>43</td>
<td>15.0</td>
<td>33</td>
</tr>
<tr>
<td>Total</td>
<td>286</td>
<td>100.0</td>
<td>274</td>
</tr>
<tr>
<td>Missing</td>
<td>41</td>
<td></td>
<td>48</td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.396

Table 11 presents the household income of women in the test and control groups. Overall, women with a household income of $20,001 to $30,000 represented the most frequent
income group 21.6%. However in the test group the most frequent income of women (18.2%) was found in the income in range of $30,000-$40,000, while in the control group the most frequent was in the range $20,001 – $30,000 (25.5%). The second most frequent income groups reversed the previous order. The income group $20,001 – $30,000 in the test group constituted 17.8% participants and in the control group the income group $30,001 - $40,000 formed 17.5% of participants. The other income groups followed the same order within both groups. The participants within the income group up to $12,000 formed the third category (test 16.1%, control 17.2% of participants), followed by income group $60,000+ (test 15.0%, control 12.0% of participants). Income category $12,001 – $20,000 formed 12.1% in the test group and 11.7% in the control group and income category $40,001 – $50,000 formed 11.5% in the test group and 8.8% in the control group. The least frequent income range group was $50,001 - $60,000, 9.1% of participants in the test group and 7.3% in the control group.

From all examined demographic characteristics the highest percentage of missing data was related to the income variable, with 41 subjects with missing data in the test group and 48 subjects with missing data in the control group.

When the groups were compared using the Chi-square test, no significant differences were found between the groups.
3.3.2 Self-assessment of health

Table 12 compares self-assessed general and oral health in the test and control groups.

Table 12. Comparison of test and control groups by the self-assessment of general / oral health

<table>
<thead>
<tr>
<th>Rating</th>
<th>Test Group (%)</th>
<th>Control Group (%)</th>
<th>Total (%)</th>
<th>Test Group (%)</th>
<th>Control Group (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>17.8</td>
<td>17.2</td>
<td>17.5</td>
<td>11.0</td>
<td>6.0</td>
<td>8.5</td>
</tr>
<tr>
<td>Very good</td>
<td>35.0</td>
<td>40.6</td>
<td>37.8</td>
<td>20.8</td>
<td>26.0</td>
<td>23.4</td>
</tr>
<tr>
<td>Good</td>
<td>33.7</td>
<td>29.4</td>
<td>31.6</td>
<td>30.3</td>
<td>31.0</td>
<td>30.7</td>
</tr>
<tr>
<td>Average</td>
<td>12.6</td>
<td>12.5</td>
<td>12.5</td>
<td>32.7</td>
<td>30.7</td>
<td>31.7</td>
</tr>
<tr>
<td>Poor</td>
<td>0.9</td>
<td>0.3</td>
<td>0.7</td>
<td>5.2</td>
<td>6.3</td>
<td>5.7</td>
</tr>
<tr>
<td>Total</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

General health, Chi square ns; p = 0.274
Oral health, Chi square ns; p = 0.198

The self-assessment of general health has the same order of frequency for responses between the test and control groups. While there were some differences in the valid percentage between the test and control groups, the most frequent reporting perception of general health was “Very good”, with 35.0% of women in the test group and 40.6% of women in the control group. The second highest perception was in category “Good”, with 33.7% of women in the test group and 29.4% in the control group. Some 17.8% of women in the test group and 17.2% of women in the control group reported the general health as “Excellent”. Only 0.7% of all women reported their general health as “Poor” with 0.9% of women in the test group and 0.3% of women in the control group. The Chi-square test found no significant differences between the test and control groups.

The self-report of oral health did not match the self-report of general health. Overall 31.7% of all women reported their oral health as “Average” and 30.7% as “Good”. In the test group the highest ranked perceptions were “Average” (32.7%) and “Good” (30.3%), while in the control group the order was reversed “Good” (31%) and “Average” (30.7%). Some 20.8% of women in the test group perceived their oral health as “Very good” while 26.0% women in the control group had this perception. Only 11.0% of women in the test group and 6.0% in the control group assessed their oral health as “Excellent” while 5.2% of
women in the test group and 6.3% of women in the control group perceived their oral health as “Poor”. When the Chi-square test was used to assess the differences between the groups no statistically significant differences were found.

3.3.3 Sources and frequencies of non-alcoholic drinks

Table 13. Comparison of test and control groups by mother’s usual source of drinking water

<table>
<thead>
<tr>
<th>Source of water</th>
<th>Test group</th>
<th></th>
<th>Control group</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Tap water</td>
<td>130</td>
<td>39.9</td>
<td>121</td>
<td>37.8</td>
<td>251</td>
<td>38.7</td>
</tr>
<tr>
<td>Filtered tap water</td>
<td>69</td>
<td>21.2</td>
<td>67</td>
<td>20.9</td>
<td>136</td>
<td>21.0</td>
</tr>
<tr>
<td>Bottled water</td>
<td>90</td>
<td>27.6</td>
<td>85</td>
<td>26.6</td>
<td>175</td>
<td>27.0</td>
</tr>
<tr>
<td>Rain water</td>
<td>31</td>
<td>9.5</td>
<td>36</td>
<td>10.9</td>
<td>66</td>
<td>10.2</td>
</tr>
<tr>
<td>Rarely drink water</td>
<td>6</td>
<td>1.8</td>
<td>12</td>
<td>3.8</td>
<td>18</td>
<td>2.8</td>
</tr>
<tr>
<td>Total</td>
<td>326</td>
<td>100.0</td>
<td>320</td>
<td>100.0</td>
<td>646</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
<td>3</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Chi square ns; \( p = 0.612 \)

Table 13 examines the sources of water which mothers usually drink. Tap water was the preferred source of water for drinking, with 39.9% mothers in the test group and 37.8% mothers in the control group, followed by bottled water with 27.6% in the test group and 26.6% in the control group. Some 21.2% of mothers in the test group and 20.9% mothers in the control group consumed filtered tap water. Rainwater was consumed by 9.5% mothers in the test group and 10.9% in the control group. Only 1.8% mothers in the test group and 3.8% mothers in the control group responded that they rarely drank water. No statistical differences were found in sources of drinking water between the mothers enrolled in the test and control groups.

3. RESULTS
Table 14. Comparison of test and control groups by mother’s frequency of drinking soft drinks

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Once or less a week</td>
<td>126</td>
<td>38.9</td>
<td>123</td>
</tr>
<tr>
<td>2 - 3 times a week</td>
<td>104</td>
<td>32.1</td>
<td>97</td>
</tr>
<tr>
<td>4 - 6 times a week</td>
<td>39</td>
<td>12.0</td>
<td>34</td>
</tr>
<tr>
<td>1 - 2 times a day</td>
<td>36</td>
<td>11.1</td>
<td>42</td>
</tr>
<tr>
<td>3 - 4 times per day</td>
<td>15</td>
<td>4.6</td>
<td>13</td>
</tr>
<tr>
<td>5 or more times per day</td>
<td>4</td>
<td>1.2</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>324</td>
<td>100.0</td>
<td>318</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>327</td>
<td></td>
<td>322</td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.685

The highest ranked frequency in consumption of soft drinks in test and control groups was “Once or less a week” with nearly identical responses, 38.9% in the test group and 38.7% in the control group, followed by the “2 – 3-times a week” with 32.1% in the test group and in 30.5% in the control group. The responses in other categories were slightly different. Some 12.0% of mothers in the test group and 10.7% of mothers in the control group consumed soft drinks “4 – 6 times a week”, while 11.1% mothers in the test group and 13.2% mothers in the control group consumed soft drink “1-2-times a day”. The higher frequency in consumption of the soft drinks of “3 – 4 times a day” was reported by 4.6% of mothers in the test group and 4.1% mothers in the control group. Only 1.2% mothers in test group and 2.8% mothers in control group drink soft drinks 5 or more times a day.

No statistically significant differences were find between the mothers in test and control groups.
3.3.4 Oral hygiene habits

Table 15. Comparison of test and control groups by mother's daily frequency of toothbrushing

<table>
<thead>
<tr>
<th>Tooth brushing</th>
<th>Test group</th>
<th></th>
<th>Control group</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Not at all</td>
<td>6</td>
<td>1.8</td>
<td>9</td>
<td>2.8</td>
<td>15</td>
<td>2.3</td>
</tr>
<tr>
<td>Once a day</td>
<td>134</td>
<td>41.2</td>
<td>133</td>
<td>41.7</td>
<td>267</td>
<td>41.5</td>
</tr>
<tr>
<td>Twice a day</td>
<td>162</td>
<td>49.8</td>
<td>154</td>
<td>48.3</td>
<td>316</td>
<td>49.1</td>
</tr>
<tr>
<td>Three times a day</td>
<td>22</td>
<td>6.8</td>
<td>20</td>
<td>6.2</td>
<td>42</td>
<td>6.5</td>
</tr>
<tr>
<td>More than three times</td>
<td>1</td>
<td>0.3</td>
<td>3</td>
<td>0.9</td>
<td>4</td>
<td>0.6</td>
</tr>
<tr>
<td>Total</td>
<td>325</td>
<td>100.0</td>
<td>319</td>
<td>100.0</td>
<td>644</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>649</td>
<td>5</td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.861

For the Chi square test, the variables “three times a day” and “more than three times” were collapsed.

The frequency of mother’s tooth brushing was similar among the mothers in test and control groups. The highest frequency of tooth brushing was “Twice a day”. In the test group 49.8% of mothers brushed their teeth “Twice a day”, while in the control group it was 48.3%, followed by the frequency “Once a day” with 41.2% of mothers in the test group and 41.7% of mothers in the control group. Some 6.8% of mothers in the test group and 6.2% mothers in the control group brushed their teeth “Three times a day”. Only 1.8% of mothers in the test group and 2.8% of mothers in the control group ticked the answer “Not at all” (brushing) and 0.3% of mothers in test group and 0.9 of mothers in the control group stated that they brushed their teeth “More than three times” a day.

No significant differences were found in frequency of tooth brushing between the test and control groups.
Table 16. Comparison of test and control groups by use of toothpaste, dental floss and mouth rinse by expectant mothers

<table>
<thead>
<tr>
<th>Product</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Toothpaste with fluoride:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>302</td>
<td>92.6</td>
<td>297</td>
</tr>
<tr>
<td>No</td>
<td>14</td>
<td>4.3</td>
<td>13</td>
</tr>
<tr>
<td>Don't know</td>
<td>10</td>
<td>3.1</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>326</td>
<td>100.0</td>
<td>320</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>327</td>
<td>100.0</td>
<td>322</td>
</tr>
<tr>
<td>Dental floss</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>103</td>
<td>31.6</td>
<td>72</td>
</tr>
<tr>
<td>No</td>
<td>223</td>
<td>68.4</td>
<td>247</td>
</tr>
<tr>
<td>Total</td>
<td>326</td>
<td>100.0</td>
<td>319</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>327</td>
<td>100.0</td>
<td>322</td>
</tr>
<tr>
<td>Mouthrinse</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>62</td>
<td>19.4</td>
<td>63</td>
</tr>
<tr>
<td>No</td>
<td>257</td>
<td>80.6</td>
<td>246</td>
</tr>
<tr>
<td>Total</td>
<td>319</td>
<td>100.0</td>
<td>309</td>
</tr>
<tr>
<td>Missing</td>
<td>8</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>327</td>
<td>100.0</td>
<td>322</td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.989 for toothpaste with fluoride
Chi square s; p = 0.010 for dental floss
Chi square ns; p = 0.765 for mouthrinse

In the use of toothpaste with fluoride there were minimal differences among the test and control groups. The vast majority 92.6% of mothers in the test group and 92.8% of mothers in the control group used toothpaste which contained fluoride, while 4.3% of mothers in the test group and 4.1% mothers in the control group used toothpaste without fluoride. The same percentage of mothers (3.1%) in both groups was unaware if the toothpaste they used contained fluoride or not. There were no statistically significant differences between the groups.

There was a statically significant difference (p< 0.01) between the test and control groups in the use of dental floss. In the test group 31.6% of mothers used dental floss and in the control group just 22.6%.
Moutrinsing as a part of oral hygiene was not used frequently. In the test group 19.4% of mothers used a mouthrinse and 20.4% of mothers in the control group. There was no statistically significant difference between the groups in the use of a mouthrinse.

3.3.5 Harmful health habits

The following table compares smoking habit between expectant mothers in the test and control groups.

Table 17. Comparison of test and control groups by self-reported smoking habits

<table>
<thead>
<tr>
<th>Are you smoking now?</th>
<th>Test group</th>
<th></th>
<th>Control group</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>74</td>
<td>22.8</td>
<td>72</td>
<td>22.5</td>
<td>146</td>
<td>22.7</td>
</tr>
<tr>
<td>No</td>
<td>234</td>
<td>72.2</td>
<td>235</td>
<td>73.4</td>
<td>469</td>
<td>72.8</td>
</tr>
<tr>
<td>Occasionally</td>
<td>16</td>
<td>4.9</td>
<td>13</td>
<td>4.1</td>
<td>29</td>
<td>4.5</td>
</tr>
<tr>
<td>Total</td>
<td>324</td>
<td>100.0</td>
<td>320</td>
<td>100.0</td>
<td>644</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>2.9</td>
<td>2</td>
<td>0.6</td>
<td>5</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.854

In the reporting of smoking during pregnancy there were minimal differences between the test and control groups. In the test group 22.8% of women smoked during pregnancy and in the control group 22.5% of women smoked during pregnancy. There was no significant difference between the test and control groups in relation to smoking habits.
Table 18 compares current use of alcoholic drinks during pregnancy among enrolled expectant mothers in the test and control groups.

Table 18. Comparison of test and control groups by self-reported use of alcohol

<table>
<thead>
<tr>
<th>Do you currently drink alcohol?</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Yes</td>
<td>40</td>
<td>12.4</td>
<td>24</td>
</tr>
<tr>
<td>No</td>
<td>283</td>
<td>87.6</td>
<td>296</td>
</tr>
<tr>
<td>Total</td>
<td>323</td>
<td>100.0</td>
<td>320</td>
</tr>
<tr>
<td>Missing</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Chi-square 4.3; df = 1 p = 0.039*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

There was a significant difference between the test and control groups in the use of alcohol in pregnancy, with Chi-square, p<0.04. Mothers in the test group reported a significantly greater use of alcohol than mothers in control group.
3.3.6. Other variables

3.3.6.1 Planned / unplanned pregnancy

Table 19 compares the frequency of planned and unplanned pregnancies between the test and control groups.

Table 19. Comparison of test and control groups by proportion of planned / unplanned pregnancies

<table>
<thead>
<tr>
<th>Pregnancy</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Planned</td>
<td>174</td>
<td>53.7</td>
<td>178</td>
</tr>
<tr>
<td>Unplanned</td>
<td>150</td>
<td>46.3</td>
<td>139</td>
</tr>
<tr>
<td>Total</td>
<td>327</td>
<td>100.0</td>
<td>317</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td>100.0</td>
<td>5</td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.533

There was no significant difference between the frequency of planned and unplanned pregnancies in the test and control groups. Pregnancy was planned in 53.7% of mothers in test the group and 56.2% in the control group.
3.3.6.2 Importance of healthy baby teeth

Table 20 compares mothers' perception of the importance of healthy baby teeth between the test and control groups.

**Table 20. Comparison of test and control groups by importance of healthy baby teeth to mothers.**

<table>
<thead>
<tr>
<th>Importance</th>
<th>Test group</th>
<th></th>
<th></th>
<th></th>
<th>Control group</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Very important</td>
<td>310</td>
<td>95.1</td>
<td>302</td>
<td>94.4</td>
<td>612</td>
<td>94.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Important</td>
<td>16</td>
<td>4.9</td>
<td>16</td>
<td>5.0</td>
<td>32</td>
<td>5.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Somewhat important</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.3</td>
<td>1</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at all important</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.3</td>
<td>1</td>
<td>0.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>326</td>
<td>100.0</td>
<td>320</td>
<td>100.0</td>
<td>646</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td></td>
<td>2</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>327</td>
<td></td>
<td>322</td>
<td></td>
<td>649</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.583

Variables “important” and “somewhat important” were collapsed for the Chi-square test.

In the test group 95.1% of women considered healthy baby teeth as “Very important”, and in the control group it was 94.4% of women. 4.9% women in the test group considered healthy baby teeth as “Important” and 5% in the control group considered healthy baby teeth as “Important”. Only two mothers in the control group mentioned the other two categories “Somewhat important” and “Not at all important”.

There was no statistically significant difference between the test and control groups.
3.4 18 months follow-up details

The personal contact information collected from the subjects during their enrolment in the study played an important role in the follow-up search for participants. During the enrolment, the home address and other available contact information were collected. If this information was unsuccessful in locating the relevant person, access to the hospital medical records allowed verification of the last address of the participant. The medical records included the home address and phone number that had been updated at the time of birth.

3.4.1 Reasons of participants' loss to follow up

In the period between the enrolment of expecting mothers to the study and the 18 months follow-up examination the number of participants enrolled in study changed. This section of the results examines the reasons behind the loss of participants to the study.

3.4.1.1 Exclusions from the study

Two rounds of exclusions had occurred in the above-mentioned period, labelled as "Exclusion 1" and "Exclusion 2". "Exclusion 1" referred to exclusion from the study after the delivery of the child. The exclusion was based on findings from medical records. The reasons for exclusion included loss of a child through miscarriage, intrauterine death, developmental defects (cleft / lip palate) and multiple pregnancies.

"Exclusion 2" was based on findings during the search for participants for the 18-month examination. The reasons for exclusion from the study were death of the child (cot death, accidental death), child in care of Child and Youth Services, mother missing, arrested or living in a Safety House, mental disorder of mother, and withdrawal of mother from the study when unreconciled differences between the mother’s feeding habits and the habits which were promoted through the study were found.

Table 21 summarises the number of participants and reasons for their exclusions from the study. In “Exclusion 1” a total of 10 mothers were excluded. There were three mothers in
the test and 3 mothers in the control group who after the enrolment to the study lost the baby through miscarriage or intrauterine death. Two mothers in the test group and one mother in the control group had a baby with cleft / lip palate. One mother was expecting twins.

In “Exclusion 2” 14 mothers were excluded. Two children in the test group and one child in the control group were lost due to cot / accidental death. One child in the test group and two children in the control group were in care of Child and Youth Services. In the test group 5 mothers lived under circumstances where we were unable to approach them, as they were missing, arrested or lived in a Safety House. Two mothers suffered from mental disorders, one was diagnosed as schizophrenic, one suffered from anorexia nervosa. One mother in the test group had her own ideas about child feeding and after the phone interview she was withdrawn from the study.

In total 24 mothers were excluded from the study, 15 from the test group and 9 from the control group. Intrauterine death and miscarriages were the main reasons for exclusion, followed by mothers’ inaccessibility. Cleft lip / palate, death of the child, and child in the care of Child and Youth Services were reported with the same percentage.

Table 21. Exclusions and reasons for exclusions

<table>
<thead>
<tr>
<th>Exclusion</th>
<th>Reason for exclusion</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
<th>% (from 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusion 1 *</td>
<td>Cleft / lip palate</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Intrauterine death, miscarriage</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>Twins</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Exclusion 2 #</td>
<td>Cot death, accidental death</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Child in care of Child and Youth services</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Mother missing, arrested, in Safety house</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td>20.8</td>
</tr>
<tr>
<td></td>
<td>Mother mental disorder</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>Withdrawn</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>15</td>
<td>9</td>
<td>24</td>
<td>100.0</td>
</tr>
</tbody>
</table>

* Exclusion 1 – after child’s birth
# Exclusion 2 – at 18 months follow-up
Table 22 explores the reasons for exclusion from the study through the analysis of mothers’ health during pregnancy, expressed by her hospitalisation.

Table 22. Exclusions and reasons for exclusions, including mothers hospitalisation during pregnancy

<table>
<thead>
<tr>
<th>Exclusion</th>
<th>Reason for exclusion</th>
<th>Test group</th>
<th>Control group</th>
<th>Total (from 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hospitalisation</td>
<td>Hospitalisation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusion 1 *</td>
<td>Cleft / lip palate</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Intrauterine death, miscarriage</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Exclusion 2 #</td>
<td>Cot death, accidental death</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Child in care of Child and Youth services</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mother missing, arrested, in Safety House</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Mother mental disorder</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Withdrawn</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Hospitalised</td>
<td></td>
<td>9</td>
<td>7</td>
<td>16</td>
</tr>
<tr>
<td>Not hospitalised</td>
<td></td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>15</td>
<td>9</td>
<td>24</td>
</tr>
</tbody>
</table>

* Exclusion 1 – after child’s birth
# Exclusion 2 – at 18 months follow up

In total 66.6% of mothers excluded from the study were hospitalised during the pregnancy, with 60.0% of mothers in the test group and 77.8% of mothers from the control group.
Table 23 examines the hospitalisation of mothers included in the study.

Table 23. Mothers included in the study and their hospitalisation during pregnancy

<table>
<thead>
<tr>
<th>Hospitalisation</th>
<th>Test group</th>
<th></th>
<th></th>
<th></th>
<th>Control group</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospitalised</td>
<td>123</td>
<td>39.9</td>
<td>120</td>
<td>39.1</td>
<td>243</td>
<td>39.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No hospitalised</td>
<td>185</td>
<td>60.1</td>
<td>187</td>
<td>60.9</td>
<td>372</td>
<td>60.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>308</td>
<td>100.0</td>
<td>307</td>
<td>100.0</td>
<td>615</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Missing</td>
<td>5</td>
<td>100.0</td>
<td>5</td>
<td>100.0</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|                   | n   |   | n   |   | n       |   |
|                   | 313 |   | 312 |   | 625      |   |

Chi square ns; $p = 0.830$

Overall 39.5% of mothers included in the study were hospitalised during pregnancy, with nearly the same proportion of hospitalised mothers in the test group (39.9%) and control group (39.1%).

The high proportion of mothers who were excluded from the study and who were hospitalised during the pregnancy 66.6% (Table 22) suggests that mother’s health problems during pregnancy contributed to their exclusion from the study.

3. RESULTS
3.4.1.2 Other reasons for the loss of participants

Table 24 describes the other reasons for the loss of participants. The other reasons were categorised into groups such “Non attendance”, “Loss”, “Moved”, “Loss to follow up”.

The category “Non attendance” described participants who were contacted and an appointment arranged, but who did not attend for the examination. Up to 6 attempts to bring the participant to the dental clinic were made, with options to choose from four locations for dental examination. Some mothers explained why they couldn’t bring the child for dental examination. The most frequent reasons were “not convenient”, “no transport”, “doesn’t drive”, “full-time work”, the second baby expected, or just being born. Some participants did not give explanation, and simply “hung -up phone”, or “appointment was arranged – the participant didn’t turn up”.

The category “Loss” described enrolled participants whom we were unable to contact, due to the disconnection of their phone, or their change of address. This reason applied not only to the participants, but to the contact persons submitted by the participant. A search for new addresses and phone numbers of participants was made through participants’ medical records in hospitals, as the hospital could have updated contact details if the participant accessed the hospital after the delivery.

The category “Moved” described participants who after the delivery moved from Adelaide to a different location and who with the help of mobile phones or contact persons could be located. However due to the distances between the new location and Adelaide they could no longer participate in the study.
Table 24 summarise all losses to the RCT in test group (separating them on losses in test subgroups A and B) and control group. Participants lost to the study due to exclusions are also included in the table. By summarising the losses through exclusions and follow up losses, the retention of participants at 18 months follow up was calculated. Overall 184 participants were lost to the study, 80 participants from the test group, (36 participants from test A and 44 participants from test B groups). From the control group 104 participants were lost.

After subtraction of participants excluded from the study (24) overall retention of the sample was 70.6%, with retention of 74.4% in the test group (test subgroup A 77.4% and subgroup B 71.2%), and retention in the control group 66.8%. The lower retention of participants in the control group can be justified by the time interval which elapsed between the enrolment to the study and examination during which no contact was made with the participants in the control group.
3.4.2 Retention of participants in test and control group according to the mothers’ demographic characteristics

To illustrate the flow of participants during the study, Table 25 describes the proportion of examined children to the proportion of children lost to the study in test and control groups according to mother’s age group. To maintain the picture of all changes in numbers of participants in the study, the numbers of enrolled and excluded women are included in the table. The last column represents retention of participants according to age group in the study. Retention is calculated as the proportion of examined children from the number of enrolled children after the exclusion.

Table 25. Retention of participants in test and control group with respect to mothers’ age groups

**Test group**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Enrolled n</th>
<th>Excluded n</th>
<th>Examined n</th>
<th>All losses n</th>
<th>Retention %</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 - 17</td>
<td>18</td>
<td>1</td>
<td>11</td>
<td>6</td>
<td>64.7</td>
</tr>
<tr>
<td>18 - 19</td>
<td>38</td>
<td>4</td>
<td>27</td>
<td>7</td>
<td>79.4</td>
</tr>
<tr>
<td>20 - 24</td>
<td>85</td>
<td>4</td>
<td>61</td>
<td>20</td>
<td>75.3</td>
</tr>
<tr>
<td>25 - 29</td>
<td>108</td>
<td>3</td>
<td>76</td>
<td>29</td>
<td>72.4</td>
</tr>
<tr>
<td>30 - 34</td>
<td>56</td>
<td>2</td>
<td>40</td>
<td>14</td>
<td>74.0</td>
</tr>
<tr>
<td>35 - 39</td>
<td>19</td>
<td>1</td>
<td>16</td>
<td>3</td>
<td>83.3</td>
</tr>
<tr>
<td>40 - 45</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
<td>66.6</td>
</tr>
<tr>
<td>Total</td>
<td>327</td>
<td>15</td>
<td>232</td>
<td>80</td>
<td>74.4</td>
</tr>
</tbody>
</table>

Chi square us; p = 0.865 (examined children versus children lost to the study)

**Control group**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Enrolled n</th>
<th>Excluded n</th>
<th>Examined n</th>
<th>All losses n</th>
<th>Retention %</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 - 17</td>
<td>20</td>
<td>0</td>
<td>9</td>
<td>11</td>
<td>45.0</td>
</tr>
<tr>
<td>18 - 19</td>
<td>39</td>
<td>2</td>
<td>19</td>
<td>18</td>
<td>51.4</td>
</tr>
<tr>
<td>20 - 24</td>
<td>99</td>
<td>4</td>
<td>68</td>
<td>27</td>
<td>71.6</td>
</tr>
<tr>
<td>25 - 29</td>
<td>94</td>
<td>2</td>
<td>60</td>
<td>32</td>
<td>65.2</td>
</tr>
<tr>
<td>30 - 34</td>
<td>47</td>
<td>0</td>
<td>39</td>
<td>8</td>
<td>82.9</td>
</tr>
<tr>
<td>35 - 39</td>
<td>14</td>
<td>0</td>
<td>7</td>
<td>7</td>
<td>50.0</td>
</tr>
<tr>
<td>40 - 45</td>
<td>9</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>87.5</td>
</tr>
<tr>
<td>Total</td>
<td>322</td>
<td>9</td>
<td>209</td>
<td>104</td>
<td>66.8</td>
</tr>
</tbody>
</table>

Chi square s; p = 0.014* (examined children versus children lost to the study)
In the test group there were no statistically significant differences between examined children and children lost to the study according to the age of the mothers. The retention of participants in the test group was 74.4%. The percentage of examined children did not vary by age of mother.

However in the control group there were statistically significant differences between examined children and children lost to the study, with \( p < 0.01 \). The retention of participants in the control group was 66.8%. The percentage of examined children in the control group varied by the age of mother, as the percentage of examined children among younger age groups of mothers tended to be lower.

The reasons for losses to the study by age group of mothers are described in Table 26.

### Table 26. Reasons for losses according to the age groups of enrolled mothers

<table>
<thead>
<tr>
<th>Age group</th>
<th>Test group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non attendance</td>
<td>Loss</td>
</tr>
<tr>
<td>14 - 17</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>18 - 19</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>20 - 24</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>25 - 29</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>30 - 34</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>35 - 39</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>40 - 45</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>33</td>
</tr>
<tr>
<td>%</td>
<td>36.2</td>
<td>41.2</td>
</tr>
</tbody>
</table>

The inability to establish contact with participants described as “Loss” was the main reason for losses in both groups. In the control group the “Loss” was responsible for half of all losses (51%) and in the test group it was 41.2%. The “Non attendance” category was nearly the same in both groups; in the test group 36.2% and in the control group 35.6%. The reason “Moved” was responsible for 22.5% of total losses in test the group and 13.5% of participants in the control group.
Table 27. Retention of participants in test and control group according to mother’s place of birth

Test group

<table>
<thead>
<tr>
<th>Born</th>
<th>Enrolled</th>
<th>Excluded</th>
<th>Examined</th>
<th>All losses</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Australia</td>
<td>264</td>
<td>14</td>
<td>182</td>
<td>80.5</td>
<td>68</td>
</tr>
<tr>
<td>Overseas</td>
<td>55</td>
<td>1</td>
<td>44</td>
<td>19.5</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>319</td>
<td>15</td>
<td>226</td>
<td>100.0</td>
<td>78</td>
</tr>
<tr>
<td>Missing</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>327</td>
<td>232</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.270

Control group

<table>
<thead>
<tr>
<th>Born</th>
<th>Enrolled</th>
<th>Excluded</th>
<th>Examined</th>
<th>All losses</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Australia</td>
<td>258</td>
<td>8</td>
<td>165</td>
<td>80.9</td>
<td>85</td>
</tr>
<tr>
<td>Overseas</td>
<td>57</td>
<td>1</td>
<td>39</td>
<td>19.1</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>315</td>
<td>9</td>
<td>204</td>
<td>100.0</td>
<td>102</td>
</tr>
<tr>
<td>Missing</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>322</td>
<td>209</td>
<td>104</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.588

Table 27 examines the retention of participants as the proportion of examined children and “All losses” to the study during the trial. There were no statistically significant differences between the test and control groups in the proportion of the examined children and “All losses” with respect to the mothers’ place of birth.

The retention of participants in the test group with respect to the mother’s place of birth was 74.3%, a little higher compared to the control group where the retention was 66.6%.
The retention of participants according to the main language spoken at home is described in Table 28.

**Table 28. Retention of participants in test and control group according to main language spoken at home**

**Test group**

<table>
<thead>
<tr>
<th>Language</th>
<th>Enrolled</th>
<th>Excluded</th>
<th>Examined</th>
<th>All losses</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>301</td>
<td>15</td>
<td>211</td>
<td>75</td>
<td>96.2</td>
</tr>
<tr>
<td>Other</td>
<td>18</td>
<td>0</td>
<td>15</td>
<td>3</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>319</td>
<td>15</td>
<td>226</td>
<td>78</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.850

**Control group**

<table>
<thead>
<tr>
<th>Language</th>
<th>Enrolled</th>
<th>Excluded</th>
<th>Examined</th>
<th>All losses</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>291</td>
<td>8</td>
<td>187</td>
<td>96</td>
<td>94.1</td>
</tr>
<tr>
<td>Other</td>
<td>22</td>
<td>1</td>
<td>15</td>
<td>6</td>
<td>5.9</td>
</tr>
<tr>
<td>Total</td>
<td>313</td>
<td>9</td>
<td>202</td>
<td>102</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.631

The ability to communicate in English was one requirement for inclusion of participants in the study. There were no statistically significant differences between the children examined and “All losses” in the test and control group according to this variable.

The retention of participants in the test group was 74.3%, while in the control group it was 66.4%. In both groups there was higher retention when the main language spoken at home was other than English.
Table 29 describes the proportion of children examined and loss to the study and their retention in the study with respect to the mothers’ marital status.

Table 29. Retention of participants in test and control group with respect to marital status

**Test group**

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Enrolled</th>
<th>Excluded</th>
<th>Examined</th>
<th>All losses</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Married</td>
<td>149</td>
<td>4</td>
<td>100</td>
<td>45</td>
<td>69.0</td>
</tr>
<tr>
<td>De facto</td>
<td>98</td>
<td>5</td>
<td>78</td>
<td>15</td>
<td>83.9</td>
</tr>
<tr>
<td>Separated / Divorced</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>25.0</td>
</tr>
<tr>
<td>Never married</td>
<td>62</td>
<td>3</td>
<td>46</td>
<td>13</td>
<td>78.0</td>
</tr>
<tr>
<td>Total</td>
<td>316</td>
<td>15</td>
<td>225</td>
<td>76</td>
<td>74.8</td>
</tr>
<tr>
<td>Missing</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>327</td>
<td>232</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square s; p = 0.02*

**Control group**

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Enrolled</th>
<th>Excluded</th>
<th>Examined</th>
<th>All losses</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>n</td>
<td>n</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Married</td>
<td>130</td>
<td>2</td>
<td>93</td>
<td>35</td>
<td>72.7</td>
</tr>
<tr>
<td>De facto</td>
<td>98</td>
<td>5</td>
<td>62</td>
<td>31</td>
<td>66.6</td>
</tr>
<tr>
<td>Separated / Divorced</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>42.9</td>
</tr>
<tr>
<td>Never married</td>
<td>77</td>
<td>2</td>
<td>44</td>
<td>31</td>
<td>58.7</td>
</tr>
<tr>
<td>Total</td>
<td>312</td>
<td>9</td>
<td>202</td>
<td>101</td>
<td>66.7</td>
</tr>
<tr>
<td>Missing</td>
<td>10</td>
<td>7</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>322</td>
<td>209</td>
<td>104</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.166

When the proportion of children examined and children lost to the study were assessed through the Chi-square statistical test, there were statistically significant differences between the examinations and “All losses” in the test group. The proportion of children lost to the study was significantly higher when the mothers were married (p<0.02). However, there were no significant differences in the control group. Women who were separated / divorced had the lowest retention rate in both test and control groups. The other forms of marital status did not follow the same pattern in the two groups. The overall retention of participants in the test group was 74.8% and in the control group 66.7%.
Table 30 describes the proportion of children examined and loss to the study and their retention in the study according to the mothers' education.

Table 30. Retention of participants in test and control group with respect to mother’s education

<table>
<thead>
<tr>
<th>Education</th>
<th>Test group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Enrolled</td>
<td>Excluded</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>n</td>
</tr>
<tr>
<td>Primary school</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Some secondary school</td>
<td>112</td>
<td>7</td>
</tr>
<tr>
<td>Completed secondary school</td>
<td>77</td>
<td>3</td>
</tr>
<tr>
<td>Some college / University</td>
<td>45</td>
<td>2</td>
</tr>
<tr>
<td>Completed University / College</td>
<td>76</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>318</td>
<td>15</td>
</tr>
<tr>
<td>Missing</td>
<td>9</td>
<td>8</td>
</tr>
</tbody>
</table>

Missing 322 232 80

Chi square ns; p = 0.159

When the retention of participants is examined as the “Examined” versus “All losses” with a Chi-square statistical test, there were no significant differences in the test group, however in the control group the differences were significant at p<0.03.

The overall retention in the test group was 74.0% and in the control group 66.4%.

As could be seen from the percentage of examined children, retention by the level of education did not follow the same pattern in the test and control groups. In the test group the lowest retention was attributed to mothers whose highest education was “Some college / university” (62.8%), in the control group it was “Some secondary school” (56.0%). The highest retention in the test group was among mothers who “Completed primary school” (83.3%) followed by the mothers who had “Some secondary education” (80.9%), and in the control group the highest retention was among mothers who “Completed university” (80.6%) and mothers with “Some college / university” (70.2%).
Table 31 describes proportion of children examined and loss to the study and their retention in the study with respect to the total household income.

Table 31. Retention of participants in test and control group with respect to the total household income

<table>
<thead>
<tr>
<th>Income (yearly)</th>
<th>Enrolled</th>
<th>Excluded</th>
<th>Examined</th>
<th>All losses</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&lt;12,000</td>
<td>46</td>
<td>3</td>
<td>34</td>
<td>17.0</td>
<td>9</td>
</tr>
<tr>
<td>12,001 - 20,000</td>
<td>35</td>
<td>2</td>
<td>27</td>
<td>13.5</td>
<td>6</td>
</tr>
<tr>
<td>20,001 - 30,000</td>
<td>51</td>
<td>4</td>
<td>35</td>
<td>17.5</td>
<td>12</td>
</tr>
<tr>
<td>30,001 - 40,000</td>
<td>52</td>
<td>1</td>
<td>35</td>
<td>17.5</td>
<td>16</td>
</tr>
<tr>
<td>40,001 - 50,000</td>
<td>33</td>
<td>2</td>
<td>23</td>
<td>11.5</td>
<td>8</td>
</tr>
<tr>
<td>50,001 - 60,000</td>
<td>26</td>
<td>2</td>
<td>18</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>60,001 +</td>
<td>43</td>
<td>1</td>
<td>28</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>286</strong></td>
<td><strong>15</strong></td>
<td><strong>200</strong></td>
<td><strong>100.0</strong></td>
<td><strong>71</strong></td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>41</td>
<td>32</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.732

Control group

<table>
<thead>
<tr>
<th>Income (yearly)</th>
<th>Enrolled</th>
<th>Excluded</th>
<th>Examined</th>
<th>All losses</th>
<th>Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>$&lt;12,000</td>
<td>47</td>
<td>3</td>
<td>23</td>
<td>13.0</td>
<td>21</td>
</tr>
<tr>
<td>12,001 - 20,000</td>
<td>32</td>
<td>1</td>
<td>19</td>
<td>10.7</td>
<td>12</td>
</tr>
<tr>
<td>20,001 - 30,000</td>
<td>70</td>
<td>2</td>
<td>47</td>
<td>26.4</td>
<td>21</td>
</tr>
<tr>
<td>30,001 - 40,000</td>
<td>48</td>
<td>2</td>
<td>31</td>
<td>17.4</td>
<td>15</td>
</tr>
<tr>
<td>40,001 - 50,000</td>
<td>24</td>
<td>1</td>
<td>18</td>
<td>10.1</td>
<td>5</td>
</tr>
<tr>
<td>50,001 - 60,000</td>
<td>20</td>
<td>0</td>
<td>14</td>
<td>7.9</td>
<td>6</td>
</tr>
<tr>
<td>60,001 +</td>
<td>33</td>
<td>0</td>
<td>26</td>
<td>14.6</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>274</strong></td>
<td><strong>9</strong></td>
<td><strong>178</strong></td>
<td><strong>100.0</strong></td>
<td><strong>87</strong></td>
</tr>
<tr>
<td><strong>Missing</strong></td>
<td>48</td>
<td>31</td>
<td>17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.169
In the test group the lowest retention (66.6\%) was in the category with the highest income ($60,000+), while in the control group the lowest retention (52.3\%) was in the lowest income category (up to $12,000). The highest retention in the test group was in the categories with the lowest income ($12,001 – 20,000 and up to $12,000) and in the control group the highest retention was in the groups with the higher incomes ($61,000+, $41,001 – 50,000, $51,000 – 60,000).

The Chi-square statistical test examining the proportion of children examined and “All losses” in the trial with respect to the family income found no significant differences between the examined participants and participants lost to the study in the test and in the control groups.
3.5 Comparability of examined children in the test and control groups

The comparability of the test and control groups was established among those children examined at the 18 month follow-up using the same demographic factors as were compared at baseline.

Table 32. Children examined in test and control groups with respect to the age of their mother

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>14 - 17</td>
<td>11</td>
<td>4.7</td>
<td>9</td>
</tr>
<tr>
<td>18 - 19</td>
<td>27</td>
<td>11.6</td>
<td>19</td>
</tr>
<tr>
<td>20 - 24</td>
<td>61</td>
<td>26.3</td>
<td>68</td>
</tr>
<tr>
<td>25 - 29</td>
<td>76</td>
<td>32.8</td>
<td>60</td>
</tr>
<tr>
<td>30 - 34</td>
<td>40</td>
<td>17.2</td>
<td>39</td>
</tr>
<tr>
<td>35 - 39</td>
<td>15</td>
<td>6.5</td>
<td>7</td>
</tr>
<tr>
<td>40 - 45</td>
<td>2</td>
<td>0.9</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100.0</td>
<td>209</td>
</tr>
<tr>
<td>Mean age</td>
<td>25.6</td>
<td></td>
<td>25.8</td>
</tr>
<tr>
<td>Std.Dev.</td>
<td>5.6</td>
<td></td>
<td>5.8</td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.610 (Age groups “35 – 39” and “40 – 45” collapsed)

There were no significant differences between the test and control groups with respect to the mother’s age group. (This is with reference to mother’s age at baseline). However mothers who brought the child for dental examination were slightly older than mothers in the test and control groups at baseline (see Table 6).
Table 33 describes the proportion of examined children in test and control groups with respect to the mothers' country of birth.

Table 33. Children examined in test and control groups with respect to the country of birth of their mother

<table>
<thead>
<tr>
<th>Country of birth</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Australia</td>
<td>182</td>
<td>80.4</td>
<td>165</td>
</tr>
<tr>
<td>Subset of Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Non-indigenous</td>
<td>174</td>
<td>96.1</td>
<td>163</td>
</tr>
<tr>
<td>- Indigenous</td>
<td>8</td>
<td>3.9</td>
<td>2</td>
</tr>
<tr>
<td>Overseas</td>
<td>44</td>
<td>19.6</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>226</td>
<td>100.0</td>
<td>204</td>
</tr>
<tr>
<td>Missing</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
</tbody>
</table>

Chi- square ns; p = 0.909

No statistically significant differences were found between the test and control groups. However when data after the examination were compared with baseline data, a higher percentage of mothers born overseas participated in dental examinations.

In the test group at baseline 17.3% of mothers were born overseas, compare to 19.6% at examination. In control group 18.1% mothers at baseline were born overseas compared to 19.1% at examination. Overall 17.7% mothers born overseas were enrolled to the study at baseline, while at examination they formed 19.3% of the sample (see Table 7).
Table 34 describes the proportion of examined children in test and control groups with respect to the main language spoken at home.

Table 34. Children examined in test and control groups with respect to the main language spoken at home

<table>
<thead>
<tr>
<th>Language</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>English</td>
<td>211</td>
<td>93.3</td>
<td>187</td>
</tr>
<tr>
<td>Other</td>
<td>15</td>
<td>6.7</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>225</td>
<td><strong>100.0</strong></td>
<td>202</td>
</tr>
<tr>
<td>Missing</td>
<td>6</td>
<td><strong>100.0</strong></td>
<td>7</td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.770

Statistically no significant difference was found between the test and control groups, with respect to the main language spoken at home. However in line with previous findings a higher percentage of mothers participating at dental examinations spoke languages other than English at home. At enrolment in the test group 5.6% of mothers spoke languages other than English at home, while at examination it was 6.7%. In the control group at enrolment it was 7.0% (see Table 8), while at examination it was 7.4%. Overall 6.3% women at baseline spoke languages other than English at home, and this group of women formed 7.0% of mothers who brought the child for dental examination.
Table 35 describes proportion of examined children in test and control groups with respect to the mothers' marital status.

Table 35. Children examined in test and control groups with respect to the marital status of their mother

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Test group</th>
<th></th>
<th>Control group</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Married</td>
<td>100</td>
<td>44.4</td>
<td>93</td>
<td>46.0</td>
<td>193</td>
<td>45.2</td>
</tr>
<tr>
<td>De facto</td>
<td>78</td>
<td>34.7</td>
<td>62</td>
<td>30.7</td>
<td>140</td>
<td>32.8</td>
</tr>
<tr>
<td>Separated / Divorced / never married</td>
<td>47</td>
<td>20.9</td>
<td>47</td>
<td>23.3</td>
<td>94</td>
<td>22.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>225</strong></td>
<td><strong>100.0</strong></td>
<td><strong>202</strong></td>
<td><strong>100.0</strong></td>
<td><strong>427</strong></td>
<td><strong>100.0</strong></td>
</tr>
<tr>
<td>Missing</td>
<td>7</td>
<td></td>
<td>7</td>
<td></td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>232</td>
<td></td>
<td>209</td>
<td></td>
<td>441</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; \( p = 0.741 \)

No statistically significant difference was found between the test and control group after examination in marital status. Compared to Table 9, which analysed the same variable at baseline the category “Separated / divorced” and “Never married” were collapsed into one category because of low numbers of participants in the category “Separated / divorced”. There was an opposite trend in the test and control groups at baseline and at the examination in the category of married mothers. While at baseline 47.2% of mothers in the test group were married and 41.7% of mothers in the control group were married (total 44.4%), at examination in the test group it was 44.4% of married women and in the control group 46.0% of women were married (total 45.2%).
Table 36 describes proportion of children examined in control and test groups with respect to the mothers' education.

Table 36. Children examined in test and control groups with respect to the mother's education

<table>
<thead>
<tr>
<th>Education</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Primary school</td>
<td>5</td>
<td>2.2</td>
<td>3</td>
</tr>
<tr>
<td>Some secondary school</td>
<td>85</td>
<td>37.9</td>
<td>61</td>
</tr>
<tr>
<td>Completed secondary school</td>
<td>52</td>
<td>23.2</td>
<td>48</td>
</tr>
<tr>
<td>Some college / University</td>
<td>27</td>
<td>12.1</td>
<td>40</td>
</tr>
<tr>
<td>Completed University /</td>
<td>55</td>
<td>24.6</td>
<td>50</td>
</tr>
<tr>
<td>College</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>224</td>
<td>100.0</td>
<td>202</td>
</tr>
<tr>
<td>Missing</td>
<td>8</td>
<td></td>
<td>7</td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.090 (between test and control groups. "Primary education" and "Some secondary education" collapsed for the purpose of Chi-square test).

There was no statistically significant difference between the test and control groups when they were analysed with respect the level of education at the follow-up examination.

Nearly the same proportions of participants were found at baseline (Table 10) and after examination.
Table 37 describes proportion of examined children in test and control groups with respect to the household income.

Table 37. Children examined in test and control groups with respect to the total household income

<table>
<thead>
<tr>
<th>Income (yearly)</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>up to 12,000</td>
<td>34</td>
<td>17.0</td>
<td>23</td>
</tr>
<tr>
<td>12,001 - 20,000</td>
<td>27</td>
<td>13.5</td>
<td>19</td>
</tr>
<tr>
<td>21,001 - 30,000</td>
<td>35</td>
<td>17.5</td>
<td>47</td>
</tr>
<tr>
<td>31,001 - 40,000</td>
<td>35</td>
<td>17.5</td>
<td>31</td>
</tr>
<tr>
<td>41,001 - 50,000</td>
<td>23</td>
<td>11.5</td>
<td>18</td>
</tr>
<tr>
<td>51,001 - 60,000</td>
<td>18</td>
<td>9.0</td>
<td>14</td>
</tr>
<tr>
<td>61,001+</td>
<td>28</td>
<td>14.0</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100.0</td>
<td>178</td>
</tr>
<tr>
<td>Missing</td>
<td>32</td>
<td></td>
<td>31</td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.518

No statistically significant difference was found between the test and control groups at the examination with respect to the yearly family income. The overall proportion of participants in the sample according to the income was similar to that at baseline (see Table 11).
3.6 Comparability of Test A and Test B groups after the randomisation of the test group

After the checking of medical records the test group was randomised into test A and test B groups. The health promotion intervention was reinforced with mothers allocated to the test A group through a phone call, which they received when their infant was between 6 – 12 months. Before assessing the impact of the phone calls on mothers in the test A group, the comparability of test A and test B groups was examined.

The groups were compared on the demographic factors which were used through the study: mother’s age group; country of birth; main language spoken at home; marital status of the mother; level of education; family income.

Chi-square tests were used to assess the comparability of the test A and test B groups. No statistically significant differences were found for all the variables analysed in this part of the study.

Table 38. Children examined in test A and B groups with respect to the age of their mother

<table>
<thead>
<tr>
<th>Age group</th>
<th>Test A group</th>
<th></th>
<th></th>
<th>Test B group</th>
<th></th>
<th></th>
<th>Test group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>14 - 17</td>
<td>6</td>
<td>4.9</td>
<td>5</td>
<td>4.6</td>
<td>11</td>
<td>4.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 19</td>
<td>18</td>
<td>14.6</td>
<td>9</td>
<td>8.3</td>
<td>27</td>
<td>11.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 - 24</td>
<td>29</td>
<td>23.6</td>
<td>32</td>
<td>29.3</td>
<td>61</td>
<td>26.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 - 29</td>
<td>38</td>
<td>30.9</td>
<td>38</td>
<td>34.9</td>
<td>76</td>
<td>32.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30 - 34</td>
<td>24</td>
<td>19.5</td>
<td>16</td>
<td>14.7</td>
<td>40</td>
<td>17.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 - 39</td>
<td>7</td>
<td>5.7</td>
<td>8</td>
<td>7.3</td>
<td>15</td>
<td>6.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40 - 45</td>
<td>1</td>
<td>0.8</td>
<td>1</td>
<td>0.9</td>
<td>2</td>
<td>0.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>123</td>
<td>100.0</td>
<td>109</td>
<td>100.0</td>
<td>232</td>
<td>100.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square ns; p = 0.659 (Age groups “35 – 39” and “40 – 45” collapse for the Chi square test).

When the involvement of mothers in the test A and test B groups was assessed according to age of participants, the teenage mothers formed 19.5% of mothers in the test group A and only 12.9% in the test group B. This created the largest differences among the age groups in the sample.
Table 39. Children examined in test A and test B groups with respect to the country of birth of their mother

<table>
<thead>
<tr>
<th>Country of birth</th>
<th>Test A group</th>
<th>Test B group</th>
<th>Test group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Australia</td>
<td>97</td>
<td>79.5</td>
<td>85</td>
</tr>
<tr>
<td>Subset of Australia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Non-Indigenous</td>
<td>93</td>
<td>76.2</td>
<td>81</td>
</tr>
<tr>
<td>- Indigenous</td>
<td>4</td>
<td>3.3</td>
<td>4</td>
</tr>
<tr>
<td>Overseas</td>
<td>25</td>
<td>20.5</td>
<td>19</td>
</tr>
<tr>
<td>Total</td>
<td>122</td>
<td>100.0</td>
<td>104</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>123</td>
<td></td>
<td>109</td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.652

There were minimal differences in the distribution of participants according to the country of birth and their Indigenous status.

Table 40. Children examined in test A and test B groups with respect to the main language spoken at home

<table>
<thead>
<tr>
<th>Language</th>
<th>Test A group</th>
<th>Test B group</th>
<th>Test group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>English</td>
<td>111</td>
<td>91.7</td>
<td>100</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>8.3</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>121</td>
<td>100.0</td>
<td>105</td>
</tr>
<tr>
<td>Missing</td>
<td>2</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>123</td>
<td></td>
<td>109</td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.300

Higher percentage of mothers in the test A group (8.3%) spoke language other than English at home than in the test B group (4.8%).

3. RESULTS
A higher percentage of mothers in test group A were married (47.1%), compared to mothers in test group B (41.3%). However, if the data were analysed by the number of parents with whom each child was living, then 79.3% of children in test group A and 78.8% of children in group B lived in families with both parents.

There were differences in the level of formal education among the mothers in test A and test B groups when expressed as percentages, but the differences were not significant.
Table 43. Children examined in test A and test B groups with respect to the total household income

<table>
<thead>
<tr>
<th>Income (yearly)</th>
<th>Test A group</th>
<th>Test B group</th>
<th>Test Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>up to 12,000</td>
<td>22</td>
<td>19.6</td>
<td>12</td>
</tr>
<tr>
<td>12,001 - 20,000</td>
<td>18</td>
<td>16.1</td>
<td>9</td>
</tr>
<tr>
<td>21,001 - 30,000</td>
<td>22</td>
<td>20.5</td>
<td>13</td>
</tr>
<tr>
<td>31,001 - 40,000</td>
<td>17</td>
<td>15.2</td>
<td>18</td>
</tr>
<tr>
<td>41,001 - 50,000</td>
<td>12</td>
<td>10.7</td>
<td>11</td>
</tr>
<tr>
<td>51,001 - 60,000</td>
<td>7</td>
<td>6.3</td>
<td>11</td>
</tr>
<tr>
<td>61,001 +</td>
<td>13</td>
<td>11.6</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>111</td>
<td>100.0</td>
<td>89</td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.295

The differences among the group A and B differed, but the differences were not significant.
3.7 Comparability of children dental characteristics with respect to allocation to the test and control groups

The age of children at examination was another variable according to which the test and control groups were compared.

Table 44. Age of the child at examination (months)

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>73</td>
<td>53</td>
<td>126</td>
</tr>
<tr>
<td>19</td>
<td>61</td>
<td>42</td>
<td>103</td>
</tr>
<tr>
<td>20</td>
<td>39</td>
<td>41</td>
<td>80</td>
</tr>
<tr>
<td>21</td>
<td>13</td>
<td>12</td>
<td>25</td>
</tr>
<tr>
<td>22</td>
<td>7</td>
<td>17</td>
<td>24</td>
</tr>
<tr>
<td>23</td>
<td>6</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>24</td>
<td>12</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>25</td>
<td>11</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>26</td>
<td>5</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td>27-30</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>20.06</td>
<td>20.43</td>
<td>20.23</td>
</tr>
<tr>
<td>St.Dev.</td>
<td>2.51</td>
<td>2.40</td>
<td>2.46</td>
</tr>
</tbody>
</table>

ANOVA F=0.556, ns = 0.456, p >0.05

The most frequent age of the children at examination in test and control groups was 18 months of age, followed by 19 months of age. The proportion of examinations at 18 months was higher in the test group than in the control group. Examinations at the age of 20 months were more frequent in the control group than in the test group.

Overall mean for age at examination was 20.23 months of age, with the mean for children in the test group 20.06 months and 20.43 months for children in the control group.

The differences between mean age of the groups mean age when analysed with one-way ANOVA were not statistically significant.
Table 45. Eruption of the first tooth

Mothers were asked to report the month of age of the child for the eruption of the first tooth in the mouth. The following distribution across the test and control groups was produced.

<table>
<thead>
<tr>
<th>Age (months)</th>
<th>Test group n</th>
<th>Test group %</th>
<th>Control group n</th>
<th>Control group %</th>
<th>Total n</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0.5</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td>2.6</td>
<td>5</td>
<td>2.4</td>
<td>11</td>
<td>2.5</td>
</tr>
<tr>
<td>4</td>
<td>20</td>
<td>8.6</td>
<td>22</td>
<td>10.5</td>
<td>42</td>
<td>9.5</td>
</tr>
<tr>
<td>5</td>
<td>24</td>
<td>10.3</td>
<td>21</td>
<td>10.0</td>
<td>45</td>
<td>10.2</td>
</tr>
<tr>
<td>6</td>
<td>48</td>
<td>20.7</td>
<td>34</td>
<td>16.3</td>
<td>82</td>
<td>18.6</td>
</tr>
<tr>
<td>7</td>
<td>39</td>
<td>16.8</td>
<td>28</td>
<td>13.4</td>
<td>67</td>
<td>15.2</td>
</tr>
<tr>
<td>8</td>
<td>29</td>
<td>12.5</td>
<td>39</td>
<td>18.7</td>
<td>68</td>
<td>15.4</td>
</tr>
<tr>
<td>9</td>
<td>18</td>
<td>7.8</td>
<td>18</td>
<td>8.6</td>
<td>36</td>
<td>8.2</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>4.7</td>
<td>10</td>
<td>4.8</td>
<td>21</td>
<td>4.8</td>
</tr>
<tr>
<td>11</td>
<td>7</td>
<td>3.0</td>
<td>6</td>
<td>2.9</td>
<td>13</td>
<td>2.9</td>
</tr>
<tr>
<td>12</td>
<td>7</td>
<td>3.0</td>
<td>4</td>
<td>1.9</td>
<td>11</td>
<td>2.5</td>
</tr>
<tr>
<td>13</td>
<td>5</td>
<td>2.2</td>
<td>4</td>
<td>1.9</td>
<td>9</td>
<td>2.0</td>
</tr>
<tr>
<td>14</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>1.0</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Don’t remember</td>
<td>17</td>
<td>7.3</td>
<td>15</td>
<td>7.2</td>
<td>32</td>
<td>7.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>232</strong></td>
<td><strong>100.0</strong></td>
<td><strong>209</strong></td>
<td><strong>100.0</strong></td>
<td><strong>441</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Mean: 7.03, St.Dev: 2.28

ANOVA F=0.368 ns=0.544 p>0.05

The five most frequent months for eruption of the first tooth were between the 4th and 8th month of age, inclusive. The most frequent month was the 6th month of age (18.6%), followed by the 8th month (15.4%), the 7th month (15.2%), the 5th (10.2%) and the 4th month (9.5%). There were slight differences in time of eruption between the test and control groups. In the test group the most frequent group was at 6 months of age, while in the control group it was the 8 months of age, followed by 7 months in the test group and 6 months in the control group. From both group 32 mothers did not remember the time of the eruption of the child’s first tooth.

Overall, the mean was 7.06 months of age, with the mean in the test group 7.03 and in control group 7.10. Statistically, using one-way ANOVA, there was no significant difference in the time of eruption of the first tooth between the test and control groups.

Time elapsed between the eruption of the first tooth and dental examination was also examined, as dental caries is age-related. As the time between the tooth eruption and examination increases the exposure of the tooth to risk factors also increases, as does the probability of the development of caries.

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Table 46. Time elapsed between the eruption of the first tooth and examination

<table>
<thead>
<tr>
<th>Time (months)</th>
<th>Test group</th>
<th>Control group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>1.7</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>0.9</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>5</td>
<td>2.2</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>1.7</td>
<td>11</td>
</tr>
<tr>
<td>9</td>
<td>16</td>
<td>6.9</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>15</td>
<td>6.5</td>
<td>16</td>
</tr>
<tr>
<td>11</td>
<td>16</td>
<td>6.9</td>
<td>21</td>
</tr>
<tr>
<td>12</td>
<td>35</td>
<td>15.1</td>
<td>23</td>
</tr>
<tr>
<td>13</td>
<td>29</td>
<td>13.5</td>
<td>27</td>
</tr>
<tr>
<td>14</td>
<td>24</td>
<td>10.3</td>
<td>21</td>
</tr>
<tr>
<td>15</td>
<td>27</td>
<td>11.6</td>
<td>13</td>
</tr>
<tr>
<td>16</td>
<td>6</td>
<td>2.6</td>
<td>14</td>
</tr>
<tr>
<td>17</td>
<td>10</td>
<td>4.3</td>
<td>10</td>
</tr>
<tr>
<td>18</td>
<td>11</td>
<td>4.7</td>
<td>12</td>
</tr>
<tr>
<td>19</td>
<td>7</td>
<td>3.0</td>
<td>8</td>
</tr>
<tr>
<td>20</td>
<td>0</td>
<td>0.0</td>
<td>4</td>
</tr>
<tr>
<td>21</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
</tr>
<tr>
<td>22</td>
<td>2</td>
<td>0.9</td>
<td>1</td>
</tr>
<tr>
<td>24</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
</tr>
<tr>
<td>Missing</td>
<td>17</td>
<td>7.31</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>232</td>
<td>100.0</td>
<td>209</td>
</tr>
<tr>
<td>Mean</td>
<td>13.00</td>
<td></td>
<td>13.26</td>
</tr>
<tr>
<td>St.Dev.</td>
<td>3.31</td>
<td></td>
<td>3.34</td>
</tr>
</tbody>
</table>

ANOVA, F = 0.684 ns = 0.409 p > 0.05

The most frequent times elapsed between eruption of the first tooth and dental examination, were 12 months (13.2%), 13 months (12.7% and 14 months (10.2%), with the same order in the test group (15.1%, 13.5%, 10.3%). In the control group the most frequent time was 13 months (12.9%) followed by 12 months (11.0%). The overall mean was 13.11 months, in the test group 13.00 months and in the control group 13.26 months.

No statistically significant difference was found in the time elapsed between the eruption of the first tooth and dental examination between the groups using one-way ANOVA.
3.8 Description of lesions of S-ECC

3.8.1 Distribution of non-cavitated / cavitated lesions on maxillary incisors

Table 47. Distribution of non-cavitated / cavitated lesions on maxillary incisors

<table>
<thead>
<tr>
<th>Caries distribution</th>
<th>Test</th>
<th>Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>No S-ECC</td>
<td>228</td>
<td>98.3</td>
<td>189</td>
</tr>
<tr>
<td>Non-cavitated S-ECC</td>
<td>3</td>
<td>1.3</td>
<td>16</td>
</tr>
<tr>
<td>Cavitated S-ECC</td>
<td>1</td>
<td>0.4</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>232</td>
<td>100.0</td>
<td>209</td>
</tr>
</tbody>
</table>

In total 5.4% maxillary incisors were affected by demineralisation. From them 4.3% lesions were non-cavitated and 1.1% lesions were cavitated. The distribution of lesions between the test and control groups was not even. In the test group 1.3% lesions were non-cavitated and 0.4% lesions were cavitated. In the control group 7.7% lesions were non-cavitated and 1.9% lesions were cavitated.

3.8.2 Frequency and extent of the demineralised lesion on maxillary central and lateral incisors

Table 48. Distribution and the surface area of carious lesions on labial surfaces of maxillary central and lateral incisors

Test group

<table>
<thead>
<tr>
<th>Tooth</th>
<th>52</th>
<th>%</th>
<th>51</th>
<th>%</th>
<th>61</th>
<th>%</th>
<th>62</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td></td>
<td>n</td>
<td></td>
<td>n</td>
<td></td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>No demineralisation</td>
<td>228</td>
<td>99.6</td>
<td>228</td>
<td>98.3</td>
<td>231</td>
<td>99.6</td>
<td>228</td>
<td>99.6</td>
</tr>
<tr>
<td>Demineralisation:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1/3</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>0.9</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>&gt;1/3 but &lt;2/3</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>&gt;2/3</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
<td>0.4</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Present teeth</td>
<td>229</td>
<td>100</td>
<td>232</td>
<td>100</td>
<td>232</td>
<td>100</td>
<td>229</td>
<td>100</td>
</tr>
<tr>
<td>Unerupted teeth</td>
<td>3</td>
<td>1.3</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>1.3</td>
</tr>
<tr>
<td>Examinations</td>
<td>232</td>
<td>100</td>
<td>232</td>
<td>100</td>
<td>232</td>
<td>100</td>
<td>232</td>
<td>100</td>
</tr>
</tbody>
</table>
When the distribution of carious lesions in the maxillary incisors was examined in the test group, the most frequently affected tooth was 51, with demineralisation occurring for four teeth, which represented 1.7% from all the 51 teeth present in the mouth (three teeth were unerupted). All other maxillary incisors were affected by caries equally, with one affected tooth in particular teeth groups (52, 61, 62), which represented 0.4% of all teeth present in mouth (in all three above mentioned groups of teeth one tooth in each group was unerupted).

When caries was identified according to the extent of demineralisation on the labial surface of the teeth, two teeth were affected by demineralisation, which affected only <1/3 of the labial surface, three teeth were affected by demineralisation that occurred on >1/3 but <2/3 of the labial surface and two teeth were affected by demineralisation on >2/3 of the labial surface of the teeth.

In the control group the most affected tooth was 61, with demineralisation occurring for 16 teeth, which formed 7.6% of all 61 teeth present in the mouth, followed by teeth 51 and 62, in which groups 11 teeth were affected by demineralisation, representing of 5.3% of all teeth present in the mouth for these particular groups of teeth. The least affected tooth was 52. In this group of teeth only eight were affected by demineralisation, which represented 3.9% of the total.

According to the extent of demineralisation on the labial surface of the teeth 29 teeth were affected by demineralisation that extended only on <1/3 of labial surface. In 7 teeth the affected area was greater, between 1/3 and <2/3 of labial surface, and on 10 teeth the demineralised area was >2/3 of the labial surface.
3.8.3 Demineralisation of incisors according to the test and control groups

The distribution of demineralised lesion according to the size of the area of the demineralisation in test, test A, test B and control groups is described Table 48.

Table 49. Worst area of carious lesion on maxillary frontal incisors, in test, test A + B groups, and control groups

<table>
<thead>
<tr>
<th>Labial surface</th>
<th>Test A</th>
<th>Test B</th>
<th>Test</th>
<th>Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>No demineralisation</td>
<td>121</td>
<td>107</td>
<td>228</td>
<td>98.3</td>
<td>189</td>
</tr>
<tr>
<td>&lt;1/3 labial surface</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0.9</td>
<td>15</td>
</tr>
<tr>
<td>&gt;1/3 but &lt; 2/3 labial surface</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0.4</td>
<td>3</td>
</tr>
<tr>
<td>&gt;2/3 labial surface</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.4</td>
<td>2</td>
</tr>
</tbody>
</table>

Chi-square 0.003 (test and control groups). Yates correction only for 2 by 2 tables.
Chi-square 0.568 (test A and B groups).

There were no differences in the number of lesions on the maxillary frontal teeth between the test A and B groups. Two maxillary incisors were affected by caries in the test A group and two maxillary incisors teeth were affected by caries in the test B group. Statistically no significant difference was found between the groups A and B.

According to extent of affected labial surfaces there was one tooth in each group with an affected area <1/3, one tooth in test B group with affected area >1/3 but <2/3, and one tooth in test group A where affected area was >2/3.

Statistically no significant difference was found between the groups A and B.

When the number and extent of affected labial surfaces on maxillary frontal incisors were compared between the test group and control groups, there was a significant difference, with p <0.003. Most of the difference in the test and control groups was limited to affected areas <1/3 of the labial surface. An affected labial area of <1/3 was found on 2 teeth in the test group and on 15 teeth in the control group. A carious area which was >1/3 but <2/3 was found on 1 tooth in the test group and on 3 teeth in the control group and an area > 2/3 of labial surfaces was found on 1 tooth in test group and on 2 teeth in control groups.
3.9 Impact of the intervention on the occurrence of S-ECC

The assessment of differences in the incidence of S-ECC between the test and control group and test A and test B group was the main purpose of this randomised controlled trial.

3.9.1 Incidence of S-ECC in the test and control groups and test A and test B groups

Table 49 compares the incidence of S-ECC in the test and control groups and test A and test B groups.

Table 50. Incidence of S-ECC on maxillary incisors in test, test A and B and control groups

<table>
<thead>
<tr>
<th>Group</th>
<th>No</th>
<th>S-ECC</th>
<th>Number of children</th>
<th>S-ECC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test A+B</td>
<td>228</td>
<td>98.3%</td>
<td>4</td>
<td>1.7%</td>
<td>232</td>
</tr>
<tr>
<td>- A</td>
<td>121</td>
<td>98.4%</td>
<td>2</td>
<td>1.6%</td>
<td>123</td>
</tr>
<tr>
<td>- B</td>
<td>107</td>
<td>98.2%</td>
<td>2</td>
<td>1.8%</td>
<td>109</td>
</tr>
<tr>
<td>Control</td>
<td>189</td>
<td>90.4%</td>
<td>20</td>
<td>9.6%</td>
<td>209</td>
</tr>
<tr>
<td>Total</td>
<td>417</td>
<td>94.6%</td>
<td>24</td>
<td>5.4%</td>
<td>441</td>
</tr>
</tbody>
</table>

Chi-square 0.001 (test and control groups).
Chi-square 0.903 (test A and test B groups).
Chi-square 0.005 (test A and control group).
Chi-square 0.010 (test B and control group).

The difference in the incidence of S-ECC between the test and control groups was statistically significant with p<0.001. From the total number of cases of S-ECC (24), 4 cases of S-ECC occurred in the test group and 20 cases in the control group.

There were no statistically significant differences between the test A and test B groups, with an equal number of cases in the test A and test B groups; in each group 2 cases occurred.

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3. RESULTS
There were statistically significant differences between the control and test A and test B group, with \( p<0.005 \) between the control group and test A group and \( p<0.010 \) between the control group and test B group.

Table 50 describes the incidence of S-ECC with respect to the phone calls made to the mothers in the test A and test B groups.

<table>
<thead>
<tr>
<th></th>
<th>No S-ECC</th>
<th>S-ECC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
</tbody>
</table>
| Test A Examination – phone call | 109      | 98.2  | 2     | 1.8   | 111     | 47.8
| Test B Examination – no phone call | 119      | 98.3  | 2     | 1.7   | 121     | 52.2
| Number of examinations   | 228      | 98.3  | 4     | 1.7   | 232     | 100.0

When the incidence of S-ECC was examined according to whether a phone call was made to the mother, there was no difference between the test A and B groups. Two children were affected by caries in test A group and 2 children were affected by caries in the control group.
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The incidence of S-ECC was assessed according to gestation age (weeks) at birth to examine if pre-term children were at higher risk of developing caries than full-term children, due to reported higher prevalence of enamel defects in pre-term children, or different feeding patterns used for pre-term children.

3.9.2 Incidence of S-ECC according to gestation age, weight at birth and child’s gender

Table 52. Gestation at birth and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Gestation</th>
<th>No S-ECC</th>
<th></th>
<th>S-ECC</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Pre-term (27–36 weeks)</td>
<td>26</td>
<td>6.3</td>
<td>0</td>
<td>0.0</td>
<td>26</td>
<td>5.9</td>
</tr>
<tr>
<td>Term (37-42 weeks)</td>
<td>388</td>
<td>93.7</td>
<td>24</td>
<td>100.0</td>
<td>412</td>
<td>94.1</td>
</tr>
<tr>
<td>Total</td>
<td>414</td>
<td>100.0</td>
<td>24</td>
<td>100.0</td>
<td>438</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>3</td>
<td></td>
<td>0</td>
<td></td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>417</td>
<td>24</td>
<td></td>
<td>441</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.206

No case of S-ECC was diagnosed among the pre-term children. All 24 cases of S-ECC occurred among children who were born at term.

Birth weight is another aspect which can be assessed in relation to the occurrence of S-ECC, as low birth weight can be associated with higher feeding frequencies.

Table 53. Weight at birth and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Weight (g)</th>
<th>No S-ECC</th>
<th></th>
<th>S-ECC</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Up to 2,500</td>
<td>20</td>
<td>4.8</td>
<td>0</td>
<td>0.0</td>
<td>20</td>
<td>4.6</td>
</tr>
<tr>
<td>2,001 - 4,000</td>
<td>354</td>
<td>85.7</td>
<td>20</td>
<td>4.5</td>
<td>374</td>
<td>85.6</td>
</tr>
<tr>
<td>4,001 - 5,000</td>
<td>39</td>
<td>9.4</td>
<td>4</td>
<td>0.9</td>
<td>43</td>
<td>9.8</td>
</tr>
<tr>
<td>Total</td>
<td>413</td>
<td>100.0</td>
<td>24</td>
<td>0.0</td>
<td>437</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>414</td>
<td>24</td>
<td></td>
<td>441</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.304

In the examined group no case of S-ECC was associated with low birth weight, as all cases occurred in children with normal or high weight at birth.
Table 54. Child’s gender and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Gender</th>
<th>No S-ECC</th>
<th>S-ECC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Boy</td>
<td>219</td>
<td>49.7</td>
<td>10</td>
</tr>
<tr>
<td>Girl</td>
<td>198</td>
<td>44.9</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>417</td>
<td>94.6</td>
<td>24</td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.31

The gender of the child did not play a statistically significant role in the development of S-ECC. Only a marginally higher percentage of girls (3.2%) compared to the boys (2.3%) was diagnosed with the S-ECC at the time of dental examination.

3.9.3 Incidence of S-ECC according to the mother’s demographic factors

The socio-demographic factors with which all other variable were compared with through the study were again used to assess if some of these factors influenced the development of S-ECC. The incidence of S-ECC is compared against the mother’s age, country of birth, main language spoken at home, marital status, education and income.

No statistically significant association was found between the above mentioned variables.

Table 55. Mother’s age group and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Age group</th>
<th>No S-ECC</th>
<th>S-ECC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>14 - 17</td>
<td>19</td>
<td>95</td>
<td>1</td>
</tr>
<tr>
<td>18 - 19</td>
<td>44</td>
<td>93.6</td>
<td>3</td>
</tr>
<tr>
<td>20 - 24</td>
<td>121</td>
<td>93.8</td>
<td>8</td>
</tr>
<tr>
<td>25 - 29</td>
<td>130</td>
<td>95.6</td>
<td>6</td>
</tr>
<tr>
<td>30 - 34</td>
<td>73</td>
<td>93.6</td>
<td>5</td>
</tr>
<tr>
<td>35 - 39</td>
<td>22</td>
<td>100.0</td>
<td>0</td>
</tr>
<tr>
<td>40 - 45</td>
<td>8</td>
<td>88.9</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>417</td>
<td>94.6</td>
<td>24</td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.925 (Variables “14 – 17” and “18 – 19”, “35 – 39” and “40 – 45” collapsed).
### Table 56. Country of birth and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Country of birth</th>
<th>No S-ECC</th>
<th>%</th>
<th>S-ECC</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>328</td>
<td>94.5</td>
<td>19</td>
<td>5.5</td>
<td>347</td>
<td>100.0</td>
</tr>
<tr>
<td>Subset of Australia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Non-indigenous</td>
<td>319</td>
<td>94.4</td>
<td>19</td>
<td>5.6</td>
<td>338</td>
<td>100.0</td>
</tr>
<tr>
<td>- Indigenous</td>
<td>9</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
<td>9</td>
<td>100.0</td>
</tr>
<tr>
<td>Overseas</td>
<td>79</td>
<td>95.2</td>
<td>4</td>
<td>4.8</td>
<td>83</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>407</td>
<td>94.7</td>
<td>23</td>
<td>5.3</td>
<td>430</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>10</td>
<td>1</td>
<td></td>
<td>1</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>417</td>
<td>24</td>
<td></td>
<td>24</td>
<td>441</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.807

### Table 57. Main language spoken at home and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Country of birth</th>
<th>No S-ECC</th>
<th>%</th>
<th>S-ECC</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>377</td>
<td>94.7</td>
<td>21</td>
<td>5.3</td>
<td>398</td>
<td>100.0</td>
</tr>
<tr>
<td>Other</td>
<td>28</td>
<td>93.3</td>
<td>2</td>
<td>6.6</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>405</td>
<td>94.6</td>
<td>23</td>
<td>5.4</td>
<td>428</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>12</td>
<td>1</td>
<td></td>
<td>1</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>417</td>
<td>24</td>
<td></td>
<td>24</td>
<td>441</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.745

### Table 58. Mother’s marital status and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Marital status</th>
<th>No S-ECC</th>
<th>%</th>
<th>S-ECC</th>
<th>%</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>183</td>
<td>94.8</td>
<td>10</td>
<td>5.2</td>
<td>193</td>
<td>100.0</td>
</tr>
<tr>
<td>De facto</td>
<td>135</td>
<td>96.4</td>
<td>5</td>
<td>3.6</td>
<td>140</td>
<td>100.0</td>
</tr>
<tr>
<td>Separated / Divorced /</td>
<td>86</td>
<td>91.5</td>
<td>8</td>
<td>8.5</td>
<td>94</td>
<td>100.0</td>
</tr>
<tr>
<td>Never married</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>404</td>
<td>94.6</td>
<td>23</td>
<td>5.4</td>
<td>427</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>13</td>
<td>1</td>
<td></td>
<td>1</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>417</td>
<td>24</td>
<td></td>
<td>24</td>
<td>441</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.258
HEALTH PROMOTION AND EARLY CHILDHOOD CARIES

Table 59. Mother's education and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Education</th>
<th>No S-ECC</th>
<th></th>
<th>S-ECC</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Primary school</td>
<td>8</td>
<td>100.0</td>
<td>0</td>
<td>0.0</td>
<td>8</td>
<td>100.0</td>
</tr>
<tr>
<td>Some secondary school</td>
<td>139</td>
<td>95.9</td>
<td>6</td>
<td>4.1</td>
<td>145</td>
<td>100.0</td>
</tr>
<tr>
<td>Completed secondary</td>
<td>92</td>
<td>92.0</td>
<td>8</td>
<td>8.0</td>
<td>100</td>
<td>100.0</td>
</tr>
<tr>
<td>school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some college / University</td>
<td>66</td>
<td>98.5</td>
<td>1</td>
<td>1.5</td>
<td>67</td>
<td>100.0</td>
</tr>
<tr>
<td>Completed University / College</td>
<td>98</td>
<td>92.5</td>
<td>8</td>
<td>7.5</td>
<td>106</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>403</td>
<td>94.6</td>
<td>23</td>
<td>5.4</td>
<td>426</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>14</td>
<td>1</td>
<td>24</td>
<td>441</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.601 (Variables “Completed secondary school” and “Some college / University Collapsed”).

Table 60. Household income and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Income (yearly)</th>
<th>No S-ECC</th>
<th></th>
<th>S-ECC</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>up to 12,000</td>
<td>55</td>
<td>96.5</td>
<td>2</td>
<td>3.5</td>
<td>57</td>
<td>100.0</td>
</tr>
<tr>
<td>12,001 - 20,000</td>
<td>42</td>
<td>91.3</td>
<td>4</td>
<td>8.7</td>
<td>46</td>
<td>100.0</td>
</tr>
<tr>
<td>20,001 - 30,000</td>
<td>77</td>
<td>93.9</td>
<td>5</td>
<td>6.1</td>
<td>82</td>
<td>100.0</td>
</tr>
<tr>
<td>30,001 - 40,000</td>
<td>65</td>
<td>98.5</td>
<td>1</td>
<td>1.5</td>
<td>66</td>
<td>100.0</td>
</tr>
<tr>
<td>40,001 - 50,000</td>
<td>40</td>
<td>97.6</td>
<td>1</td>
<td>2.4</td>
<td>41</td>
<td>100.0</td>
</tr>
<tr>
<td>50,0001 - 60,000</td>
<td>28</td>
<td>87.5</td>
<td>4</td>
<td>12.5</td>
<td>32</td>
<td>100.0</td>
</tr>
<tr>
<td>60,001 +</td>
<td>52</td>
<td>96.3</td>
<td>2</td>
<td>3.7</td>
<td>54</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>359</td>
<td>95.0</td>
<td>19</td>
<td>5.0</td>
<td>378</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing</td>
<td>58</td>
<td>5</td>
<td>24</td>
<td>441</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square ns; p = 0.770 (Variable “up to 12,000 and 12,001 -20,000; “21,001 and 30,000”, “30,001 – 40,000”; 40,001 – 50,000 and 50,001 – 60,000 and 60,001” collapsed).
Marital status is not always answered in a questionnaire, especially in a family with one parent. For this reason the question about the presence of both parents in the family was asked at the dental examination.

Table 61. Both parents and one parent family and the incidence of S-ECC

<table>
<thead>
<tr>
<th>Family</th>
<th>No S-ECC</th>
<th>S-ECC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>One parent</td>
<td>79</td>
<td>19.7</td>
<td>9</td>
</tr>
<tr>
<td>Both parents</td>
<td>323</td>
<td>80.3</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
<td>402</td>
<td>100.0</td>
<td>24</td>
</tr>
<tr>
<td>Missing</td>
<td>15</td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>

Chi-square; p = 0.033*

When the incidence of S-ECC was assessed taking into consideration whether it was a one or both parent family, statistically significant differences (p<0.033) were found. Children living in a one parent family had higher incidence of S-ECC than those in a two parent family.
3.9.4 Logistic regression

Variables that had statistical significance associated with S-ECC in the study and variables traditionally considered as important factors in the development of S-ECC were entered into a logistic regression, to control for confounding or heterogeneity – the test and control group comparison.

The mother's age and age of children at examination (months) were entered as continuous variables. All other variables were entered as categorical variables, with S-ECC as the dependent variable.

3.9.4.1 Bivariate logistic regression

Table 62. Bivariate logistic regression analyses of S-ECC children, with un-adjusted odds ratios

<table>
<thead>
<tr>
<th>Variable</th>
<th>Un-adjusted odds ratio</th>
<th>95.0% C.I.</th>
<th>R Squared</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Control group</td>
<td>6.090</td>
<td>2.046</td>
<td>18.127</td>
</tr>
<tr>
<td>Mother's age</td>
<td>0.992</td>
<td>0.922</td>
<td>1.068</td>
</tr>
<tr>
<td>Examination – age (months)**</td>
<td>1.226</td>
<td>1.068</td>
<td>1.407</td>
</tr>
<tr>
<td>Both parent family*</td>
<td>0.401</td>
<td>0.169</td>
<td>0.951</td>
</tr>
<tr>
<td>Mother's employment</td>
<td>1.571</td>
<td>0.665</td>
<td>3.711</td>
</tr>
<tr>
<td>Australia born</td>
<td>1.148</td>
<td>0.380</td>
<td>3.468</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary, some secondary</td>
<td></td>
<td>Ref.</td>
<td></td>
</tr>
<tr>
<td>Completed secondary, some</td>
<td>1.396</td>
<td>0.485</td>
<td>4.017</td>
</tr>
<tr>
<td>university, college</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completed university, college</td>
<td>2.000</td>
<td>0.673</td>
<td>5.942</td>
</tr>
</tbody>
</table>

Significance: *** p<0.001
              ** p< 0.01
              * p< 0.05

Test / Control group, age of the child at examination, and one / both parents family were significant variables when entered into bivariate logistic regressions.

With test group as the reference group (0) children in the control group had 6.090 higher odds of developing S-ECC than children in the test group.

According to the age of child at examination the odds of developing S-ECC increased 1.23 times with each one unit of the age of the child.

With one parent as the reference category (0), for a child with both parents the odds of developing S-ECC was 0.4 times the odds for a child with one parent.
### 3.9.4.2 Multivariable logistic regression

Table 63. Multivariable logistic regression analysis to explain S-ECC among examined children with adjusted odds ratios

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adjusted odds ratio</th>
<th>95.0% C.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>6.839</td>
<td>2.132 - 21.941</td>
</tr>
<tr>
<td>Mother's age</td>
<td>0.967</td>
<td>0.876 - 1.065</td>
</tr>
<tr>
<td>Examination – age (months)**</td>
<td>1.253</td>
<td>1.073 - 1.463</td>
</tr>
<tr>
<td>Both parent family*</td>
<td>0.304</td>
<td>0.113 - 0.818</td>
</tr>
<tr>
<td>Mother's employment</td>
<td>0.460</td>
<td>0.168 - 1.255</td>
</tr>
<tr>
<td>Australia born</td>
<td>0.839</td>
<td>0.252 - 2.798</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary, some secondary</td>
<td>Ref.</td>
<td></td>
</tr>
<tr>
<td>Completed secondary, some university, college</td>
<td>1.244</td>
<td>0.379 - 4.087</td>
</tr>
<tr>
<td>Completed university, college</td>
<td>2.492</td>
<td>0.639 - 9.717</td>
</tr>
</tbody>
</table>

R. Squared = 0.197
Significance: *** p< 0.001
** p< 0.01
* p< 0.05

The same variables as in the previous table were entered into multivariable logistic regression. With the test group as reference group (0), the adjusted odds ratio for developing S-ECC was 6.839 higher if the child was in the control group.

Each one higher unit in age of the child at examination increased the odds for developing S-ECC 1.3 times.

With one parent as the reference group (0) families with both parents had lower odds for developing S-ECC (0.3 times).

The adjusted Nagelkerke R squared (0.197) indicates that the overall fit of this model explained nearly 20% of the variance in the incidence of S-ECC.

This study evaluated the efficacy of the intervention at the level of the test and control groups and the test A and test B groups. For this reason the remaining unexplained variance (80%) has not been studied yet (eg. use of fluoridated water, fluoride containing toothpaste, brushing behaviour, dietary factors etc).
3.10 Evaluation of written health promotion program

The requirements of today's society for good quality printed information are determined not only by the content of written material. The presentation, use of language, credibility and usefulness of the information are all-important features, which determine the value of printed information material.

The written oral health promotion program developed for the purpose of this study made an effort to fulfil these requirements even if some features of the program, like visual presentation, were not overly professional or expensive.

Mothers in the test group who received written information material during the study evaluated the presented program. For the purpose of evaluation, the program was divided and evaluated in six sections, to receive feedback on different aspects of the program. The percentage of responses was calculated from questionnaires completed by 232 mothers whose children attended the 18-month dental examination.

3.10.1 Content, usefulness of health promotion material

Tables 4.1 and 4.2 describing the overall response of mothers to the content of the information which they received during the intervention.

Table 64. Question 1.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>What was the initial reaction to this material?</td>
<td>1 Very negative</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Negative</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Neutral</td>
<td>26</td>
<td>12.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 Positive</td>
<td>95</td>
<td>46.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Very positive</td>
<td>82</td>
<td>40.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>203</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing</td>
<td>29</td>
<td>12.5</td>
</tr>
</tbody>
</table>

The initial reaction of mothers enrolled in the program was “positive” in 46.8%, “very positive” (40.4%) and in 12.8% of mothers the reaction was “neutral”.

132
Table 65. Questions 2 – 6.

Questions applied in Yes / No format.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>All Responses</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Did it tell you something new?</td>
<td>195</td>
<td>14</td>
<td>209</td>
</tr>
<tr>
<td>3.</td>
<td>Did the material hold attention?</td>
<td>196</td>
<td>13</td>
<td>209</td>
</tr>
<tr>
<td>4.</td>
<td>Did you receive sufficient information on how to prevent tooth decay?</td>
<td>202</td>
<td>4</td>
<td>206</td>
</tr>
<tr>
<td>5.</td>
<td>Did it say enough about the causes of the tooth decay?</td>
<td>200</td>
<td>8</td>
<td>208</td>
</tr>
<tr>
<td>6.</td>
<td>Were the topics what you need to know?</td>
<td>200</td>
<td>5</td>
<td>205</td>
</tr>
</tbody>
</table>

From mothers who completed the questionnaire 93.3% acknowledged that material which they received had brought them new information, and 93.8% mothers reported that the material held their attention. The information which they received during the program was found by 98.0% of mothers sufficient in the prevention of tooth decay, with 96.1% mothers agreeing that delivered material gave them enough information about the causes of tooth decay. On the topics presented in the program, 97.6% of mothers' acknowledged them as important in the prevention of tooth decay.

3.10.2 Reaction to the health promotion materia

The handling and use of information by mothers is examined in Tables 4.3 and 4.4.

Table 66. Questions 7 – 9.

Questions applied in Yes / No format

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>All Responses</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>Did you read all the information?</td>
<td>167</td>
<td>45</td>
<td>212</td>
</tr>
<tr>
<td>8.</td>
<td>Have you kept the information?</td>
<td>168</td>
<td>44</td>
<td>212</td>
</tr>
<tr>
<td>9.</td>
<td>Did you pass the information on to other mothers with small children?</td>
<td>59</td>
<td>155</td>
<td>214</td>
</tr>
</tbody>
</table>

Mothers who read all material formed 78.8% of mothers who completed the questionnaire. Over three-quarters, 79.3%, of mothers kept the information. Over a quarter, 27.6%, of mothers passed the information which they received onto other mothers with small children.
Table 67  Question 10.

Question applied in Less, More, No change format.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.</td>
<td>After reading the information were you worried about tooth decay for your child?</td>
<td>Less</td>
<td>19</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>More</td>
<td>72</td>
<td>34.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No change</td>
<td>120</td>
<td>56.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>211</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing</td>
<td>21</td>
<td></td>
</tr>
</tbody>
</table>

The impact of material on the level of mothers’ worry about the development of tooth decay was the following: 9.0% of mothers were worrying less after the reading of the information, 34.1% more than before. For 56.9% of mothers the material didn’t cause any changes related to the worry about their child’s tooth decay.

3.10.3 Credibility of the health promotion material

The mothers’ perception of the credibility of information supplied is examined in table 4.5

Table 68. Questions 11 – 12.

Questions applied in Yes / No format.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>All Responses</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>11.</td>
<td>Did you think the information presented was trustworthy?</td>
<td>180</td>
<td>86.1</td>
<td>29</td>
</tr>
<tr>
<td>12.</td>
<td>Were you aware where the information was produced?</td>
<td>136</td>
<td>65.1</td>
<td>73</td>
</tr>
</tbody>
</table>

The trustworthiness of the health promotion material was acknowledged by 86.1% of mothers, however only 65.1% of mothers were aware where the information material was produced.
3.10.4  Readability of the health promotion material

Good understanding of written material is a basic requirement in this form of health education. Tables 4.6, 4.7 and 4.8 evaluate the readability of the material.

Table 69. Questions 13.

Scaled response: scale ranging from 1 (Difficult) to 5 (Very easy).

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>How easy did you find the material read?</td>
<td>1 Difficult</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Tricky</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Neutral</td>
<td>25</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 Easy</td>
<td>82</td>
<td>39.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Very easy</td>
<td>101</td>
<td>48.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>208</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing</td>
<td>24</td>
<td></td>
</tr>
</tbody>
</table>

Nearly a majority of mothers (48.6%) found the oral health promotion material was “Very easy” to read, and for 39.4% of mothers it was “Easy” reading. “Neutral” with regard to the readability of the material was reported by 12.0% of women who responded to this question.

Table 70. Question 14.

Question applied in Yes / No format.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>All Responses</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Could you understand it easily?</td>
<td>Yes</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>198</td>
<td>96.6</td>
<td>7</td>
</tr>
</tbody>
</table>

A high percentage of mothers (96.6%) agreed that the material was easy to understand.
Table 71. Questions 15.

Scaled response: scale ranging from 1 (Very little) to 5 (A great deal).

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>15.</td>
<td>How much information about tooth decay did you have previously?</td>
<td>Very little</td>
<td>25</td>
<td>12.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Little</td>
<td>69</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adequate</td>
<td>83</td>
<td>40.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Satisfactory</td>
<td>22</td>
<td>10.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A great deal</td>
<td>8</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>207</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing</td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

On the quantity of previous information about the development of tooth decay, 40.1% of mothers reported it as “Adequate”, with the response “Little” (33.3%) being the next most frequent. “Very little” information was reported by 12.1% of mothers, while 10.6% of mothers evaluated their previous information as “Satisfactory”. Only 3.9% of mothers report that they had “A great deal” of information before the program started.
3.10.5 Impact of the health promotion material

Table 4.9 examines the impact of the intervention on behaviour of mothers.

Table 72. Questions 16, 17, 18, 19.

Questions applied in Yes / No format.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>All Responses</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>16.</td>
<td>Is it now easier to make a decision on what is good for child's teeth?</td>
<td>195</td>
<td>95.6</td>
<td>9</td>
</tr>
<tr>
<td>17.</td>
<td>Do you care more about child's teeth?</td>
<td>131</td>
<td>63.6</td>
<td>75</td>
</tr>
<tr>
<td>18.</td>
<td>Did the program raise awareness about your own oral health?</td>
<td>149</td>
<td>72.0</td>
<td>58</td>
</tr>
<tr>
<td>19.</td>
<td>Did you change your own behaviour to prevent oral disease?</td>
<td>103</td>
<td>49.8</td>
<td>104</td>
</tr>
</tbody>
</table>

For a high percentage of mothers (95.6%) who responded to these questions it was now easier for them to make a decision on what was good for their child’s teeth. Two-thirds of mothers, 63.6%, reported giving more care to their child's teeth after the program. In relation to the mother’s own oral health, the program raised awareness in 72.0% of mothers, and 49.8% of them changed their own behaviour in order to prevent oral disease.
3.10.6 Evaluation of health promotion material

The overall evaluation of the intervention is presented in Tables 4.10 and 4.11.

Table 73. Question 20.

Question applied in Yes / No format.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>All Responses</th>
<th>Missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>20.</td>
<td>Does the material provide you with the information needed to care for your child?</td>
<td>Yes</td>
<td>196</td>
<td>96.6</td>
</tr>
</tbody>
</table>

The written material provided was found by 96.6% of mothers to be useful in providing care for their child.

Table 74. Question 21.

Scaled response: scale ranging from 1 (very poor) to 5 (very good).

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Response</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>21.</td>
<td>What overall rating would you give to the program?</td>
<td>1 Very poor</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 Poor</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Neutral</td>
<td>13</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4 Good</td>
<td>113</td>
<td>55.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Very good</td>
<td>79</td>
<td>38.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>205</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Missing</td>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>

The overall assessment of the quality of written information material was rated by the participating mothers as “Good” (55.2%), “Very good” (38.5%), and “Neutral” (6.3%).
3.11 Missing values and non-responses

3.12.1 Missing values

When data were analysed for missing values, the only variable where the missing value was higher than 5% was the “family income” variable, which, traditionally, more respondents refuse to answer.

There was no attempt to impute the missing value, as the computation of missing values from a relatively small sample could lead to bias.

All data in tables were presented as the valid percentage and the subjects with missing values are reported for each variable.

3.12.2 Non-responses in the evaluation of written health promotion material

The percentages of non-responses in the evaluation of the health promotion material ranged from 7.7% to 12.5%, according to the particular question.
3.12 Active role of mothers in the shaping any further intervention

To give mothers the opportunity to express their opinions on how to further improve the program, space was allocated at the end of the questionnaire. To provide a guideline, three questions underlined the suggestions:

1. What other information do you need?
2. How could this material be improved?
3. Comments:

In total 56 mothers expressed their opinions and suggestions about the study. In general they expressed satisfaction with the program with which they participated. Further comments could be summarise as:
- concern about introducing new foods
- child’s increasing resistance to oral hygiene
- wanted less paperwork, smaller format

The responses present a transcript of the answers without correction. The number represents the number of the questionnaire and the letter relates to the A or B test groups.
15a
1. “How” to make my baby eat other food beside a repetitive routine of plain noodles with soy sauce & bowl of pea everyday. She is very picky.

57b
1. How to overcome simple problems e.g. my daughter brushes her teeth no problems but refuses to rinse her mouth afterwards. This has become only recent problem.
2. I think that this program is excellent, and does not really need any improvement.
3. The program is run in a way that is convenient for the mother + baby. I believe that this program is also very flexible. The appointments may be changed at any time – very convenient.

135b
3. The program is fantastic in teaching people oral health during pregnancy. I am a very caring parent and still would have cared for my child’s teeth, but this program has given me a lot of information on things I wouldn’t have known.

140a
1. How clean child’s teeth and make it fun for them and less traumatic for parents / children
2. via booklet, video workshop (role play)
3. Very impressed program. Would be very interest to be informed about findings. Well done.

144a
I thought that its an excellent idea to have this program so young people understand that they need to look after their teeth and the teeth of their children.

149b
1. Very informative

151a
1. about feeder cups, are different brands better than another
2. Less to read – very busy
3. Very interesting and we try not to offer high sugar snacks. My awareness will hopefully give my Sarah better teeth than partner and myself have.

160b
2. Less paper work. More direct (to the point).

164b
3. I’ve always been fairly aware of dental problems. I’m 27 and still haven’t had a cavity and that’s pretty much how I want my kids teeth to be, in their mouth for as long as possible.

185b
2. Think it was great – very informative.
3. Very glad to be a part of this program. Received a lot of great information – thank you!

3. RESULTS
191a
1. How to convince small children / engage them in teeth brushing.

196a
1. I would like to know why some people are more susceptible to tooth decay than others, eg: my father doesn’t clean or floss ever eats sugar and has perfect teeth. I was told it has something also to do with the pH level in your mouth?

When should a child begin to floss?

223b
3. Every mother should read about tooth decay!

231a
3. If all parents used commonsense no child or adult would have tooth decay unless there is a genetic concern.

241a
1. Where to go from here?
   When to start going to the dentist?
2. Smaller cards (A5 or smaller) that can be placed on fridge / wall near baby’s cot.
   Easy access. I do not need A4 sheets.

257a
3. I have gained some very useful info from the packages as my partner. I suffer from poor teeth, we are now more equipped to help Ava make more educated choices about foods she eats, her overall oral hygiene! Thanks!

273b
1. Info about when to use toothpaste.
2. Photo’s, diagrams

332a
1. Needed more info on how to brush babies toddlers teeth for appropriate: demonstration, picture. Cleaning and to create enthusiasm for kid.
2. Present material to more mothers and the media (to give info more attention).
   - make info more public and “pushed” by doctors and family youth services.

52b
3. Great study. Very informative. Thank you!

323b
1. Nothing. It was very helpful
2. I think it is fine you did an excellent job
3. Well done!
HEALTH PROMOTION AND EARLY CHILDHOOD CARIES

339a
1. Naturopathic methods toothpastes etc - available on the market & their efficacy details about F drops for people without access to F water.
2. Some questions are very closed & don’t allow explanation when answering yes and no isn’t strictly truthfull.
3. Q37 My child “brush” her teeth herself (to get used to doing it, promote independence) but I always brush them properly too – so do I answer yes or no?
   Q12 My child didn’t have a bottle at night, but it I don’t put anything for 6 month it implies she got nothing, when in fact she was breastfed.

111b
3. Very useful for young mothers. Thank you.

24b
1. The information I have received has helped a lot, but there are always new developments in health. Please keep me informed.
2. Keep it short and make sure it’s easy to read.
3. Keep up the good work and I hope you having reasonable input on our government.
   Thanks.

34b
2. It is fine as it is.

285a
1. I though the information was fantastic. It answered all my concerns. I was impressed how you presented it.
2. I though it was perfect. The only thing I can think of, s making parents aware of how important is oral care for children who have heart murmurs.
3. I am so delighted that I signed up or the program. Not just Daisy but all of us has learnt something. Thank you.

297b
3. How many biscuits can a child presume before forming tooth decay? My child likes his biscuits.

106a
1. At what age should you change toothpaste from milk teeth to regulate toothpaste?
2. I think it is fine as it is. It’s easy to follow!
3. I think every person that has a child should be sent information about children teeth because I’ve seen many children with decaying teeth that there. Parents need to be educated.

307a
You need to show pictures with children with tooth decay to open people’s eyes even More.

42b
3. Excellent idea.
125a
1. No other information was as helpful but the knowledge that all childrens teeth will come .......would easy worries.
3. Thanks for all the information & toothbrushes, I didn’t know such things existed before.(finger toothbrush).

108b
3. I like to look after my own teeth, so I was grateful for information relating to my daughters oral health. I wouldn’t have started cleaning her first tooth if I didn’t have the info. The finger brush was particularly useful.

49b
1. When to start flossing. When they can brush and floss on their own?
2. Yes, flossing.

66b
2. Practical. eg. somebody showing you how to brush his or her teeth. When to use baby toothpaste.
3. Very helpful otherwise.

296b
2. Make it more memorable since I cannot remember anything about 6-12 month send out. Did I get it?

50a
3. A very informative & helpful program

59b
1. How to get my child’s attention to brush her teeth?

2a
3. It is just perfect, and thanks for caring about our children teeth. Me and my family are supporting your program. If there is any thing we could do.

107a
3. As I said before I remember receivng info and looking at it, but I couldn’t remember the info to answer this survey properly.

279a
1. How to brush teeth. Adding fluoride to water tank.
   Problem when child doesn’t like brushing. Dentist role and how regular need to for visits.

287a
3. The finger toothbrush was OK to use but my daughter kept bitting my fingers – so I didn’t persist.

31b
3. Very happy with overall package.
HEALTH PROMOTION AND EARLY CHILDHOOD CARIES

53a
1. How to make my child like tooth brushing?
3. I’m impressed with the follow-up of the programme, and staffs are very helpful.

277a
1. At what age is a baby supposed to drink fluids other than milk? Even my doctor didn’t know. My son wouldn’t drink anything except milk until he was 12 months. There is heaps of information on food but not on how much water a baby should drink.

2. Maybe hints or tips from other mums on how to stop bad habits, healthy recipe and snack ideas.

3. Also, if you are going to give your child a biscuit or cereals, what are the best brands? (the healthiest). What occasional treats can you give your child that... going to stick to their teeth. And will allow you to complete your shopping in peace? Are sugar free lollypops OK?

126a
1. Having some trouble with baby letting me brush teeth sometimes doesn’t do go herself. Any other suggestions?

175a
3. Very informative

308b
1. How much it cost to see dentist and how much it would cost if there were problems that need to be fixed in the mouth.

69a
1. Not educated enough to say. All the information provided is important because is supplied by people who wish to recommend the best advice. Experienced and trained people who have a professional, accurate account on how to minimise unhealthy results.

3. Thank you for allowing my child and me to participate, as I find your researching very rewarding.

225b
3. Thank you for providing information to me, and helping me do the best for my child’s teeth.

300b
1. What age do I now need to take my child to the dentist? (eg. after this check with you?) What age do I take my next child to the dentist if they are not involved in this program?

2. Less sheets on it - a lot of information. But still giving the key message.

3. Thank you for toothbrush + information. Increased my awareness’ through content on information, but also the frequency of being reminded during the first year.
8a
3. I’m not sure why, but it took a few months before we made a big effort to clean Henry’s teeth. He hated it. After they appeared. Basically until my own dentist said that he had to hold his kids down to scrub them and they survived – with nice teeth!!!

331a
Program is informative. Very happy with it. Thank you.

226a
3. List of places I can go for dental checks up with my children, preferably free. eg. Can I take them to school dental clinics if under school age?

171b
3. I think it’s a great program and there should be more programs like this concerning the health of young children and babies.

76a
3. The information in a different format: a booklet rather than A4 sheets of paper.

124b
3. The information was well set out & easy to understand. I am glad I enrolled my son.

260b
1. I’d like to know what to do when the child won’t let me put the brush in his mouth. As gets older (now he is 20 months), he wants to take control but he doesn’t usually brush properly.

2. Breaking up the info into more parts (sections) and mailing it out more periodically.

3. I must say that after not hearing for 6 months, I thought you’d forgotten about sending information. I do appreciate though that it is expensive doing the mail outs.
Chapter 4. Discussion

4.1 Overview - general statement and study objectives

The study described and evaluated a newly developed oral health intervention program, conducted in the form of anticipatory guidance, the purpose of which was to decrease the incidence of severe early childhood caries. This was to be achieved by improving the mother’s knowledge about the prevention of S-ECC and motivating them to adhere to the guidelines.

The program started with the enrolment of nulliparous women, and continued after the birth of their child until the child reached the age of 18+ months, when all children participating in the study were examined by a dentist. To evaluate the efficacy of the program, the program was conducted in the form of an RCT.

The oral health promoting information was delivered in a non-intrusive way at baseline enrolment of the mothers and following the child’s delivery, by being mailed to each mother’s home address. The information was always relevant to the developmental stage of the infant.

This method of delivering the information presented several advantages:
- it gave each mother the opportunity to examine the oral health promotion information in private, and at a time suitable to her;
- other family members also had an opportunity to inspect the information if the mother informed them of the content of the program. This approach can help to unify the child’s dental care in the family; and
- the information can be reviewed if the need arises.

The mothers’ trust in the information they received was an important factor in influencing the acceptance of the program. The mothers were familiar with the sender of the information, and the majority of them were aware where the program was created. Our intention to help mothers with the dental care of their child was further demonstrated by
supplying them with practical dental care items such as toothbrushes. Mothers especially appreciated the finger toothbrush, which was unfamiliar to most prior to the study. It was found to be a very useful tool in establishing a child’s oral hygiene after the eruption of the first tooth.

For the conduct of the study a lot of attention was given to the methodology. The study’s central features were stated clearly and they included:

- aim and purpose of the study;
- enrolment of the subjects, including the process of randomisation; and
- inclusion and exclusion criteria of subjects were defined before enrolment.

A clear distinction between the test and control groups was established and was made visible in the RTC flow diagram (Figure 1.1). The program of the intervention was prepared well ahead of its intended use.

- The criteria for the outcome measures of the trial were defined, (e.g. case definition, cavitated, non-cavitated lesion, characteristics of the lesion, depth and area).
- To assess the influence of the intervention on the trial outcome the baseline and follow up comparability for test and control groups were established and analysed using relevant statistical methods.
- A model to ascertain the risk factors for the development of ECC was developed.

While the aim of the study was to obtain an unbiased estimate of the impact of the intervention on the incidence of S-ECC, in the process of conducting the study unpredictable events caused some departures from the “ideally” designed study. For this reason the strengths and limitations of the study were examined.

4.2 The strengths of the study

4.2.1 Design of the study and the relevance of the RCT for health promotion programs

Assessing the effectiveness or efficacy of previous oral health interventions is essential when planning for further interventions. However only interventions designed as RCTs,
with distinct test and control groups, can be readily evaluated in this manner. The RCT design is not often used in oral health promotion programs (Kay, Locker, 1996).

Despite the need for evidence of the effectiveness / efficacy of interventions in communities, the use of an RCT as a design for conducting health promotion intervention has been questioned recently (Watt et al., 2001). The reason lies in the assumption that some health promotion interventions are too complex to express the relationship between the input and output of an intervention in statistical terms. This relates especially to changes in human behaviour, which can be influenced by many interacting factors, determined genetically, socially and environmentally. With this assumption in mind, the RCT may appear too restrictive.

While some arguments against the RCT in health promotion interventions must be acknowledged, for interventions where the outcomes are specific and “easily” measurable (e.g. incidence of caries) and expressible in statistical terms, the RCT should retain its position as the preferred design for the evaluation of the quality of an intervention. There is a general need in society for evidence-based decisions in health promotion, in order to identify which past interventions worked, to what degree and, if they failed, what the reasons were (Rychetnik, 2003).

Some objections to the RCT design could arise from an ethical standpoint, such as the withdrawal of available information from the control group during the trial. In the context of the validity of the study, the possible sources of bias arising at different stages must be recognised and addressed.
4.2.2 Sample size calculation

The sample calculation for the study anticipated the enrolment of 590 mothers, in order to detect a 50% difference between the test and control group, with a two-sided 5% significance test, and power of 80%. The number of enrolled women was later increased to 649, when researchers experienced in work with pregnant women addressed the possibilities of larger losses during the period of the study.

4.2.3 Representativeness of the study

The representativeness of the sample in relation to “All” nulliparous women who gave birth in 2002 in the participating hospitals was analysed in Chapter 3, Section 3.2.4. (Table 3). The representativeness was assessed according to the age group composition in the sample compared to “All” nulliparous women. They were compared through percentages and descriptive statistics only, as the data relating to the “All” women group were summary statistics supplied by the “Pregnancy outcome unit”. There were minimal differences in the mean, median, and variance between the age groups, with women in the trial being slightly younger.

The representativeness and results of a study can be influenced by biases that may be introduced at different stages of the study (Keirse, Hanssens, 2000; Cochrane Reviewers Handbook, 2000).

The sources of systematic bias and their possible impact on results were considered when the study was evaluated. The following biases were recognised:

- Selection biases, the main and most important sources of bias, arise from processes by which the study subjects were selected. They can distort the comparison of test and control groups. Selection biases may have been introduced through a lack of blinding during the enrolment (a problem characteristic for Zelen’s design). The two main sources of these biases were mothers that did not accept the group into which they were randomly allocated and the exclusion of non-English speaking mothers. While there was an awareness of these biases, the low percentage of mothers who did not accept their allocation to the group to which they were randomly assigned (0.8%)
HEALTH PROMOTION AND EARLY CHILDHOOD CARIES

and the low percentage of mothers who did not meet the inclusion criteria (2.6%) were considered to be minor influences on the results of the study.

- Exclusions, losses and withdrawal of participants from the study contribute to the attrition biases. To some extent the benefit of randomisation can be lost when the losses are high or asymmetrical between the test and control groups. In this study, the comparability of the test and control groups was established at enrolment and again at the 18 month follow-up, by examining the same demographic characteristics of the mothers. No statistically significant differences were found between the test and control groups at any stage of the study.

- Performance / contamination bias (biased effectiveness of the intervention) arises through contamination of the intervention, as the subjects from the test and control groups live in a “free” environment, exposed to additional sources of information, which may positively or negatively influence both groups. This source of bias was not examined in the study, and is discussed in Section 4.3.1 “Contamination in trial”.

- Non-response biases are addressed in the section relating to the evaluation of written health promotion material (Section 3.12.2). The non-response rate in this aspect of the research was high, ranging from 7.7% to 12.5%, depending on the particular question. The reason for the high rate of non-response was most likely to be the overloading of the subjects with numerous activities at the 18 month follow-up. In addition to the questionnaire assessing the written health promotion material, the mothers were asked to complete the third questionnaire “Child Oral Health Survey” at the same time. Some mothers expressed concern about the number of questions they were asked to answer.

- (While the Performance / contamination and Non-response biases did not contribute to the strength of the study, they are mentioned in this section in order to deal with biases as a complex issue).
Observer biases are caused by the individual measuring the outcome. For example, if the person conducting the examinations is aware of the group in which the subjects are allocated, this may influence the way that the outcome is measured. While the same person conducted the dental examinations, the examination subjects were organised by the dental receptionists, thus preventing any direct knowledge of group allocation by the examining dentist before the dental examination.

4.2.4 Verification of the data in the sample

The prevalence of diseases, congenital anomalies, health harming habits such as alcoholism and smoking tend to be relatively stable in a given population at any point in time. The data obtained through the questionnaires, medical records, and dental examinations were compared with the population data in South Australia, or with other studies, which reflected the socio-economic structure of Australia.

This was to compare the occurrence of each event in the sample and the population. The number of children excluded from the study due to abnormalities in the oro-facial area (cleft/lip palate) was unusually high (three children) when considering that in South Australia 1 child in 600 is born with a defect in the oro-facial area. The number of cases in the sample was confirmed through re-examination of the medical records. However the selected public hospitals included the key centres for high-risk pregnancies and genetic abnormalities and therefore there may have been some self-selection or referral with these hospitals.

4.2.5 Frequency of contact with mothers

4.2.5.1 In relation to the result of the trial intervention

According to the results of the study, the frequency of contact with the mothers and the amount of information they received was satisfactory. Too frequent contact with mothers and too much health promoting information could fatigue the participants (Eckersley, 2001).

There were a few exceptions, with some mothers requesting more frequent contact.
4.2.5.2 In relation to the prevention of losses during the trial

The frequency of contact with the mothers was related to the type of losses of participants during the study. There was a proportionally higher percentage of losses in the control group characterised by our inability to establish contact with the mothers (Section 3.4.2, Table 26) as there was no contact with this group from the time of enrolment.

In the test group, a proportionally higher percentage of losses were due to the participants having moved from Adelaide to a distant location. In many cases we were informed of their intention to move. This reflects the importance of more frequent contact with participants during the trial, which assists the retention of participants.

All losses contributed to attrition bias. However the loss of participants is not always caused by a lack of interest in the study, but rather a change in life circumstances e.g. residential relocation.

4.2.6 Sustainability of the sample during the health promotion intervention trial

The total retention of participants in the study was 70.6% from the time of enrolment until the 18 month examination. In the test group the retention rate was 77.4%, compared to 66.8% in the control group.

The trend, mostly among younger people, to convert to mobile phones made it possible to locate some participants even after their relocation. However some of them were unable to attend the dental examination due to the long distances they would need to travel.
4.2.7 Dental examination and early diagnosis of ECC

A dental examination of infants and young children is relatively rare and there was limited knowledge about the behaviour of these children during the examination. The American Academy of Pediatric Dentistry (AAPD) recommends that infants (and parents) should be scheduled for an initial oral evaluation within six months of the eruption of the first primary tooth. This timing is important, particularly from an educational perspective, as the initial consultation with the dentist can help to establish oral health promoting habits. In this study only 1.8% of all participating children were examined within the recommended period.

The psychological maturity of a child is an important factor when conducting a dental examination. It is even more individual and variable than physical maturation. Psychological maturation is highly dependent upon the influence of society, which can stimulate or retard the development of the child. The presence of the mother during the examination is fundamental for the child’s “security” and is also important for the dentist, as the communication with the infant/toddler is minimal (Mathewson, Primosch, 1995). The generally accepted developmental theories (Table 4.1) recognise the rapid changes in the psychological development of the child during the first three years of life (Behrman, 2000).

<table>
<thead>
<tr>
<th>Theory</th>
<th>Infancy (0–1 year)</th>
<th>Toddlerhood (2–3 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freud: psychosexual</td>
<td>Oral</td>
<td>Anal</td>
</tr>
<tr>
<td>Erikson: psychosocial</td>
<td>Basic trust</td>
<td>Autonomy vs shame / doubt</td>
</tr>
<tr>
<td>Piaget: cognitive</td>
<td>Sensorimotor (stages 1–IV)</td>
<td>Sensorimotor (stages V, VI)</td>
</tr>
</tbody>
</table>

The Freudian theory refers to the biological (sexual) drive during the development of the child, with the oral and anal stages that involve the excitation or tension and satisfaction or release. Erikson’s theory refers to the emerging personality of the child, through the development of the internal sense of autonomy or shame, which corresponds with the anal stage of Freudian theory. Piaget’s theory refers to the cognitive development of the child measured through its sensorimotor ability (child’s ability to manipulate objects). However
there is no theory that measures and evaluates the child’s emotional responses (Nadel, Muir, 2004).

The dentist must be aware of the psychological stage of a child’s development during the dental examination, the hallmark of which, at this stage, is striving for autonomy and independence, though at the same time the child wants to be close to the primary attachment figure – the mother (Schroeder, Gordon, 2002).

The dentist must thus be particularly astute while providing dental care for young children, as the dentist must understand and assess the child from all aspects of child development, including motor, intellectual, verbal, social and emotional. Normal development usually means that the child matches the average in all aspects of development.

The mouth is vitally important for the infant during the first two years, as it satisfies not only the early physiological need for sucking, but later becomes an organ through which the child discovers its surroundings by tasting, biting, and licking to gain important information about the environment (Koch, Poulsen, 2001). This is another reason why creating a safe environment during the examination, with communication adapted to the age and maturity of the child, is an important factor in the child’s acceptance of the dental care.

The children’s age during the examination ranged from 18 months to 30 months, with mean age of 20 months ± 2.5 sd, and differences in their behaviour during the examination were noteworthy. While most of the 18-month-old children were highly dependent on their mother and their short attention span made the examination more difficult, the children from approximately 24 months were co-operative and some of them enjoyed the examination. For example, some voluntarily stayed in the examining position, with their head on the lap of the examiner, even after the examination was completed. This observation reflected the rapid development of the child, in which each month of life makes a difference in their adaptation to new experiences.
While the AAPD recommends that the initial dental examination should be conducted within 6 months after the eruption of the first tooth, a prevention oriented examination of children at the age of two years can be provided routinely at dental clinics with a strong likelihood of co-operation from the child, if a safe environment is provided.

4.3 Limitations of the study

4.3.1 Contamination in trial

During the trial preparation little attention was focussed on other possible sources of information regarding the child’s oral health, which could influence the mothers’ knowledge and behaviour during the trial and thus contaminate the intervention. There was potential to investigate the exposure of participants to other external sources of information eg. media, other health professionals, experienced family members etc, in the third Questionnaire: Child’s Oral Health Survey, but this was not carried out. Even if these biases are considered, with respect to the comparability of test and control groups, it could be assumed that the influence would be the same.

The potential for information to crossover from the mothers in the test group to those in the control group was minimal due to geographical distance between the residences of mothers, which included in total 151 postcodes across Adelaide and suburbs. Only 4 postcodes were repeated more than 20 times in the sample of 649 enrolled women and only 10 postcodes were repeated more than 10 times.

Overall only 27.6% of mothers in the test group indicated that they passed the information on to mothers with small children, but the relationship between these mothers was not examined. During the child’s dental examination none of the mothers in the control group indicated that they had received information from the mothers in the test group.

4.3.2 Use of oral antiseptic “Savacol” by mothers in the test group

During their enrolment in the study, expectant mothers in the test group received the mouthrinse “Savacol” (2mg/ml chlorhexidine gluconate, ethanol 115mg/ml) to improve their oral hygiene during pregnancy. The instructions for use of the product were described
in the information sheet (B – 8). It was recommended to use Savacol once a day for a period of two weeks, at six monthly intervals. The product was not recommended for daily long-term use due to potential staining problems.

Emphasis on the oral health of the mothers continued through all phases of the intervention (see section B – 32, B – 49). However the practical use of the antiseptic was not examined in the study. It would be difficult to assess the impact of Savacol on the infants’ microbial flora, as the mothers were enrolled in the trial at different stages of pregnancy. The study did not include the collection of mothers’ saliva for microbiological examination.
4.3.2 Sustainability of the results

4.3.2.1 Sustainability of information

Despite the success of the intervention at 18 plus months, the sustainability of the intervention remains uncertain, if no further contact were to be maintained with the group. The intervention was conducted in the form of anticipatory guidance, following the child’s development, which was rapid at this age. By discontinuing the delivery of further information, some of the information will become obsolete and the positive effects of the program could be lost (Swerissen, Crisp, 2004).

4.3.2.2 Sustainability of social support to the mother

By emphasising the health promoting information, the value of the continuous social support that the mothers received through participation in the program and the interest in the oral health of their child by the researchers can be overlooked.

While different forms of social support are recognised (e.g. physical, emotional), in this case it was mainly informational social support that was provided to the participants in the form of information relating to the maintenance of the child’s oral health (Kline, 2002).

There is no literature in dentistry that would examine the attitude of pregnant women, mothers towards continuous informational social support and the impact of this support on the oral health of their children. Some knowledge related to this problem could be gained through experience from different medical fields involving mothers.

A systematic review of seven randomised controlled trials found that women were more dissatisfied during pregnancy if they had fewer visits than compared to traditional regimes of antenatal visits, however more visits did not produce differences in the detection of complications during pregnancy (Dodd, 2002). It is the combination of medical care and the information supplied to mothers by the health professional which is crucial to them at this stage of their life.
Modern technologies such as the internet may become a future vehicle for delivering health information, where information could be delivered continuously. However in the case of this sample, the internet would not reach the targeted population as only 5.2% of mothers in the test group at the time of enrolment stated that they used the internet as a source of information during pregnancy, while 54.9% stated that their main source of information was health professionals. The information delivered to mothers through health professionals during pregnancy and after the birth of their first child creates an extremely important form of social support for women, and this cannot be replaced through technology.

The Adelaide study by Newman emphasises the importance of social and community support for families, and the disappearance of this support is seen as one of the reasons for a lowered birth rate. Lack of information about baby care, especially with the first child, may have widespread social consequences (Newman, 2004).

Information about the prevention of early childhood caries provides only a small part of the information needed to raise a healthy child. The social support provided by mailed information was well perceived by mothers. During the examination many of them expressed the need to continue with this form of support. They acknowledged that they were not aware of many of the practices described in the information material, and that the information received helped them to make an informed decision.

4.3.3 Home visit program versus phone call study

Home visiting programs are a recognised intervention that has been found to be successful in the prevention of child abuse and neglect (Vimpani, 1996) and in long-term oral health education programs (Kowash, 2000). This type of intervention was originally intended for mothers in test A group to reinforce the health promotion intervention. However, the home visit program was changed to a telephone contact, after realising the large geographic area from which the sample had been drawn.
There were also concerns for visitor safety, especially in more socially disadvantaged areas. These living conditions are frequently connected with disadvantaged inhabitants, characterised by isolation and increased vulnerability, especially when the persons have to deal with access to health or dental care. This creates a greater need for support to the mother.

By changing the approach, personal contact with the mothers was compromised and an opportunity to offer tailored advice was sacrificed. On the other hand, a new form of health promoting intervention via the telephone, which could potentially have broad application in Australia, with its low density of inhabitants and large distances between dwellings in rural areas, was tested. According to the Australian Bureau of Statistics at 30 June 2003, 64% of the Australian population lived in capital cities. The density of population was 2.6 people per square kilometre (Australian Bureau of Statistics, 2005) one of the lowest in the world. In South Australia, the density of population was even lower (1.5 persons per square kilometre), with population clustered (81%) in the better watered south – eastern region: Adelaide and a radius within 80 kilometre of Adelaide.

4.3.4 Early diagnosis at 18 months

4.3.4.1 Diagnosis of non-cavitated lesions

No clinically objective methods are available to determine the aetiology of non-cavitated lesions of the enamel. The diagnosis of white spot non-cavitated lesion was based on their location, colour and shape. To aid diagnosis, teeth were thoroughly cleaned with a new toothbrush prior to the exam. The favourable position of the maxillary incisors made these teeth easy to dry during the examination.

4.3.4.2 Consistency of the diagnosis

As mentioned in Chapter 2 section 2.5.4, prior to the examination phase of the study, the examiner completed a training session at the Women’s and Children’s Hospital Paediatric Dental Unit in Adelaide. During the dental examination a hospital dentist verified the diagnosis on occasion. This approach was not consistent, however, as the availability of a
second dentist was dependent on the location of the clinic where the examination was conducted.

Among the re-examined cases no situation of conflicting diagnosis between the hospital dentist and the examiner were found. Because these dual examinations were opportunistic there was no attempt to analyse the percentage of agreement through statistical methods, such as the calculation of kappa values.

### 4.3.4.3 The co-operativeness of the child

The accuracy of a clinical examination depends on the conditions under which the examination was conducted, including the lighting, use of instruments and especially the cooperation of the child. While the environmental conditions and cooperation of staff in the dental clinics were satisfactory, this wasn’t necessarily the case with the 18 month old subjects, whose level of cooperation varied widely. For this reasons the data reported in this study are limited to the incidence of dental caries on the labial surfaces of the maxillary front incisors which were visible even in uncooperative children.

### 4.3.5 Plausibility of the study

The study was designed to assess the efficacy of the intervention as a RCT. To assess the efficacy of the intervention the comparability of test and control groups was assessed at different stages of the trial. It was assumed that if no significant differences were present between the groups, then the differences in outcome of the trial would be the result of the intervention.

Further analysis would need to be conducted to assess the behavioural differences that could alter risk and protective factors between the test and control groups.

### 4.3.6 Missing data

Missing data have the potential to reduce the validity of a study. In this study the only variable missing in more than 5% of cases was “family income”. This low percentage of missing data was unlikely to have affected the results. There was no attempt to impute the

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missing values, as the computation of missing values from a relatively small sample could lead to bias.

All data in the tables were presented as the valid percentage and the number of subjects with missing values were reported for each variable.

4.4 Significance of the study

Early childhood is considered to be the most important stage in the life of an individual. It can have a profound impact on future development. Unfortunately, the contact between dental health professionals and mothers, who have traditionally been the main facilitators of care during this critical time, is insufficient at best and often missing completely.

The introduction of new methods in the delivery of oral health information to mothers and the continuity in the delivery of guidance during the period of the trial is an essential feature of the study, which resulted in the significantly lower incidence of S-ECC among children whose mothers received such guidance.

The high retention of participants in the study, especially the retention of participants with lower income and education, is an important feature of the study, however the study wasn’t able to improve the oral health of children in one-parent families.

4.4.1 Comparison with other studies

RCT studies of interventions with positive results are regarded as the highest level of evidence that an intervention works. In the overview of interventional preventive programs (Section 1.9), all the cited studies demonstrated a decrease in the prevalence of ECC in the groups where the intervention was applied. However, not all studies were designed as RCTs. In turn the RCT design does not guarantee that the same results will be achieved under different conditions or in different communities.

Studies target different risk factors involved in the initiation of S-ECC, using various methods, applied at different stages of the child’s development. Some subjects received regular prophylactic treatment to prevent the transmission of bacteria, while other studies targeted only behavioural changes through which the improvement of oral health care
should be achieved. Whatever the intervention used in the prevention of ECC, the real target was always the mother. She was the main vector through which the intervention was delivered and realised.

Currently there is insufficient information to assess the results of existing interventions in terms of systemic reviews and meta-analysis. The low number of studies and the methodological differences between the studies and the different social, cultural and environmental conditions at the communities where the interventions were applied preclude us from drawing generalised conclusions. Despite these limitations, experience gained from such published studies can be used in the preparation of new interventions.

The study “Cavity free children” reflected and complemented the local conditions in South Australia, by addressing the gap in dental health care. The selection of nulliparous women as the target group was ideal, as they were generally very receptive to the information provided, and felt motivated to provide their first-born child with the best care possible. The significant difference between the test and control groups in the incidence of ECC demonstrates the efficacy of the interventional program.

The oral health of mothers plays an important role in the possible association with low birth weight and pre-term delivery (Khader, Ta‘ani, 2005) and later in the transmission of cariogenic microorganisms to the child (Caufield et al., 1993; Li et al., 1995). Providing expectant mothers with information about the importance of their own oral health during pregnancy and the importance of healthy primary teeth for the development of the child will increase the success of the intervention.

4.4.2 Retention of participants according to education and household income

The relationship between the number of children lost to the study and the mother’s education and household income generated an interesting pattern. When retention of the mothers in the study was analysed according to their formal highest level of education, the lowest retention in the test group was contributed by the mothers whose highest education was “Some college/University” (62.8%) and in the control group it was “Some secondary school” (56.0%). The highest retention in the test group was among mothers who “Completed primary school” (83.3%) followed by the mothers who had “Some secondary
education” (80.9%), and in the control group they were mothers who “Completed university” (80.6%) and mothers with “Some college / University” (70.2%) (Section 3.3.2, Table 30). The reverse order in the retention rates between the test and control groups may be a reflection of the mothers’ varying motivation for participation in the study.

While the mothers in the test group with the lowest formal education level, “Completed primary school” or “Some secondary education”, could see participation in the program as an opportunity to extend their knowledge about the prevention of ECC and thus improve their parental skills, mothers in the control group with the lowest levels of formal education may not have identified with the importance of a preventive dental check-up for the child at 18 months as a reward for their participation and they had the lowest retention in the study. Inversely the mothers with the highest education in the control group through their high retention in the study acknowledged the importance of preventive dental examinations.

The same pattern of participant retention is followed when it is assessed by income. In the test group the highest losses (33.3%) were in the category with the highest income ($60,000+), in the control group the highest losses (47.1%) were in the lowest income category (up to $12,000). The lowest losses in the test group were in the categories with the lowest income ($12,001 – 20,000 and up to $2,000) and in the control group they were the category with the highest income ($61,000+, $41,0001 – 50,000, $51,000 – 60,000).

The high level of interest in the program displayed by mothers with lower education and income levels may be representative of a shift in the thinking of disadvantaged mothers, who might have been more willing to take advantage of opportunities to increase their parental skills.

The antenatal clinics of public hospitals seem to be an appropriate venue for the enrolment of expectant mothers into dental preventive programs as the younger and financially less secure women, whose access to dental care can be limited by these circumstances, preferentially use the services of these hospitals. Involving them in the program during their pregnancy, and providing them with information about changes in their mouth during pregnancy and relevant dental care can establish the stimulus and motivation for the maintenance of both their and their child’s oral health.
This approach to preventive dental education could be thus seen as an attempt to reduce health inequalities for children, as children from low-income families have higher caries rates (Watson et al., 2001).

4.4.3 Home delivered “Anticipatory guidance”

The timing of the intervention is seen as one its most important aspects. Providing relevant advice around the time that it is needed increases interest in the study. The nulliparous women targeted by the study are more “susceptible” to the information due to their inexperience in child rearing. Compared to other forms of education, the opportunity to learn about oral health in the privacy of their homes removes any stress relating to the demonstration of inexperience in front of others.

4.4.4 Dental health education and inequalities

Epidemiology reveals that prevalence of disease varies across the socio-economic groups, with socially disadvantage inhabitants the most affected (Daly et al., 2002). One of the strategies to decrease the inequality is to improve the access of this population to health promotion services and programs.

However, the results of health education interventions - the purpose of which is to increase the preventive health knowledge and to change the behaviour of participants in favour of health promoting behaviour - are often uneven in their impact on the participants. The unevenness often reflects their social position. The smallest positive changes are reported from participants with a lower socio-economic status, which is characterised by a comparison between the family income and the national average income. (In Australia low-income families are families with a yearly income lower than $30,000 per year.) The health inequalities can thus increase through an intervention (Schou, Wight, 1994).

The retention in the test group of mothers with the lowest formal education and lowest income in the study showed their interest in maintaining the oral health of their children. By delivering the oral health promoting information to their home address they have the opportunity to access it without problems relating to transport, fears of social rejection if
the information is presented through classes, or the fear of having to admit their inexperience publicly.

The consequences of social inequality have a far-reaching impact on the life of a child. Reducing them is an important goal in primary care. In general there is evidence that people from disadvantaged groups are less likely to use preventive health services and thus benefit from the opportunity to maintain or to improve their health.

Even this study’s form of oral health promotion can reflect the existing social inequality, as a number of mothers were unable to participate in the study due to their inability to arrange transport to the dental examination as a result of their socio-economic situation.

Multivariable logistic regression provided the opportunity to explore the efficacy of the intervention on the incidence of S-ECC in relation to the socio-economic position of participants. Family income was the only variable in the study exceeding 5% of missing responses and consequently this variable was not used in logistic regression analysis. Instead, level of education was used as a proxy measure of family income. Hence when the level of education was entered into the logistic regression model with primary and some secondary education as the reference group for the level of education, no significant differences in the incidence of S-ECC in the relation to any of examined levels of education were found.

The adjusted odds ratio for children to develop S-ECC whose mothers completed secondary education, some university or college was not significant, and for those children whose mothers completed university or college the odds ratio was also not significant. This provides some support for the proposition that the benefit of this oral health promotion intervention was unrelated to mothers’ education, a positive finding given the frequent finding of a social gradient in disease experience and efficacy of the intervention.

The low incidence of ECC in the test group (4 cases) made it impossible to conduct more analyses on the efficacy of the oral health promotion program in relation to the socio-economic position of participating mothers, as well as in relation to other variables used in the study.
4.4.5 Disadvantage of the one parent family.

This sample of mothers was characterised by the low mean age at birth, which was 25.4 years at the enrolment (Section 3.1.4, Table 4), 25.7 years at examination (Section 3.5, Table 32), compared to all nulliparous mothers in SA, whose mean age was 25.9 years. The sample was characterised by a high percentage of single parent families, which was 20.7% at the 18 months examination (Section 3.9.3, Table 61), compared to all parents in South Australia, where in 2002 the percentage of single parent families was 13.9%. A quarter of single mothers in SA were teenagers, and another third were in their early twenties. A greater proportion of single women attend public hospitals for health care (Chan, 2002).

The consequences of being a one-parent family often include a higher level of unemployment, poor housing, and financial hardship. In relation to psychological health, associations with increased incidence of long-term emotional and behavioural problems among the children have been reported (Lissauer, Clayden, 200).

The unfavourable impact of one-parent families on the health of the child was also demonstrated by this study. In addition to the aforementioned trends of increased incidence of various problems among children from one-parent families, these children also demonstrated a statistically significant increase in the incidence of S-ECC (p<0.033) compared to two parent families.

4.5 Implications of the program

The impact of early childhood caries on children and their families is frequently underrated or neglected despite the substantial incidence of caries. Access to dental care for young children in the public sector is often limited by waiting periods or the unavailability of these services for very young children.

Mothers (parents) should have the opportunity to receive information that will support the maintenance of “Cavity free children” and thus choose better health options when caring
for their child. To achieve these goals, some structural reforms of oral health care, which support the sustainability of the interventional programs, must be implemented.

Even with the success of the intervention future applications should be made only with the vision of:

- further improvement of the implemented program;
- extension of the program and following the development of the children already enrolled through to commencement of school;
- involvement of further groups of people who can influence the oral health of children.

The program should be continuously monitored and evaluated, so we can learn what parts of the program work in the community best and why.

### 4.5.1 Improvement of the program

The program and the experience gained during the preparation and application of the intervention were assessed and analysed. Further improvement of the intervention needs to involve both the researchers and active input from the participating mothers.

The mothers already played an active role in assessing the quality of the current intervention. In total 56 mothers expressed their thoughts on the intervention, or addressed some practical problems they encountered while caring for their child's oral health which were not covered in the intervention.

By supplying the mothers with information considered important in the prevention of S-ECC and answering their questions relating to the oral health of their child, the intervention will reflect “real life” information needs, which should increase the interest of the mothers in the intervention. The active involvement of the mothers has to be maintained throughout the intervention.

The oral health promotion program should be understood as a process. For this reason, mothers whose older children experienced dental caries should have the opportunity to access the program again, if they are interested, when subsequent children are born.
4.5.2 Involvement of other groups of people in the program

As children get older, their involvement with their surrounding environment expands and consequently increases their contact with other people who can shape and influence their health habits. For this reason the “Cavity free children” program should include people who have frequent contact with children, including other health professionals, teachers in child-care centres and other family members. (The improved program can be disseminated via internet with the address of web site containing oral health promoting information.)

4.5.2.1 Other health professionals

Other health professionals’ knowledge of S-ECC prevention should be updated regularly, as many of them circulate through different departments of the hospital, and may come into contact with young children. This should not be limited to doctors, whose current medical curriculum rarely includes aspects of preventive dentistry.

The knowledge of nurses, especially in the area of primary care, and nutritionists should be regularly updated and reinforced as they have many opportunities to influence the oral health promoting decisions of mothers.

The education campaign “Lift the lip” has been carried out in different settings around the world. As a part of this study the imitation of the mouth with the possibility to lift the upper lip was developed. The purpose was to demonstrate the areas of teeth where caries typically is initiated. This model could be use in conjunction with further education of other health professionals.

4.5.2.2 Other family members

The program should target the fathers, grandfathers and especially grandmothers, who like to offer their frequently outdated experiences to young families. Differences in opinion can create tensions in the family, which should be prevented. This could also play an important role in the prevention of S-ECC as other family members may play important roles in the care for the child.
In this study 45.6% of mothers were the major carers for the child, followed by the fathers 20.9% grandmothers 14.7%, and child care centres 9.8%. The less frequent carers were grandfathers 1.8%, neighbours 0.5%, other family members 2.9% and unspecified others 1.3%. In total 2.5% of participants did not respond to this question.

Child care is changing with an increasing number of young children receiving formal care (regulated child care away from home eg, long day care, preschool or kindergarten, with the greatest increase among 0 –2 years olds which increased from 8% in 1984 to 22% in year 1999. (http://www.abs.gov.au/Ausstats/abs@.nshiLookup).

4.5.2.3 Child-care centre

While at the time of the dental examination only 9.8% of children attended a childcare centre, it is likely that this number will increase as they get older. The high numbers of children in childcare centres is the reason for educating the staff in this area. Information on the prevention of S-ECC and ECC should be delivered on a regular basis to the staff of childcare centres.

4.5.3 Extension of the research

The research should be extended further, to include the following:

- follow-up of the intervention
- the “Cavity free children” program should be updated to incorporate the developments in preventive dental knowledge according to preconceived objectives, and in partnership with mothers.

4.5.3.1 Follow-up of the intervention

The intention is to continue with the program “Cavity free children” until children involved in the study reach five years of age, when further dental care can be provided through the school dental services. The mothers have already demonstrated commitment towards the study and many of them expressed their willingness to continue with the program.
To examine the impact and the sustainability of the intervention, the dmft of the children enrolled in the program could be compared and further comparisons made with children selected from the school child population.

By continuing the program “Cavity free children” new information and experiences can be gained about caries prevention in preschool children. These experiences can again establish the basis for further program improvement.

4.5.3.2 Improved program “Cavity free children”

The “Cavity free children” program is planned to continue, in co-operation with the South Australian Dental Service and SA Department of Health. A team of dentists and school dental therapists should be involved into the program (after they receive the information about the process and aims of the program). These dental team members should reinforce main massages and motivate parents in the program. The involvement of dentists and school dental therapists has another advantages: parents have to be informed about the location of dentists and school dental therapists, whom they can visit with their child.

A higher number of enrolled expectant mothers is anticipated and methods of improving the enrolment process are being considered. The challenge is to design and organise the program including the evaluation stage, before its commencement. Insufficient attention to the organisation of programs often leads to difficulties in the evaluation stages, which can compromise data regarding the impact of the intervention as well as jeopardise further funding for such programs.

The intervention will succeed only if the community accepts the information provided. Mothers must be aware that they and their children will benefit from the intervention and must see their participation in the program as an opportunity tailored to their specific needs.

The success of long-term oral health promoting programs thus depends on the ability to establish proper relationships with mothers and their engagement in the educational process. For this reason health-promoting messages based on the current scientific knowledge must be trustworthy and clearly communicated. The educational process often
faces many barriers, such as geographic, sociological, psychological, and economical barriers. A social approach to health promotion, which can reduce health inequalities, is necessary if overall reduction in the incidence/prevalence of ECC is to be achieved.

The Australian health system gives all pregnant women access to essential health care they need during pregnancy and the social security system provides them with resources to cover their basic financial needs. Further effort should be made by health professionals to help mothers and their children to develop a healthy lifestyle early in life and thus prevent the onset of preventable chronic diseases such as S-ECC.

Achieving optimal health for children in the future must involve the gradual shifting of resources from the provision of treatment to more preventative strategies, and putting the well-known proverb “Prevention is better than cure” into practice.

4.5.3.3 Evaluation of the program “Cavity free children”

Given the efficacy of the intervention, cost becomes a further consideration and one where there may be an advantage. The program can be run centrally with distribution through mail. It could also reach a large number of mothers.

The impact of the intervention should also be seen from a broader view, not only in the reduction of direct cost involved in the treatment of the disease. The existing indirect cost of the disease arising from the absence of parents at work during the child’s treatment and recuperation after the surgery is another component of the cost of the disease. The most significant component is the consequence of a disease, which influences all aspects of child’s life (psychological as well as physical) often years after the primary event, which is often forgotten.
4.6 References to Chapter 4


http://www.abs.gov.au/Ausstats?abs@nsfl/Lookup


Rychetnik L. Evidence-based practice and health promotion. Health Prom J Aust 2003;


Vimpani G. How we can improve access to services for families with young children? The need for new models of interagency collaboration. Paper presented to the Australian Family Research Conference Brisbane, 27-29 November 1996.


Chapter 5. Summary

To decrease the prevalence of tooth decay in the primary dentition new, innovative and effective preventive approaches targeted to the family must be developed. This is of fundamental importance as children usually spend their first years of life in the home environment with their mothers or other carers, mostly family members. Only a small percentage of children attend childcare in the early months (years) of their life.

While there is no doubt about the importance of introducing healthy habits early in life, it is not easy to disseminate oral health enhancing information in the home environment of the infants and thus influence the home based individual care of infants and young children. Another problem arises from mothers' (parents', caregivers') choices about accessing children's health care. It is rare that parents take a child to the dentist for a dental check-up during the first three years of the child's life if no obvious dental problem arises.

In South Australia, health care can be accessed through Child and Youth Services, Community health centres, the family doctor or paediatrician, hospitals, pharmacies or crisis care after business hours. These health professionals are in a position to implement oral health promoting preventive methods, yet they themselves often are not prepared for this role or do not have time for this kind of work.

The purpose of this study was to test the efficacy of an experimental oral health promotion program applied in the form of anticipatory guideline, targeting nulliparous women. A controlled randomised trial was chosen as the design for the study to test the hypothesis of the intervention.

Two main aspects were examined and tested through the study:

- the differences in incidence of Severe Early Childhood Caries between the test and control groups at the age of 20 ± 2.5 months.
- the perception of interventional oral health-promoting material among nulliparous women in the test group.
The evidence for the potential efficacy of the interventional program was established from multiple sources, which included epidemiological, behavioural and socio-demographic information.

Data from the following sources were collected as part of the research:

1. questionnaires: First Questionnaire: Maternal oral health survey
   Second Questionnaire: Refusal to participate
   Third Questionnaire: Child’s oral health survey
   Fourth Questionnaire: Evaluation of the oral health intervention

2. medical history
3. telephone intervention
4. clinical dental examinations.

The sample size was determined statistically to assess the differences in the prevalence of early childhood caries between the test and control group and inflated for exclusion, attrition and non-participation at the 18 month follow-up dental examination.

A total of 649 nulliparous women were enrolled in the program. The oral health-promoting program was implemented among mothers in the test group in the form of three rounds of printed oral health promotion material. The intervention took place between January 2002 and January 2004.

The first round of information was obtained by mothers during their antenatal visit to hospital. The following two rounds of information were sent to their home address when the child was six and 12 months old. In addition to the printed promotional information, mothers received a small gift with each round of information. During the pregnancy it was the mouth-rinse “Savacol”, to help them keep their oral environment healthy. With the second round of information it was a “finger toothbrush” for each child, and with the third round of information it was a toothbrush for the mother.

After checking medical records for pregnancy outcomes the mothers in the test group were randomised into test A and test B groups. The written health promotion material in test A group was reinforced through phone calls. The phone calls were conducted between the six and twelve months of the child’s life.
HEALTH PROMOTION AND EARLY CHILDHOOD CARIES

The dental examination took place between September 2003 and July 2004. In total 441 children were examined at the age of 20 ± 2.5 months. The retention rate of the sample (after exclusions) was 70.6%. The incidence of Severe Early Childhood Caries in the test group was 1.7%, with no differences in numbers of children affected by decay between test A and test B group. The incidence of Severe Early Childhood Caries among children in the control group was 9.6%. The total incidence of Severe Early Childhood Caries in the sample was 5.4%.

The written health promotion material was evaluated from 232 questionnaires completed by the mothers at their child’s dental examination. Participating mothers accepted the program positively. The positive answers in yes / no type questions ranged from 97.6% to 49.8%. The answers to the scaled questions were most frequently the second most positive response category. Overall the program was evaluated as good 113 (55.2%) and very good 79 (38.5%) responses.
Chapter 6. Conclusions

The conclusions drawn from this study will be addressed in three categories:

1. the design and methods of the study
2. the results of the health promotion
3. the implications of the program

6.1 The design and methods of the study

1. The sample on which the intervention was implemented represented 1/5 of all nulliparous women who gave birth in public hospitals where recruitment occurred in 2002. The mean age for primigravidae in the sample was 25.4 years. The mean of age of all nulliparous women who gave birth in the same period of time in hospitals where recruitment occurred was 25.8 years of age. The mean of age of all nulliparous women in SA in the same period was 27.1 years. The differences in mean of age were caused by the fact that “older” nulliparous women who were in a financially more favourable position tended to give birth in private hospitals.

2. As the majority of tooth decay is concentrated in a small number of children from lower socio-economic sectors of the population, public antenatal clinics were a suitable place for enrolling women into oral health promotion research study.

3. The oral health promotion program was tested on a sample randomised into two groups (test and control).

4. The health promotion intervention implemented in the test group consisted of three rounds of printed health promotion materials. The information material was received by mothers at the time of enrolment and later in two deliveries to their home address. Further accessories to the program (mouth-rinse, toothbrushes), were also provided to test group mothers to stimulate their adoption of oral health protective behaviours.
HEALTH PROMOTION AND EARLY CHILDHOOD CARIES

5. At around 18 months of age, 441 children were examined by a dentist to establish the incidence of Severe Early Childhood Caries in the test and control groups. A case of S-ECC was defined as “One or more maxillary anterior teeth carious”.

6.2 Results of the health promotion program

6. Beside the losses caused by death of the child and mothers’ illnesses, the main reason for losing participants was their unstable residential status.

7. At baseline there were no significant differences between the groups in socio-demographic characteristics, the perception of general, dental health, nutritional and self-care habits (including the health-damaging (alcoholism, smoking) habits) and psychological well-being.

8. The retention rate of the sample was 70.6%. No significant socio-demographic differences were found between the test and control groups at the time of examination.

9. The incidence of Severe Early Childhood Caries in test group was 1.7% compared to 9.6% in control group. The difference in incidence between test and control groups was statistically significant indicating the efficacy of the implemented program.

10. The telephone intervention to reinforce the oral health information obtained through printed material in test group A did not play a significant role in the incidence of Severe Early Childhood Caries.

11. The principle of non-intrusive presentation of the oral health information was a critical characteristic for the intervention. The mothers (parents) had the opportunity to read the written material at a time suitable to them, and re-access it as necessary.

12. The program was well accepted by the participating mothers and rated as good to very good. The mothers perceived the form of delivery of the oral health promotion information to their home address as being useful in making decisions about oral care for their children.

180 6. CONCLUSIONS
13. Some 56 mothers submitted in writing their suggestions, concerns, problems and experiences which they gained while caring about the oral health of their child.

6.3 Implications of the program

14. Based on experiences from this study, the program can be improved and applied to a broader population. The main beneficiaries should be people in rural and remote areas, where access to medical and dental care is limited not only by distance, but more importantly by the shortage of health professionals.

15. Special attention should be given to socially and economically disadvantaged mothers and families to reduce the inequalities in oral health. In some circumstances the program should be adjusted to the literacy of the group.
Appendix A1: Information sheet
PARTICIPANT INFORMATION SHEET: CAVITY FREE CHILDREN

You and your child are invited to participate in a two-year research study. In the past various scientific studies have indicated that tooth decay is a preventable disease. Despite this fact around 20% of 2 year olds suffer from dental decay. The earlier the decay develops, the more serious its consequences. Each year around 800 preschool children are treated in the Women’s and Children’s Hospital under general anaesthesia as a result of dental decay.

What is the aim of the study? The study will test whether a preventive program during the first two years of a child’s life works effectively to prevent dental decay. The program will include topics such as oral hygiene, diet counselling, use of fluoride, and self-detection of the disease.

Background. The preventive program may be tested against mothers and babies not receiving health information. Both a Test group and a Control group are necessary. The researcher will approach 600 first time pregnant women at four antenatal clinics in the Adelaide metropolitan area and give them an information sheet, a consent form and a screening questionnaire. 300 women will be randomly allocated (by a process like tossing a coin) to each group. You will have a 50-50 chance of receiving health information and other support, or receiving none at all from the researcher. From the 300 in the test group 50 will be selected randomly for home visit half when the babies are 6 months and half when the babies are 12 months old.

What happens during study?

A: If you are in control group, all what is required is that you:
- sign a consent form
- agree to answer a second questionnaire before your baby reaches 18 months of age, posted to you with a pre-paid return envelope
- allow your child to have a dental examination (see below*) at the age of 18 months
- allow the researcher to access your case notes

B: If you are selected for the test group the following procedures will be followed:
- sign a consent form
- you will receive health information during enrolment and then by post before your baby reaches 6 and 12 months of age.
- you will have the 1800 toll-free phone number and the opportunity to contact a dentist in need of information (Telephone number will be arranged in the middle of the year 2002).
- either at 6 months or 12 months the researcher will visit 25 of you at a time to suit your convenience and talk about oral hygiene, nutrition and lifestyle. This visit will last no longer than 30 minutes.
- You will be asked to complete another questionnaire before the baby reaches 18 months of age. This will be posted to you with a pre-paid return envelope.
- allow your child to have a dental examination (see below*) at the age of 18 months
- allow the researcher to access your case notes
When ALL BABIES (both groups) reach the age of 18 months a dentist will examine the babies' teeth, according to the recommendations of the Australian Dental Association*. The child will be sitting in your lap and the teeth will be examined with the help of mouth mirror and a pen light source. The examination will take less than 30 minutes. No drugs, injections will be administered, no X-rays will be taken. At this time you will be counselled on how to maintain your child's oral health and prevent dental decay.

Is any cost involved? No. The dental examination and counselling are free. There will be no payment to you, or to your child, or reimbursement of travel costs for taking part in the study.

Where will the dental examination take place? The dentist / researcher will conduct the examination in the nearest health centre to you, or in the Adelaide Dental Hospital. You will be contacted by phone before baby reaches 18 months of age, to arrange the place and time most suitable to you.

What are the risks of this study? There is no greater risk involved than for a normal dental examination.

Can I withdraw my child from the study? You can withdraw your child from the study at any stage and this will not affect medical care or any other aspects of your child's relationship with this hospital. Researchers retain the right to withdraw any participants at any time.

What happens to the results? They will be used to develop appropriate methods of preventing dental decay in babies, and published in scientific journals. At the completion of the study a Newsletter will be sent to you outlining the results. Your name or the name of your child will never be included in any results. You can retain a copy of the Consent Form, when completed, and the Information Sheet.

What if I have questions about the study? Any questions regarding the study can be discussed with the researchers. They can be contacted as follows:

Prof. John Spencer 8303 5438  Dr. Kamila Plutzer 8303 3292

This study has been reviewed by the Flinders Clinical Research Ethics Committee. Should you wish to discuss the project with someone not directly involved, in particular in relation to matters concerning policies, information about the conduct of the study or your rights as a participant, or should you wish to make a confidential complain, you may contact the Administrative Officer – Research, Ms Carol Hakof, on 8204 4507.
Appendix A 2: Consent form
I, ................................................................. request and give consent to
(first name) (surname)

my involvement in the research project: CAVITY FREE CHILDREN

I acknowledge that the nature and purpose of the research project described on the attached Information Sheet has been fully explained to my satisfaction by Kamila Plutzer and my consent is given voluntarily.

I acknowledge that the procedures have been explained to me, including indications of risks, and inconveniences. The procedures involve:

Either – Test group:
- the completion of two questionnaires (Maternal Oral Health Survey at the time of enrolment and Baby’s Oral Health Survey at the age of 18 months, mailed at home address)
- printed oral health information: received directly during the enrolment to the study and before the baby reaches 6 and 12 months of age (mailed at home address)
- 1800 toll-free phone number to contact a dentist researcher when in need (from the middle of the year 2002)
- home visit (one) by a dentist researcher
- home phone call made by a researcher to mother to arrange time and place for dental examination of the baby
- baby’s dental examination
- access to case notes

Or – Control group:
- the completion of two questionnaires (Maternal Oral Health Survey at the time of enrolment and Baby’s Oral Health Survey at the age of 18 months, mailed at home address)
- home phone call made by a researcher to mother to arrange time and place for dental examination of the baby
- baby’s dental examination
- access to case notes

I acknowledge that the details of the baby’s dental examination at the age of 18 months, which will take less than 30 minutes have been explained to me, including indications of risks, and inconveniences.
I acknowledge, that the oral health information and counselling is an integral part of the study.

I consent to inform a researcher when baby’s health will prevent his/her continuation in the study.

I have understood and I am satisfied with the explanations that I have been given.

I have been provided with a written information sheet.

I understand that my involvement in this research project may not be of any direct benefit to me and that I may withdraw my consent at any stage without affecting my rights or the responsibilities of the researcher in any respect. The researcher retains the right to withdraw any participants any time.

I declare that I am over the age of 18 years.

Signature of research subject: __________________________ Date:

Signature of Witness:

______________________________

I, Kamila Plutzer have described to

the research project and the nature and effects of the procedure involved. In my opinion he/she understands the explanation and has freely given his/her consent.

Signature __________________________________________________________________

Date: __________________________

Status in project: dental researcher.
Appendix A 3:

1st Questionnaire – Maternal oral health survey
CAVITY FREE CHILDREN

Questionnaire 2002

Maternal oral health survey

This questionnaire is part of a study being conducted by researchers from Social and Preventive Dentistry at Adelaide University.

Responses to this questionnaire are STRICTLY CONFIDENTIAL and will be reported in statistical form only so that individuals cannot be identified. Some information (eg name and address) is used by the researcher only to ensure that accurate matching of information occurs between different stages of the study. All questionnaires will be destroyed at the completion of the study.
# PERSONAL DETAILS

1. **Family name** ............................................... **Given name** .................................................................

2. **Address** ........................................................................................................................................

<table>
<thead>
<tr>
<th>Number</th>
<th>Street</th>
<th>Suburb</th>
<th>Post code</th>
</tr>
</thead>
</table>

3. **Contact telephone number** ........................................................................................................

<table>
<thead>
<tr>
<th>Home</th>
<th>Work</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Mobile</th>
<th>e-mail</th>
</tr>
</thead>
</table>

4. **Do you expect to change your address within the next 24 months?**
   - No *(please proceed to Q 6)*
   - Yes

5. **If you know the address of your next residence please write below.**

<table>
<thead>
<tr>
<th>Number</th>
<th>Street</th>
<th>Suburb</th>
<th>Post code</th>
</tr>
</thead>
</table>

6. **Could you give the name and phone number of another person who might be contacted in the event that you change address during next 24 months?**

   **Contact person** .................................................................................................................................

<table>
<thead>
<tr>
<th>Name</th>
<th>Phone Number</th>
</tr>
</thead>
</table>

7. **Your date of birth** ..........................................................

8. **Your height** ........................................... **9. Your weight before pregnancy** ............................................

10. **Expected date of the birth of your baby** ........................................
Please tick the answer which best describes your usual behaviour.

Note: The subscribed numbers next to the answer boxes (1,2,3,...) are used only for statistical purposes. They do not indicate the “right” answer.

1. From the following list please indicate those sources, which influence you most in shaping your attitude toward health? (Tick one or more)
   1. Parents
   2. School
   3. Friends and colleagues
   4. Books, journals, newspapers, magazines
   5. Health care professionals
   6. TV and radio
   7. Partner or spouse
   8. Internet

2. If you receive health advice from health professionals and different advice from a person around you, whose opinion would you follow? (Tick only one)
   1. Health professional
   2. Person important to me
   3. Neither

3. How would you rate your own GENERAL health? (Tick only one)
   1. Excellent
   2. Very good
   3. Good
   4. Average
   5. Poor
   6. Very poor

4. How would you rate your DENTAL health? (Tick only one)
   1. Excellent
   2. Very good
   3. Good
   4. Average
   5. Poor
   6. Very poor

5. During your last visit at dental clinic has a dentist or hygienist given you detailed instructions on ways to improve your oral health?
   1. Yes
   2. No

6. Do you think that good oral hygiene habits are helpful for you to keep your teeth? (Tick only one)
   1. Very helpful
   2. Helpful
   3. Somewhat helpful
   4. Not at all helpful
   5. Don’t know

7. How important is it to you to keep your natural teeth? (Tick only one)
   1. Very important
   2. Important
   3. Somewhat important
   4. Not at all important
   5. Don’t know

8. How important to you are healthy baby teeth? (Tick only one)
   1. Very important
   2. Important
   3. Somewhat important
   4. Not at all important
   5. Don’t know
9. How important is it to you to prevent cavities, gum problems, or other dental diseases? Please tick one response for each dental problem.

<table>
<thead>
<tr>
<th>Dental Problem</th>
<th>Very important</th>
<th>Important</th>
<th>Somewhat important</th>
<th>Not at all important</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cavities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gum problems</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other dental diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

10. Do you have access to the Internet?

1. Yes
2. No (go to question 12)

   If yes, tick where
   1. Home
   2. Work
   3. Library
   4. Other

11. If you have Internet access, have you visited any of the health websites?

1. Yes
2. No

12. Before you became pregnant, did you suffer from premenstrual tension (PMT)?

1. Yes
2. No

13. Have you been treated for chronic diseases such as: (Tick whichever is applicable):

   1. Depression
   2. Cardiovascular disease
   3. Infective endocarditis
   4. Diabetes
   5. Respiratory disease
   6. Other, please specify

14. How many times did you brush your teeth yesterday?

1. Not at all
2. Once
3. Twice
4. Three times
5. More than three times

15. What kind of toothbrush are you using?

1. Manual
2. Electric
   1. Soft
   2. Medium
   3. Hard
   4. Don't know

16. Does the toothpaste you usually use contain fluoride:

1. Yes
2. No
3. If don’t know (Please specify brand)

17. Did you use dental floss last week?

1. Yes
2. No (go to question 19)

18. If yes, how many times do you use dental floss a week?

1. More than seven
2. Seven times a week
3. Two to six times
4. Once
19. Did you use a mouth rinse yesterday?
   1 Yes  What brand name of mouth rinse? ............................................. 2 No

20. Do you have any problems taking care of your teeth?
   1 Yes  If yes, tick where applicable
   2 No
   1 Difficulty in cleaning
   2 Floss getting caught
   3 Food getting stuck frequently
   4 Not enough time
   5 Do not remember
   6 Other

21. How often (if ever) do you look in the mirror to carefully examine the inside (back of your front teeth) of your mouth? (Tick only one)
   1 I never really look at the inside of my mouth
   2 I look at the inside of my mouth once in a while
   3 I look at the inside of my mouth about once or twice a week
   4 I look at the inside of my mouth almost each time I brush my teeth

22. In your opinion, how thoroughly do you usually clean your teeth? (Tick only one)
   1 Very thoroughly
   2 Fairly thoroughly
   3 Not very thoroughly
   4 Don't know

23. At this time, how willing are you to consider improving some aspect of your care for your teeth?
   1 Very interested
   2 Interested
   3 Somewhat interested
   4 Not interested
   5 Don't know

24. What is your usual source of drinking water?
   1 Tap water
   2 Filtered tap water
   3 Bottled water
   4 Rain water
   5 Rarely drink water

25. How frequently do you drink soft drinks?
   1 Once or less a week
   2 Two to three times a week
   3 Four to six times a week
   4 One to two times per day
   5 Three to four times per day
   6 Five or more times per day

26. How frequently do you drink fruit/vegetable juice?
   1 Once or less a week
   2 Two to three times a week
   3 Four to six times a week
   4 One to two times per day
   5 Three to four times per day
   6 Five or more times per day

27. Do you drink soft drinks or juices between meals?
   1 Yes  If yes, tick whichever applicable
   2 No
   1 I drink them because I like their taste
   2 I drink them when I am bored
   3 They quench my thirst best
<table>
<thead>
<tr>
<th>Question</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>28. Do you eat sweet foods?</td>
<td>1 Daily, 2 Quite frequently, 3 Sometimes</td>
</tr>
<tr>
<td></td>
<td>4 Rarely, 5 Never</td>
</tr>
<tr>
<td>29. Do you eat salty foods?</td>
<td>1 Daily, 2 Quite frequently, 3 Sometimes</td>
</tr>
<tr>
<td></td>
<td>4 Rarely, 5 Never</td>
</tr>
<tr>
<td>30. Do you chew chewing gum?</td>
<td>1 Yes, if yes, tick which type</td>
</tr>
<tr>
<td></td>
<td>2 No, 1 Sugar free, 2 Other</td>
</tr>
<tr>
<td>31. Do you eat cheese?</td>
<td>1 Yes, if yes, tick whichever is applicable</td>
</tr>
<tr>
<td></td>
<td>2 No, 1 Daily, 2 A few times a week, 3 Once a week,</td>
</tr>
<tr>
<td></td>
<td>4 Less than once a week</td>
</tr>
<tr>
<td>32. When shopping how often do you buy chocolate?</td>
<td>1 All the time, 2 Quite frequently, 3 Sometimes,</td>
</tr>
<tr>
<td></td>
<td>4 Rarely, 5 Never</td>
</tr>
<tr>
<td>33. When shopping how often do you buy lollies?</td>
<td>1 All the time, 2 Quite frequently, 3 Sometimes,</td>
</tr>
<tr>
<td></td>
<td>4 Rarely, 5 Never</td>
</tr>
<tr>
<td>34. When shopping how often do you buy biscuits?</td>
<td>1 All the time, 2 Quite frequently, 3 Sometimes,</td>
</tr>
<tr>
<td></td>
<td>4 Rarely, 5 Never</td>
</tr>
<tr>
<td>35. Do you eat chocolate?</td>
<td>1 Yes, if yes, tick whichever is applicable</td>
</tr>
<tr>
<td></td>
<td>2 No, 1 Daily, 2 A few times a week, 3 Once a week,</td>
</tr>
<tr>
<td></td>
<td>4 Less than once a week</td>
</tr>
<tr>
<td>36. Do you eat lollies?</td>
<td>1 Yes, if yes, tick whichever is applicable</td>
</tr>
<tr>
<td></td>
<td>2 No, 1 Daily, 2 A few times a week, 3 Once a week,</td>
</tr>
<tr>
<td></td>
<td>4 Less than once a week</td>
</tr>
</tbody>
</table>
37. Do you eat biscuits?
   1 Yes If yes, tick whichever applicable
   2 No
   1 Daily
   2 A few times a week
   3 Once a week
   4 Less than once a week

38. Do you drink tea with sugar?
   1 Yes If yes, how many spoonfuls of sugar do you add?
   2 No
   1 One
   2 Two
   3 Three
   4 More than 3

39. Do you drink coffee with sugar?
   1 Yes If yes, how many spoonfuls of sugar do you add?
   2 No
   1 One
   2 Two
   3 Three
   4 More than 3

40. How many servings of the following products did you have yesterday:
   1 Milk (1 serve=250ml) .............. 1 None
   2 1-2
   3 3-4
   4 More than 4
   2 Yoghurt (1 serve=200gm) .......... 1 None
   2 1-2
   3 3-4
   4 More than 4

41. How many servings of fruit did you have yesterday?
   1 None
   2 One
   3 Two
   4 Three
   5 Four
   6 Five
   7 Six
   8 Seven or more

42. How many servings of vegetables did you have yesterday?
   1 None
   2 One
   3 Two
   4 Three
   5 Four
   6 Five
   7 Six
   8 Seven or more

43. How many servings of meat/protein did you have yesterday? (1 serving =100gm)
   1 None
   2 One
   3 Two
   4 Three
   5 Four
   6 Five
   7 Six
   8 Seven or more

44. Before you became pregnant had you ever attempted to diet, or otherwise modify the specific kinds of food you eat?
   1 Yes For how long .................................................................
   2 No
45. Do you consider your diet, eating habits:
   1 Healthy – no need to change
   2 Moderately healthy – willing to change
   3 Moderately healthy – unwilling to change
   4 Unhealthy – willing to improve
   5 Unhealthy – not likely to change

46. Are you planning to breastfeed your baby?
   1 Yes
      If yes, for how long?
      1 less than 1 month
      2 1–2 months
      3 3–4 months
      4 5–6 months
      5 7–12 months
      6 up to 2 years
   2 No

47. Do you currently drink alcohol?
   1 Yes
      On average how many drinks a day?
      1 One
      2 Two
      3 Three
      4 Four
      5 4 or more
   2 No

48. Have you ever attempted to quit drinking alcohol?
   1 Yes
   2 No

49. Are you smoking now?
   1 Yes
      How many cigarettes daily? ....................... 3 Occasionally
      For how many years have you smoked? .......
   2 No

50. Have you ever smoked?
   1 Yes
      If yes, 3 Occasionally
      For how many years? ................................... .
      How many cigarettes daily? ......................... .
      When did you cease? ................................. .
   2 No

51. The pregnancy was:
   1 Planned (you wanted pregnancy now, or sooner)
   2 Unplanned (you wanted pregnancy later, or not at all)

52. What would be your most preferred way for you to learn about childcare? (Number three in order of importance)
   1 In direct consultation with health professional
   2 Through a specialised free phone line
   3 To attend classes in hospital/health centre/community
   4 To obtain relevant health information through mail
   5 To rely only on information from family members and friends
   6 Through access information from an Internet web site
53. Tick only one response for each following questions (a–d).

53a. If you had to go to the dentist tomorrow, how would you feel about it?
   a. I would look forward to it as a reasonably enjoyable experience.
   b. I wouldn’t care one way or the other.
   c. I would be a little uneasy.
   d. I would be afraid that it would be unpleasant and painful.
   e. I would be very frightened of what the dentist would do.

53b. When you are waiting in the dentist’s reception area for your turn, how do you feel?
   a. Relaxed.
   b. A little uneasy.
   c. Tense.
   d. Anxious.
   e. So anxious that I sometimes break out in a sweat or almost feel physically sick.

53c. When you are in the dentist’s chair waiting while he/she gets ready to begin working on your teeth, how do you feel?
   a. Relaxed.
   b. A little uneasy.
   c. Tense.
   d. Anxious.
   e. So anxious that I sometimes break out in a sweat or almost feel physically sick.

53d. You are in the dentist’s chair to have your teeth cleaned. While you are waiting and the dentist is getting out the instruments which will be used to scrape your teeth around the gums, how do you feel?
   a. Relaxed.
   b. A little uneasy.
   c. Tense.
   d. Anxious.
   e. So anxious that I sometimes break out in a sweat or almost feel physically sick.

Please rate your feeling or reaction to questions 54, 55, 56 using the scale:

<table>
<thead>
<tr>
<th></th>
<th>NEVER</th>
<th>ONCE OR TWICE</th>
<th>A FEW TIMES</th>
<th>OFTEN</th>
<th>NEARLY EVERY TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>54. Has fear of dental work ever caused you to put off making an appointment?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>55. Has fear of dental work ever caused you to cancel an appointment?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>56. Has the cost of dental services ever caused you to delay making an appointment?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
57. Have any of the following been a problem for you in the last year? Please tick one response for each dental problem.

<table>
<thead>
<tr>
<th></th>
<th>VERY OFTEN</th>
<th>OFTEN</th>
<th>SOMETIMES</th>
<th>HARDLY EVER</th>
<th>NEVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sensitive teeth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Toothache</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Difficulty chewing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Bleedings gums (pink toothbrush)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Sore jaw</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Sore gums</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Frequent bad breath</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Filling falling out</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. None</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

58. In the last 12 months how often have you felt uncomfortable with the appearance of your teeth, mouth, or dentures?

1. Very often
2. Often
3. Sometimes
4. Hardly ever
5. Never in the last 12 months

59. Tick any of the following that currently affect the appearance of your teeth.

1. Stains
2. Chipping
3. Crowding/crooked teeth
4. Gaps
5. Disease
6. Other

60. When you feel some dental discomfort or pain, how do you respond?

1. You seek professional help immediately
2. You observe the problem and wait to see what happens
3. You try to ignore the problem for a while
4. You hope that the problem will disappear, or will resolve without intervention

61. When was the last time you visited the dentist/hygienist?

1. Less than 12 months ago.
2. More than 1 year and less than 2 years ago
3. More than 2 years and less than 5 years ago
4. More than 5 years ago
5. Don’t remember

62. What was the reason for that visit?

1. Regular check-up
2. An occasional check-up
3. Discomfort and pain
4. Something needed to be fixed

63. During your most recent dental treatment how much pain or discomfort did you experience?

1. Extreme pain / discomfort
2. Moderate pain / discomfort
3. Very minimal pain / discomfort
4. None
64. What was that treatment?
1. Check-up
2. Fluoride application
3. Amalgam filling
4. White filling
5. Root canal filling
6. Tooth extracted
7. Gum treatment
8. Teeth straightened/braces
9. Teeth cleaned
10. Infection, ulcer treatment
11. Whitening/bleaching
12. Denture (new, repair)
13. Other treatment (please specify) ........................................

65. Have you visited a dentist during your pregnancy?
1 Yes
2 No
Are you planning to visit a dentist
1 Yes
2 No

66. Do you have a problem with bleeding and swollen gums? *(Tick as many as applicable).*
1 Yes
2 No

1. Before pregnancy
2. During pregnancy
3. The condition worsened during pregnancy

67. Where was your last dental visit?
1. Private practice
2. Public hospital/clinic
3. School Dental Service
4. Dental technician
5. Health Fund Clinic
6. Other

68. Is there a regular dentist you usually go to for dental care?
1 Yes
2 No

69. How long did it take you to travel to either the Women’s and Children’s Hospital or the Queen Elizabeth Hospital?
1 Less than 30 minutes
2 Between 30 minutes – 1 hour
3 Between 1 hour – 1.5 hours
4 Between 1.5 hours – 2 hours
5 More than 2 hours

70. When you think of the pleasures and problems of your daily life with your husband/partner, how do you feel?
1 Unhappy
2 Tense
3 Frustrated
4 Neglected
5 Relaxed
6 Contented

71. When you think of your financial situation, how do you feel?
1 Worried
2 Tense
3 Frustrated
4 Insecure
5 Relaxed
6 Contented
We are interested in knowing the number of teeth you have, and the reason for any missing teeth. Teeth may be missing for a number of reasons (they had never developed, or failed to erupt, they could be extracted because of crowding or severe decay, or they could be knocked out in an injury).

If you have less than 32 natural teeth present, please consider the possible reasons for teeth to be missing. There may not be obvious spaces to show that teeth are missing.

Please answer the following questions by placing a number in the boxes below.

<table>
<thead>
<tr>
<th>Question</th>
<th>Upper Jaw</th>
<th>Lower Jaw</th>
</tr>
</thead>
<tbody>
<tr>
<td>72. How many natural teeth do you have in each jaw (minimum 0 and maximum 16 teeth)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>73. If you have less than 16 teeth in each jaw, please consider the number of teeth missing for the following reasons:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never erupted</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Extracted because of crowding (eg premolars and wisdom teeth)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Extracted because of decay, pain (eg premolars and wisdom teeth)</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Lost through injury</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>16</td>
</tr>
</tbody>
</table>

74. Among your teeth present how many teeth with one or more fillings can you count in each jaw? (“Fillings” include crowns, silver fillings and white fillings)

75. How many teeth do you think you have at this moment with decay (cavity), in each jaw?
76. How often during the PAST YEAR has your teeth, mouth or dentures........ (Circle one)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>VERY OFTEN</th>
<th>OFTEN</th>
<th>SOMETIMES</th>
<th>HARDLY EVER</th>
<th>NEVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Made pronouncing any words difficult?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2. Affected your sense of taste?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>3. Caused pain in your mouth?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>4. Caused discomfort when eating some foods?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>5. Caused you to feel self-conscious?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6. Caused you to feel tense?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>7. Meant that your diet has been unsatisfactory?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>8. Caused an interruption to your meals?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>9. Made it difficult for you to relax?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>10. Caused you to feel embarrassed?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>11. Caused you to feel a little irritable with other people?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>12. Made it difficult for you to do your usual jobs?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>13. Caused you to feel that life in general was less satisfying?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>14. Meant that you have been unable to lead a normal life?</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

77. There are people in my life who........ (Circle one)

<table>
<thead>
<tr>
<th></th>
<th>STRONGLY DISAGREE</th>
<th>DISAGREE</th>
<th>NEITHER DISAGREE NOR AGREE</th>
<th>AGREE</th>
<th>STRONGLY AGREE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pay attention to my feelings and problems.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>2. Express appreciation of my work.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>3. Help with certain activities if needed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. Advise on how to handle things if needed.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5. Help me effectively cope with important changes in my life.</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>
78. Which answer best describes your way of thinking: *(Circle one)*

<table>
<thead>
<tr>
<th></th>
<th>NOT AT ALL TRUE</th>
<th>BARELY TRUE</th>
<th>MODERATELY TRUE</th>
<th>EXACTLY TRUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I spend time identifying long-range goals for myself.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I feel in charge of making things happen</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I feel responsible for my own life.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I feel driven by my personal values.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I am driven by a sense of purpose.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I am able to choose my own actions.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I focus my efforts on things that I can control.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. There are abundant opportunities that await me.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(office use only)*

79. Which answer best describes your way of thinking: *(Circle one)*

<table>
<thead>
<tr>
<th></th>
<th>NOT AT ALL TRUE</th>
<th>BARELY TRUE</th>
<th>MODERATELY TRUE</th>
<th>EXACTLY TRUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I can always manage to solve difficult problems if I try hard enough.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. If someone opposes me, I can find means to get what I want.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. It is easy for me to stick to my aims and accomplish my goals.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I am confident that I could deal efficiently with unexpected events.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Thanks to my resourcefulness, I know how to handle unforeseen situations.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I can solve most problems if I invest the necessary effort.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. I can remain calm when facing difficulties because I can rely on my coping abilities.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. When I am confronted with a problem, I can usually find several solutions.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. If I am in trouble, I can usually think of something to do.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. No matter what comes my way, I'm usually able to handle it.</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(office use only)*

A – 21
80. Are you:
1 Married
2 De facto
3 Separated
4 Divorced
5 Widowed
6 Never married

81. Were you born in Australia?
1 Yes
   If yes, Are you of Aboriginal/Torres Strait Islander origin?
1 Yes
2 No
   If no, Where were you born? .............................................................
Which year did you arrive in Australia? ...........................................

82. Which language do you mainly speak at home?
1 English
2 Other, please specify ........................................................................

83. What is the highest level of education you have attained?
1 Completed primary school
2 Some secondary schooling
3 Completed secondary schooling
4 Some college or university
5 Completed college or University

84. Do you currently work in a job or business?
1 Yes
   1 Full time
   2 Part time
2 No

85. Are you studying?
1 Yes
   1 Full time
   2 Part time
2 No

86. Who will be the main carer of your baby during its first year?
1 Mother
2 Father
3 Grandparent
4 Other family member
5 Day care centre

87. Do you currently have a government health concession card?
1 Yes
2 No

88. Do you have private dental health insurance?
1 Yes
2 No

89. Into which category does your total household income (before tax) fall?
Include salaries, pensions, allowances, benefits. (Tick where appropriate)

<table>
<thead>
<tr>
<th>Household income per year</th>
<th>OR</th>
<th>Household income per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>up $12,000</td>
<td>up to $ 230</td>
<td></td>
</tr>
<tr>
<td>$12,001 to $20,000</td>
<td>$321 to $ 385</td>
<td></td>
</tr>
<tr>
<td>$20,001 to $30,000</td>
<td>$386 to $ 577</td>
<td></td>
</tr>
<tr>
<td>$31,000 to $40,000</td>
<td>$578 to $ 769</td>
<td></td>
</tr>
<tr>
<td>$40,001 to $50,000</td>
<td>$770 to $ 961</td>
<td></td>
</tr>
<tr>
<td>$50,001 to $60,000</td>
<td>$962 to $1,154</td>
<td></td>
</tr>
<tr>
<td>more than $60,000</td>
<td>more than $1,154</td>
<td></td>
</tr>
</tbody>
</table>

90. How many people are dependent on this total household income, including yourself?
(Tick only one)
1 One
2 Two
3 Three
4 Four
5 Five
6 Six
Appendix A 4:

2nd Questionnaire – Refusal to participate
Could you please specify why are you refusing to take a part in the research?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Did you feel that you don't have enough information about the study?</td>
</tr>
<tr>
<td>2.</td>
<td>Did you feel that you will be controlled?</td>
</tr>
<tr>
<td>3.</td>
<td>Did you feel afraid that you may be criticized?</td>
</tr>
<tr>
<td>4.</td>
<td>Did you think that it is too early to start with cavity prevention?</td>
</tr>
<tr>
<td>5.</td>
<td>Did you feel pressured into taking part?</td>
</tr>
<tr>
<td>6.</td>
<td>Did you decide not take part because it was inconvenient?</td>
</tr>
<tr>
<td>7.</td>
<td>Did you feel you understood the purpose of the research?</td>
</tr>
<tr>
<td>8.</td>
<td>Have you heard of someone who publicly criticized the study?</td>
</tr>
<tr>
<td>9.</td>
<td>Did these views affect your decision making process?</td>
</tr>
<tr>
<td>10.</td>
<td>Were there any parts of the study you were worried about?</td>
</tr>
<tr>
<td>11.</td>
<td>Are you too busy?</td>
</tr>
</tbody>
</table>

WHY? (Further comments)
1. Are you: 1. married  2. de facto  3. separated  
  4. divorced  5. widowed  6. never married

2. What is the highest level of education you have attained?
   1. completed primary school 2. some secondary schooling  
   3. completed secondary school 4. some university or college  
   5. completed university or college

3. Do you currently work in a job or business?
   1. full time  2. part time  3. not employed

4. Are you a student?
   1. YES  1. full time  
      2. part time  2. NO

5. Who will be the main carer in the first year of the baby’s life?
   1. mother  2. father  3. grandparent  
   4. other family member  5. day care center

6. Do you currently have a government health concession card?
   1. YES  2. NO

7. Do you have private dental health insurance?
   1. YES  2. NO
Appendix A 5:

3rd Questionnaire – Child oral health survey
CAVITY FREE CHILDREN

Questionnaire 2003 / 4

Child Oral Health Survey

This questionnaire is part of a study being conducted by researchers from Social and Preventive Dentistry at Adelaide University.

Responses to this questionnaire are STRICTLY CONFIDENTIAL and will be reported in statistical form only so that individuals cannot be identified. Some information (eg name and address) is used by the researcher only to ensure that accurate matching of information occurs between different stages of the study. All questionnaires will be destroyed at the completion of the study.
Dear Mum,

This is the 2nd questionnaire we have sent you. Please answer the questions as truthfully and precisely as possible. Your answers will help us better understand the factors and circumstances that cause early childhood decay.

Thank you for your co-operation and time in answering this questionnaire.

What was the weight of your child at their first birthday?

............. Kilograms (e.g. 3.2 kg) OR ............. pounds ............. ounces

What is the weight of your child now (at 18 months)?

............. Kilograms (e.g. 3.2 kg) OR ............. pounds ............. ounces

**FEEDING PRACTICE**

1. **Was your baby breast-fed ONLY?**
   - [ ] Yes  
   - [ ] No  
   - [ ] If Yes, for how many weeks .......... or / months ..........?

2. **Was your baby PARTIALLY breastfed?**  
   (Partially means that your baby was sometimes breast-fed and sometimes bottle-fed).
   - [ ] Yes  
   - [ ] No  
   - [ ] If Yes, from ..........weeks / or ..........months, to ..........months of age

3. **Was your baby ever fed infant formula?**
   - [ ] Yes  
   - [ ] No

4. **What kind of water did you use to make up the infant formula?**
   - [ ] Tap water  
   - [ ] Carbon Filtered tap water  
   - [ ] Osmosis / Distillation filtered  
   - [ ] Bottled water / spring / mineral water
   - [ ] Rainwater / Tank water
   - [ ] Other: (please specify)

A -28
5. Which brands of infant formula has your baby been fed most of the time?
For each period of time please indicate (tick) main brands

<table>
<thead>
<tr>
<th>From birth to 6 months</th>
<th>Over 6 months</th>
<th>Over 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula brand name</td>
<td>Formula brand name</td>
<td>Milk drink - brand name</td>
</tr>
<tr>
<td>(Starter)</td>
<td>(Follow – On)</td>
<td>(Toddler)</td>
</tr>
<tr>
<td>□ 0, Lactogen (Nestle)</td>
<td>□ 0, NAN 2 (Nestle)</td>
<td>□ 1 Neslac- milk drink</td>
</tr>
<tr>
<td>□ 0, NAN 1 (Nestle)</td>
<td>□ 0, S-26 Progress (Wyeth)</td>
<td>□ 2 Nurture - with iron</td>
</tr>
<tr>
<td>□ 0, NAN 1 HA (Nestle)</td>
<td>□ 0, S-26 Infasoy Progress (Wyeth)</td>
<td>□ 3 Karicare Toddler 3</td>
</tr>
<tr>
<td>□ 0, S-26 (Wyeth)</td>
<td>□ 0, S-26 Gold (Wyeth)</td>
<td>□ 4 S – 26 Toddler Gold 3</td>
</tr>
<tr>
<td>□ 0, S-26 Infasoy (Wyeth) (Lactose Free)</td>
<td>□ 0, S-26-2 (Wyeth) (With iron, nucleotides)</td>
<td>□ 5 Other: (Please specify)</td>
</tr>
<tr>
<td>□ 0, S-26 AR (Wyeth) (For infants with reflux)</td>
<td>□ 0, Nurture Gold (Heinz) (with LPCs)</td>
<td></td>
</tr>
<tr>
<td>□ 0, S-26 Gold (Wyeth)</td>
<td>□ 0, Nurture (Heinz)</td>
<td></td>
</tr>
<tr>
<td>□ 0, S-26 Lactose Free (Wyeth)</td>
<td>□ 0, Karicare 2 (Nutricia)</td>
<td></td>
</tr>
<tr>
<td>□ 0, S-26-1 (Wyeth) (With iron, nucleotides)</td>
<td>□ 0, Karicare Gold 2 (Nutricia)</td>
<td></td>
</tr>
<tr>
<td>□ 10 SMA (Wyeth)</td>
<td>□ 0, Karicare Goat 2 (Nutricia)</td>
<td></td>
</tr>
<tr>
<td>□ 11 Nurture Gold Starter (Heinz) (With LPCs, iron, whey dominated)</td>
<td>□ 11 Karicare Soya (Nutricia)</td>
<td></td>
</tr>
<tr>
<td>□ 12 Nurture Starter (Heinz)</td>
<td>□ 12 Other: (Please specify)</td>
<td></td>
</tr>
<tr>
<td>□ 13 Karicare AR (Nutricia) (For infants with reflux)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 14 Karicare Infant (Nutricia)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 15 Karicare Gold 1 (Nutricia)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 16 Karicare De-Lact (Nutricia) (Lactose free)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 17 Karicare Goat 1 (Nutricia)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 18 Karicare Soya (Nutricia)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 19 Other: (Please specify)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ 20 Other: (Please specify)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. How old was your baby when you stopped feeding them Infant formula?
.................................................. Months

7. What sort of milk replaced the breast milk / formula?
☐ 1 Cow's milk
☐ 2 Goats milk
☐ 3 Soya milk
☐ 4 Other (please specify) ....................

8. What type of water does your baby usually drink?
☐ 1 Tap water
☐ 2 Carbon Filtered tap water
☐ 3 Osmosis / Distillation filtered
☐ 4 Bottled water / spring / mineral water
☐ 5 Rainwater / Tank water
☐ 6 Other (please specify) ....................

9. How old was your baby when you first introduced solid food?
.................................................. Months

10. Sleeping: Please tick the appropriate box for each activity

At each of these ages, my child USUALLY → At 6 months At 12 months At 18 months
Slept in their own cot 1  
Slept in their own room 2  
Woke up during the night 3  

11. Feeding: Please tick the appropriate box for each activity

At each of these ages, my child USUALLY → At 6 months At 12 months At 18 months
Was breastfed during the night 1  
Was bottle fed during the night 2  
Has a bottle in bed and feeds themself when hungry / thirsty 3  

12. At each of these ages of my child, the BOTTLE contained:
(you may tick more than one response)

<table>
<thead>
<tr>
<th>At 6 months</th>
<th>At 12 months</th>
<th>At 18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>During</td>
<td>During</td>
</tr>
<tr>
<td></td>
<td>Day</td>
<td>Night</td>
</tr>
<tr>
<td>Breast milk</td>
<td>01</td>
<td></td>
</tr>
<tr>
<td>Formula</td>
<td>02</td>
<td></td>
</tr>
<tr>
<td>Formula with sugar</td>
<td>03</td>
<td></td>
</tr>
<tr>
<td>Milk without sugar</td>
<td>04</td>
<td></td>
</tr>
<tr>
<td>Milk with sugar</td>
<td>05</td>
<td></td>
</tr>
<tr>
<td>Flavoured milk (Milo, Chocolate milk, Nesquik)</td>
<td>06</td>
<td></td>
</tr>
<tr>
<td>Milk with honey</td>
<td>07</td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td>08</td>
<td></td>
</tr>
<tr>
<td>Cordial</td>
<td>09</td>
<td></td>
</tr>
<tr>
<td>Juice</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

13. At some stage did your baby share a bed with you?
(Shared means your baby slept part or all of the night in your bed.)

- Yes – after delivery to 3 months old
- Yes – between 3 - 6 months old
- Yes – between 7 -12 months old
- Yes – over one year old
- No (go to Q 15)

14. During the stay in your bed did your baby have access to the breast and could feed itself whenever they desired?

- Yes
- No
- Sometimes
- No applicable

15. Does your child still drink from a bottle whenever they feel thirsty?

- Yes
- No
- Sometimes
16. Do you flavour the food / drinks to suit your tastes?

☐ 1 Yes  ☐ 2 No  ☐ 3 Sometimes

17. How old was your baby when you introduced a cup for drinking instead of a bottle?

..................................... Months

18. What sort of drink is usually in the cup?

☐ 1 Milk without sugar  ☐ 6 Water
☐ 2 Milk with sugar  ☐ 7 Cordial
☐ 3 Milk with honey  ☐ 8 Juice
☐ 4 Formula  ☐ 9 Other (please specify) ..................................
☐ 5 Flavoured milk (Milo, Chocolate milk, Nesquik)

19. Now at 18 months what are your child’s two favourite drinks? (Tick two only)

☐ 01 Breast milk  ☐ 07 Soya milk
☐ 02 Plain cow’s  ☐ 08 Plain water
☐ 03 Flavoured milk  ☐ 09 Fruit juice
☐ 04 Sweetened teas  ☐ 10 Soft drinks
☐ 05 Unsweetened teas  ☐ 11 Cordials
☐ 06 Lemonades  ☐ 12 Cola drinks – occasionally

20. Do you use bottle as pacifier?

☐ 1 Yes  ☐ 2 No  ☐ 3 Sometimes

If yes what is usually in?

.................................................................

21. Does your child usually have an established routine for feeding?

☐ 1 Yes  ☐ 2 No
22. **What kind of food did your child consume yesterday?**

*(Please use the serving sizes given below and write number of serves for each day)*

<table>
<thead>
<tr>
<th>Food type</th>
<th>1 serving equals:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread, biscuits, cakes, lollies</td>
<td>1 slice of bread or cake, 1 biscuit, 1 lolly</td>
</tr>
<tr>
<td>Rice, Pasta, cereals, cheese, yoghurt, meat, fish, poultry</td>
<td>1 oz or 30mls or 2Tbsp</td>
</tr>
<tr>
<td>Vegetables, puddings, milk</td>
<td>1 cup (250ml)</td>
</tr>
<tr>
<td>Fruit</td>
<td>1 medium piece (or 2 small pieces)</td>
</tr>
<tr>
<td>Table sugar</td>
<td>1 tsp</td>
</tr>
<tr>
<td>Chocolate, muesli, health bars</td>
<td>1 bar</td>
</tr>
<tr>
<td>Syrups, jams, Nutella, honey</td>
<td>1 Tbsp</td>
</tr>
</tbody>
</table>

### Yesterday

*(write number of serves)*

<table>
<thead>
<tr>
<th>Bread</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cereals – write the brand name:</td>
<td>2</td>
</tr>
<tr>
<td>Rice 3</td>
<td></td>
</tr>
<tr>
<td>Pasta 4</td>
<td></td>
</tr>
<tr>
<td>Vegetables 5</td>
<td></td>
</tr>
<tr>
<td>Fruit 6</td>
<td></td>
</tr>
<tr>
<td>Milk 7</td>
<td></td>
</tr>
<tr>
<td>Cheese 8</td>
<td></td>
</tr>
<tr>
<td>Meat 9</td>
<td></td>
</tr>
<tr>
<td>Fish 10</td>
<td></td>
</tr>
<tr>
<td>Poultry 11</td>
<td></td>
</tr>
<tr>
<td>Yoghurt 12</td>
<td></td>
</tr>
<tr>
<td>Biscuits, cakes puddings 13</td>
<td></td>
</tr>
<tr>
<td>Table sugar (in tea, on cereals) 14</td>
<td></td>
</tr>
<tr>
<td>Chocolate 15</td>
<td></td>
</tr>
<tr>
<td>Lollies – number 16</td>
<td></td>
</tr>
<tr>
<td>Muesli &amp; health bars 17</td>
<td></td>
</tr>
<tr>
<td>Syrups, jams and sweet spreads (honey, Nutella) 18</td>
<td></td>
</tr>
</tbody>
</table>

A-33
23. Did your child ever use a dummy?
- □ 1 Never used dummy (go to Q. 25)
- □ 2 Used until .......... months old
- □ Still using: □ 3 While asleep
- □ 4 Only when upset
- □ 5 During the day at naptime
- □ 6 All day access

24. What do you put on the dummy?
- □ 1 Nothing
- □ 2 Honey
- □ 3 Nutella
- □ 4 Sugar
- □ 5 Jam
- □ 6 Syrup
- □ 7 Other sweetener (please write name)

25. At each of these ages of your child, did they suck on any of the following to sooth themselves? (Tick appropriate box)

<table>
<thead>
<tr>
<th>At 6 months</th>
<th>At 12 months</th>
<th>At 18 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nothing 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dummy 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thumb 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other fingers 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Toys 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blanket 6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mother’s breast (without drinking) 7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

26. According to your experience when a healthy child older than 12 months wakes up during the night, the reason for this is:
- □ 1 Hunger
- □ 2 Attention seeking
- □ 3 Wants to play
- □ 4 Need for security
- □ 5 Change of nappies
- □ 6 Don’t know
- □ 7 Other, eg colic / reflux
27. How old was your baby when the first tooth appeared?
Please be as exact as possible.
If you wrote down the date, please state the date when you discovered the first tooth.
----------------------day -----------------month------------------------year------------------------
If you do not remember the day, write month of age-----------------------------months.

28. What problems did your child experience before the first tooth appeared?

☐ 01 Decrease of appetite for solids ☐ 10 Facial rash
☐ 02 Decrease of appetite for liquid ☐ 11 Nappy / body rash
☐ 03 Pain ☐ 12 Sleep disturbance
☐ 04 Biting / chewing ☐ 13 Fever
☐ 05 Gum rubbing Vomiting ☐ 14 Vomiting
☐ 06 Ear rubbing ☐ 15 Cough
☐ 07 Drooling ☐ 16 Running nose
☐ 08 Irritability ☐ 17 None
☐ 09 Bowel upset (ranging from constipation to loose stool and diarrhoea)

29. How did you ease the discomfort associated with teething?

☐ 1 Rubbing the gums with a blanket / washcloth /flanel
☐ 2 Using teething rings
☐ 3 Using chilled teething rings
☐ 4 Medication – Children’s Panadol, Nurofen for children
☐ 5 Medication applied onto sore area: Bonjela gel, Mouth Paint etc..
☐ 6 Dummies
☐ 7 Hard vegetables (carrot, celery)
☐ 8 Biscuits, crackers, pretzels
☐ 9 Other (please specify)..................................................................................
### 30. When did you start cleaning / brushing your child's teeth?

<table>
<thead>
<tr>
<th>Option</th>
<th>Write number of months old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Immediately after the first tooth appeared 1</td>
<td></td>
</tr>
<tr>
<td>When more front teeth erupted 2</td>
<td></td>
</tr>
<tr>
<td>When the back teeth (molars) erupted 3</td>
<td></td>
</tr>
<tr>
<td>I haven't started with tooth cleaning yet 4</td>
<td></td>
</tr>
<tr>
<td>Some other time 5</td>
<td></td>
</tr>
</tbody>
</table>

### 31. At each of these ages of your child what device did you mainly use for tooth cleaning / brushing? (Please tick appropriate box for each age)

<table>
<thead>
<tr>
<th>Device</th>
<th>6 – 12 months</th>
<th>Over 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flannel, face wash, cloth 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finger tooth brush 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infant tooth brush 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular tooth brush 4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No tooth cleaning 5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 32. Is toothpaste being used in the cleaning of your child's teeth?

- [ ] Yes
- [ ] No (if no go to the Q 36)

If yes: how old was your child when you started to use toothpaste? ........ months

### 33. Is it a special toothpaste formulated for children?

- [ ] Yes
- [ ] No

### 34. What is the brand of the toothpaste?

- [ ] Colgate
- [ ] Colgate Junior Oral B
- [ ] My first Colgate
- [ ] Aim
- [ ] McLeans
- [ ] McLeans – Milk teeth
- [ ] Oral B
- [ ] Oral B - stages
- [ ] Other (Please write brand name)

A -36
35. **How much toothpaste do you use on child’s toothbrush?**

<table>
<thead>
<tr>
<th>Toothpaste Use</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amount Used</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

36. **At what time of the day do you now brush your child’s teeth?**

*Please tick one or more answers if applicable*

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>brushing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1. Before breakfast
- 2. After breakfast
- 3. Before lunch
- 4. After lunch
- 5. During the bath
- 6. Immediately after dinner
- 7. Before going to bed
- 8. Didn’t start yet

37. **Does your child brush their teeth for themselves?**

<table>
<thead>
<tr>
<th>Age</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>brushing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1. At the age of 6–12 months?
- 2. At the age of 12–18 months?

38. **Do you always supervise tooth brushing (including application of toothpaste)?**

<table>
<thead>
<tr>
<th>Age</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>supervision</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1. At the age of 6–12 months?
- 2. At the age of 12–18 months?

39. **Does your child like tooth brushing?**

<table>
<thead>
<tr>
<th>Age</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>like</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1. At the age of 6–12 months?
- 2. At the age of 12–18 months?

40. **Do / did you share spoons / food with your child?**

<table>
<thead>
<tr>
<th>Age</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>sharing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1. At the age of 6–12 months?
- 2. At the age of 12–18 months?

41. **Do/ did YOU use any mouth rinse?**

<table>
<thead>
<tr>
<th>Age</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>mouth rinse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1. When your child was 6–12 months old?
- 2. When your child was 12–18 months old?

42. **In general, would you say your child’s health at 18 months is:**

<table>
<thead>
<tr>
<th>Health</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>description</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 1. Excellent
- 2. Very good
- 3. Good
- 4. Fair
- 5. Poor
43. Has your child suffered from...?
(Please tick boxes at each stage if the answer is yes)

<table>
<thead>
<tr>
<th>Months old</th>
<th>Birth – 6 Months</th>
<th>7 – 12 Months</th>
<th>Over 12 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ear infection 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhoea 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vomiting 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abdominal pain and rash 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allergies (eczema) 5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others problems 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Please specify:</td>
<td>..................</td>
<td>..................</td>
<td>..................</td>
</tr>
</tbody>
</table>

44. Has your child ever been hospitalized?

☐ 1 Yes  ☐ 2 No
If yes, what was the problem? .................................................................

45. Has your child been on any medication over a reasonable period of time?
(eg: 10+ days)  ☐ 1 Yes  ☐ 2 No
If yes, what was the medication? 1) .............................................. 2) ..............................................

46. Are you currently employed?

☐ 1 Yes  ☐ 2 No
If yes, ☐ 1 Full time  ☐ 2 Part time

47. How old was your baby when you started working?

......................... months old

48. Who is your child’s main carer while you are working?

☐ 1 Father  ☐ 5 Grandmother
☐ 2 Grandfather  ☐ 6 Other family member
☐ 3 Child Care Centre  ☐ 7 Family childcare
☐ 4 Neighbour  ☐ 8 Other (please specify)

49. Does your child live in a one-parent household?

☐ 1 Yes  ☐ 2 No

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Appendix A 6:

4th Questionnaire – Evaluation of the health promotion intervention
Your reaction to the health promotion material.

Dear mum,

Since time of enrolment of your child in the program “Cavity free children”, you have received three packages of oral health promotion material: during pregnancy, and around time when the child reached 6 and 12 months of age.

We would like to know how helpful and how practical the information you received has been. By answering the following few questions you will help us to improve the program for future mothers.

<table>
<thead>
<tr>
<th>Question</th>
<th>Very negative</th>
<th>Very positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What was your initial reaction to this material? (please tick 1 answer out of 5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Did it tell you something new?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>3. Did the material hold your attention?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>4. Did you receive sufficient information on how to prevent tooth decay?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>5. Did it say enough about causes of the tooth decay?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>6. Were the topics what you needed to know?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>7. Did you read all the information?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>8. Have you kept the information?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>9. Did you pass your information on to other mothers with small children?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>10. After reading the information were you worried about tooth decay for your child?</td>
<td>Less</td>
<td>More</td>
</tr>
<tr>
<td>11. Did you think the information presented was trustworthy?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>12. Were you aware where the information was produced?</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>
13. How easy did you find the material to read?  
(please tick 1 answer out of 5)  
<table>
<thead>
<tr>
<th>Difficult</th>
<th>Very easy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

14. Could you understand it easily?  
| YES | NO |

15. How much information about tooth decay did you have previously?  
| Very little | A great deal |
| 1         | 2         | 3         | 4         | 5         |

16. Is it now easier for you to make a decision on what is good for your child’s teeth?  
| YES | NO |

17. Do you think you care more about your child’s teeth than you would have if you had not been enrolled in the program?  
| YES | NO |

18. Did this program raise your awareness about your own oral health?  
| YES | NO |

19. Did you change your own behaviour in order to prevent oral disease?  
| YES | NO |

20. Does the material provide you with the information needed to care for your child’s teeth at home?  
| YES | NO |

21. What overall rating would you give to the program?  
| Very poor | Very good |
| 1         | 2         | 3         | 4         | 5         |

Suggestions:

1. What other information do you need?

2. How could this material be improved?

3. Comments:
Appendix A 7: Appointment letter
Dear ...............

During pregnancy you enrolled your unborn child in program “Cavity Free Children”. Now the child has reached the age, when the first dental examination should take place. (As mention previously, during the examination the child will be sitting on your lap, and only disposable oral mirror with light will be used). The examination is free of charge.

The location, which you choose for dental examination is:

**Women’s and Children’s Hospital**

**Day: ........................**

**Time: .....................**

Please do not forget to bring the completed Questionnaire with you to the appointment!

Access to the Dental Department: The easiest way to access the Dental Department is from King William Street. Approach the building through the “roof” covered entrance. After entering the building, it is only 70 steps... on the right side you will see a sign “Dental”.

PS. After the examination the child will receive a toothbrush and a “Certificate” recognising their attendance and you will receive an “Acknowledgment” about your participation in the study.

If you can’t keep the scheduled appointment, please let me know, my phone number is 8303 3292, you can e-mail me on kamila.plutzer@adelaide.edu.au so we can arrange a time that suits you.

Thanks for your co-operation.

Dr. Kamila Plutzer
Appendix A 8: Dental record form
### Dental Record Form

<table>
<thead>
<tr>
<th>Family name</th>
<th>Given name</th>
<th>Date of birth</th>
<th>Age</th>
<th>Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Examiner</th>
<th>Recorder</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DEMINERALIZATION (SURFACE AREA)**

<table>
<thead>
<tr>
<th>Surface area</th>
<th>0 = no demineralization</th>
<th>1 = &lt;1/3 labial surface</th>
<th>2 = &gt;1/3 but &lt;2/3</th>
<th>3 = &gt;2/3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DEMINERALIZATION (DEPTH)</th>
<th>LABIAL</th>
<th>LABIAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>52 51</td>
<td>61 62</td>
</tr>
</tbody>
</table>

**dmfs CHART**

<table>
<thead>
<tr>
<th>LINGUAL</th>
<th>DISTAL</th>
<th>BUCCAL</th>
<th>MESIAL</th>
<th>OCCLUSAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>54 53 52 51</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LINGUAL</th>
<th>BUCCAL</th>
<th>MESIAL</th>
<th>OCCLUSAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>84 83 82 81</td>
<td></td>
<td>71 72 73 74</td>
<td></td>
</tr>
</tbody>
</table>

**PLAQUE SCORES**

| 54 53 52 51 | | | | |
|-------------| | | | |

| | | | | |
|-------------------| | | | |

**ERUPTION**

| 55 54 53 52 51 | | | | |
|----------------| | | | |

| 61 62 63 64 | | | | |
|-------------| | | | |

**Plaque**: 0 = No P visible  
1 = P. visible with the aid of probing  
2 = P. visible without probing  
9 = not erupted

**Eruption**: 0 = Not erupted  
2 = Partially erupted  
1 = Eruption completed

---

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Appendix B1.

Cover sheet: CAVITY FREE CHILDREN
CAVITY FREE CHILDREN
...more happy faces

...cavity free, naturally
Appendix B 2:

1st round of health promotion material
Dear mother to be

Maybe it will come as a surprise to start talking about the prevention of tooth decay before your baby’s teeth have appeared, or even before the baby is born, but all available evidence indicates that the right time to think about this is now.

It is recognized that baby tooth decay, which is referred to as "early childhood caries" in scientific literature, is largely preventable. If parents are not aware of the causes of the condition and how to prevent it, your child might unnecessarily develop baby tooth decay.

Tooth decay can begin early, sometimes immediately after the first teeth appear. The decay can progress rapidly, because the tooth enamel is thin and not as hard as in adult teeth.

Dentists from Social and Preventive Dentistry at the Adelaide University are offering parents guidance to help them raise their child without baby tooth decay. The program called:

"CAVITY FREE CHILDREN"

is an innovative concept of specialized advice and encouragement on how to prevent baby tooth decay. It does not replace any routine check ups you may wish to have with dental providers.

The program is free.
Why are baby teeth important?

Oral health is part of general health. Healthy teeth not only help the child to look healthy and feel good about him/herself, they also have a number of other important functions.

• They help to maintain good nutrition by permitting the child to chew healthy food properly, and gain more nutrients from the foods eaten.

• They allow development of good pronunciation and speech habits.

• They keep space for the permanent teeth to grow into their proper position. It is very important that primary teeth are kept in their position until they are ready to fall out naturally.

In contrast, baby tooth decay is associated with pain, headaches, sleepless nights and tiredness during the day. A dental visit under such circumstances may be connected with anxiety, and with the inevitable expense. When dental treatment must be performed under general anesthesia hospitalisation becomes necessary, which is a major event.

Help your baby stay free of baby tooth decay.

We are pleased to be working with you.

Best wishes from the research team.
Oral health in pregnancy

Unique hormonal changes that women experience during pregnancy influence their oral health. The changes are often linked to increased gum sensitivity, discomfort during tooth brushing, bleeding gums, and sometimes bad breath. Increased cravings for particular foods and between meal snacking may intensify the risk of dental decay. Existing problems such as tooth decay and gum inflammation can become worse during pregnancy.

This particular time in a women’s life is important for preventive dental oral care.

How is your oral health influenced by pregnancy?

Morning sickness, caused by hormonal changes, usually occurs during the 4th to 12th week of pregnancy. Frequent vomiting can leave stomach acids in the mouth. If not cleared away, the acids can damage the surface of the teeth and promote tooth decay. To prevent this happening, rinse your mouth with water and use a fluoride mouth rinse after vomiting. Do not start brushing your teeth immediately after vomiting as the acid softens the tooth's surface and brushing can easily damage it.

Swollen, inflamed gums, called “pregnancy gingivitis”, commonly start in the 3rd month of pregnancy. If the gums were inflamed before pregnancy the severity of inflammation will be greater. As the cause of gum inflammation is the irritation of the gums by plaque accumulated on the teeth, regular, gentle tooth brushing is crucial for improvement. However, some women chose not to brush their teeth at such times to avoid bleeding gums. This leads to further accumulation of plaque on the teeth, and aggravation of the condition.

Regular, gentle brushing of teeth (in the morning after breakfast and evening after the last meal of the day) with toothpaste containing fluoride, and gentle flossing, will improve gum health. With proper toothbrushing, gum health improves after the pregnancy.

Keeping your mouth healthy during pregnancy could be important not only for you, but also for your baby’s development. Severe gum infection during pregnancy may increase the risk of pre-term deliveries of low-birth-weight babies.

The problem of infection remains important after the delivery. When the baby’s teeth start to appear (around 6 months of the age) transmission of bacteria from your mouth to the mouth of your baby can occur. If you have decay or gum disease you can pass the bacteria for these infections in your saliva to your baby.

With good toothbrushing, regular dental care and healthy eating, pregnant women should not lose any teeth. And if you have concerns about the health of your teeth, the best time to go to the dentist is from the 4th to the 7th month of pregnancy.
The importance of oral hygiene is unquestionable in preventing oral diseases. By prevention we mean not only the avoidance of dental decay, but also the prevention of gum inflammation and disease (periodontal disease).

The range of different oral care products on the market is considerable. But which one works best to promote oral health?

Dental floss.

Flossing should precede toothbrushing. Removing gross plaque between the teeth allows the toothpaste easier access to the spaces between the teeth during brushing. This increases the benefit. Unwaxed dental floss is preferable, unless the spaces between the teeth are very tight.

Toothbrushes.

We can choose between electrically powered and traditional manual toothbrushes.

Electrically powered toothbrushes have become very popular and are no longer considered a luxury. There are some reports of their positive effect on maintaining healthy gums.

Manual toothbrushes should be soft-bristled. The appropriate size of the toothbrush head is dependant on the size of one's mouth and one's dexterity. Generally, toothbrushes with smaller heads are recommended, because they are easier to move in the mouth and can get to the harder to reach places.

The loss of colour on the coloured bristles of manual as well as electric toothbrushes after a period of use is a useful indicator for when a toothbrush should be changed.

Toothpastes.

Fluoride in toothpaste is the most important constituent for prevention and control of dental decay. There is a myth that fluoride is useful for the prevention of decay only in children. In fact, the regular use of fluoride toothpastes during a lifetime is without a doubt the best decay prevention.

The environment in the mouth changes several times a day according to the kind of food we eat. Food containing sugar, for example, creates a favorable environment for bacterial growth in dental plaque.
The bacteria produce acid, which will start to demineralise the tooth enamel. If this process is repeated frequently, tooth decay develops. Between periods of acid attack the tooth enamel can try to heal, or remineralise, using minerals in saliva.

Fluoride protects the teeth, because it reduces the demineralising effect of the acid produced by bacteria in the dental plaque, and accelerates the remineralisation of the enamel after the acid attack.

The majority of toothpastes on the market contain fluoride. Some toothpastes contain agents to control the growth of bacteria, as well as fluoride. The combination of different agents in toothpaste helps to prevent not only dental decay, but gum disease too.

**Mouth rinses.**

In general, there are 2 sorts of mouth rinses.

1. **Mouth rinses containing fluoride.** They increase protection of the teeth from decay as described above. Use them daily after tooth brushing. Hold them in the mouth for 1 minute and then spit out.

2. **Antiplaque** (anti-bacterial) mouth rinses. They fight bacteria in the mouth. In the mouth we can find about 350 different bacterial species. Most of them are not harmful. Only around 20 of them are associated with either tooth decay or gum disease. Mouth rinses can successfully lower the amount of bacteria in the mouth.

The most efficient chemical antiplaque agent is chlorhexidine. It is regarded as the gold standard among all antiplaque agents. On the market it can be found under the brand name Savacol. Savacol can significantly lower the amount of bacteria in the mouth. It is recommended to use Savacol mouthwash once a day, for a period of two weeks only at six monthly intervals. Do not use Savacol or others chlorhexidine products immediately after the use of fluoride containing toothpastes, as they chemically react together. The middle of the day is the best time.

A potential problem with long-term use is brown staining of the teeth and tongue. It is therefore not recommended for daily long-term use. If staining does occur, it can be removed through professional tooth cleaning.

**Listerine** is probably the most popular oral antiplaque mouth rinse. When used in conjunction with fluoride toothpaste during regular oral hygiene, it provides a benefit in reducing bacteria in the mouth.

(Adapted from Children's Health Development Foundation, SA and Deakin University. The Australian Guide to Healthy Eating. Canberra: Commonwealth of Australia, 1998.)

A good quality, balanced nutrition during pregnancy is essential for your baby's development, as well as for your health. About 3-4 months after conception, a baby's teeth begin to form. At the time of birth, all primary teeth have started their formation. Calcium, phosphate and vitamin D are the most important factors needed for the development of teeth, though there are other valuable vitamins, minerals and nutrients that are essential for the oral health, as well as the general health, of your baby.

Nutrition rationale

Food is grouped into five food groups that contain similar nutrients.

The five groups are: - Bread, cereals, rice, pasta, noodles - Vegetables, legumes - Fruit - Milk, yogurt, cheese - Meat, fish, poultry, eggs, nuts, legumes

Nutritional characteristics of the five food groups

<table>
<thead>
<tr>
<th>FOOD GROUP NAME</th>
<th>BREAD, CEREALS, RICE, PASTA, NOODLES</th>
<th>VEGETABLES, LEGUMES</th>
<th>FRUIT</th>
<th>MILK, YOGURT, CHEESE</th>
<th>MEAT, FISH, POULTRY, EGGS, NUTS, LEGUMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main Distinguishing Nutrients</td>
<td>Carbohydrate, Iron, Thiamin</td>
<td>Vitamin A, (beta-carotene)</td>
<td>Vitamins, Especially Vitamin C</td>
<td>Calcium, Protein</td>
<td>Protein, iron, Zinc</td>
</tr>
<tr>
<td>Other Significant Dietary Components</td>
<td>Energy, Protein, Fat, Fibre, Zinc Magnesium, Riboflavin, Niacin, Folate, Sodium</td>
<td>Carbohydrate, Fibre, Iron, Magnesium, Vitamin C, Folate, Sodium</td>
<td>Carbohydrate Fibre, Folate</td>
<td>Energy, fat, Cholesterol, Carbohydrate, Magnesium, Zinc, Riboflavin, Vitamin B 12, Sodium, Potassium</td>
<td>Fat, Cholesterol, Niacin, Vitamin B 12</td>
</tr>
</tbody>
</table>

Thirsty? Drink plain unsweetened water to quench thirst.
The Australian Guide to Healthy Eating encourages the consumption of a variety of foods from each of the five food groups every day in sensible proportions.

The recommended amount of food from a particular food group is expressed as a number of serves. The number of serves varies according to the stage of life of a person and individual needs or appetites.

The table below shows the number of daily serves needed to achieve a healthy diet for pregnant and breastfeeding women. A guide to the size of serves is given on the next two pages.

<table>
<thead>
<tr>
<th>Pregnant Women</th>
<th>Bread, Cereals, Rice, Pasta, Noodles</th>
<th>Vegetables, Legumes</th>
<th>Fruit</th>
<th>Milk, Yogurt, Cheese</th>
<th>Meat, Fish, Poultry, Eggs, Nuts, Legumes</th>
<th>Extra Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-6</td>
<td>5-6</td>
<td>4</td>
<td>2</td>
<td>1.5</td>
<td>0-2.5</td>
<td></td>
</tr>
<tr>
<td>Breastfeeding Women</td>
<td>5-7</td>
<td>7</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>0-2.5</td>
</tr>
</tbody>
</table>

You can combine foods from the various food groups within the recommended number of servings.

Compare your own eating pattern (number of daily servings) with that recommended.

<table>
<thead>
<tr>
<th>DAY</th>
<th>Bread, etc</th>
<th>Vegetables</th>
<th>Fruit</th>
<th>Milk</th>
<th>Meat, etc</th>
<th>Extra foods</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
</tbody>
</table>

What is the size of a serve?

A serve indicates *equivalent* food within each group of food. Serves *do not define equivalent food between food groups*, i.e., a serve of bread is not comparable to a serve of vegetables.

**A serve of bread, cereal, rice, pasta, noodles:**
- 2 slices (60g) bread, 1 medium bread roll
- 1 cup (180g) cooked rice, pasta, noodles
- 1 cup (1230g) cooked porridge, 1½ cups (40g) cereal flakes or ready to eat cereal
- ½ cup (65g) untoasted muesli
- ½ cup (40g) flour

**A serve of vegetables, legumes:**
- ½ cup (75g) cooked vegetables
- ½ cup (75g) cooked dried beans, peas or lentils
- 1 cup salad vegetable
- 1 small potato

**A serve of fruit:**
- 1 medium piece (150g) of fruit (apple, banana, orange, pear)
- 2 small pieces (150g) of fruit (apricots, kiwi fruit, plums)
- 1 cup (150g) diced pieces or canned fruit
- 1½ tablespoons sultanas, 4 dried apricot halves
- ½ cup (125 ml) fruit juice

**A serve of milk, yoghurt or cheese:**
- 1 cup (250ml) fresh, longlife or reconstituted dried milk
- 1 cup (250ml) soy milk (fortified with at least 100mg calcium / 100ml)
- ½ cup (125ml) evaporated milk
- 2 slices (40g) cheese
- 1 small carton (200g) yogurt
- 1 cup (250ml) custard

**A serve of meat, fish, poultry, eggs, nuts, legumes:**
- 65-100g cooked meat, chicken eg: ½ cup of lean mince, 2 small chops, 2 slices of roast meat
- ½ cup (80g) cooked (dried) beans, lentils, chickpeas, split peas, and canned beans
- 80-120g cooked fish fillet
- 2 small eggs
- ½ cup peanuts or almonds
Enjoy a variety of foods every day

Vegetables, legumes

Fruit

Bread, cereals, rice, pasta, noodles

Milk, yogurt, cheese

Lean meat, fish, poultry, eggs, nuts, legumes

Drink plenty of water

Choose these sometimes or in small amounts
Are they safe, or dangerous? To use or not use them?

In recent years more scientific attention has been focused on the use of pacifiers. They have been examined from different aspects: in relation to middle ear infections, breastfeeding duration, and deformities in the positioning of teeth.

The need for sucking in newborns during the first 6 months of life is strong and a basic reflex, which enables the baby to suck frequently at the breast to stimulate good milk supply. A pacifier can be used for a young baby as long as it does not replace breastfeeds. Sucking provides babies with a feeling of security. Pacifiers are useful to calm upset babies, and help them go to sleep.

If you wish to use a pacifier, you may offer one to a new baby. If he/she rejects it, don’t urge the baby to use the pacifier. Not all babies like them. Some come to use them when they are older.

Hygiene. Pay attention to the hygiene of the pacifier. Clean it frequently with warm, soapy water. Remember that pacifiers can become contaminated with bacteria and yeast. If your baby develops thrush - a yeast infection in the mouth (white plaques on soft tissue), you have to sterilise the pacifier by placing it in boiling water for 10 minutes.

Never clean a pacifier by sucking it yourself, because these way bacteria from your mouth can be transferred to your baby’s mouth.

......to use or not use them?

1. Keep the pacifier clean and use it freely until the age of 6 months. As the baby grows, the need for sucking disappears.

2. For babies older then 6 months restrict the use of the pacifier to those times when the baby is falling asleep. Research suggests that this may help prevent episodes of middle ear infection.

3. Never put glycerin, honey, sugar, jam, or other sweetener on the pacifier, as this can cause serious tooth decay.
4. Try to discontinue its use at the age of 10 to 12 months.

5. Replace the pacifier when it looks tired (sticky, change of color...).

6. Choose the right design. You can purchase pacifiers in different shapes and sizes, as there is currently no standard for their design. Aspiration, and consequently airway obstruction with the pacifier is rare, but when purchasing one keep in mind that the size of the flanges should have a minimum diameter of 43 mm (horizontal and vertical) and ventilation holes. Rings should be always attached to the flange to facilitate removal if aspirated.

7. Never tie a ribbon holding a pacifier around the child’s neck, as this could lead to the risks of strangulation. Pin any such ribbon to the baby’s clothing.
Sleeping habits

The baby’s need for sleep during the first year of its life changes in two ways.

- The number of hours the infant sleeps drops on average from 16 ½ hours a day in the first week of life to 13 ¾ hours a day at the end of the first year.

- The most dramatic change occurs in the proportion of hours slept during the day and night. While a newborn’s sleeping pattern during the first month remains unaffected by differences between day and night, the one year old sleeps 11 hours during the night and only about 2 ¾ hours during the day on average.

Encouraging a good sleeping pattern is important not only for the baby, but also for the parents, who need time for rest.

Infants whose parents spend time interacting with and stimulating them during the day, learn to sleep mainly during the night. By 2 months of age, most infants are waking briefly two or three times to feed overnight and some sleep six or more hours at a time.

There are a lot of ways to interact with a baby during the first 6 months of life. The best times to communicate with him/her are during feeding, in playtime after feeds, nappy changing, and bathing. Smiling, gentle touching, massage, talk, singing, reading simple rhymes – these are all great for the baby. With these experiences an emotional bond between the baby and the parent (carer) develops.

By watching and responding to your baby’s face, reactions, and noises, you learn to understand your baby better. In such an environment the baby feels safe.

Establishing proper sleeping patterns before the eruption of first teeth (around 6 months) is important in the prevention of dental decay.

Parents are often tempted to comfort a restless, sleepless child by offering it a bottle containing juice, milk, formula, or other sweetened liquids. This increases the risk of severe dental decay. If you want to offer a drink between usual feeds, plain water is best. Breastfeed babies don’t need to have water between feeds.

(....to be continued, when your baby is 6 months old)
Typical sleep requirements in childhood.

**HOURS OF SLEEP**

<table>
<thead>
<tr>
<th>AGE</th>
<th>Nighttime sleep</th>
<th>Daytime sleep *</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 week</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>1 month</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>3 months</td>
<td>10</td>
<td>6</td>
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<td>6 &quot;</td>
<td>9</td>
<td>7</td>
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<td>9 &quot;</td>
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<td>12 &quot;</td>
<td>7</td>
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<tr>
<td>18 &quot;</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>2 years</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>3 &quot;</td>
<td>4</td>
<td>12</td>
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<tr>
<td>4 &quot;</td>
<td>3</td>
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<td>18 &quot;</td>
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</tbody>
</table>

*Divided into typical number of naps per day. Length of naps may be quite variable.

Appendix B 3.1:

Cover letter (number 1)
Dear Mum and Baby,

Some time has passed since our first meeting in the waiting room of the antenatal clinic. Today I would like to congratulate you on the arrival of your first baby. So on behalf of myself and my colleagues from the Social and Preventive Dentistry area of the University of Adelaide, a big

CONGRATULATIONS!

We hope that you have recuperated well after the delivery, and that you and the baby are enjoying good health.

In this second dental information package we will concentrate on the following subjects which are relevant in the period between 6 and 12 months of your baby's life,

The subjects are as follows:
Teething (p.1-3)
Sleep problems (p.4)
Tooth anatomy (p.5-7)
Acquisition of bacteria (p.8)
Nutrition (p.9-11)
Oral hygiene (p.12)
Self care for parents (p.13-14)

Because we recommend that you start your baby's oral hygiene immediately after the first tooth appears, we are sending you a little gift, a finger toothbrush. This toothbrush can easily be manipulated in the baby's mouth, and can be used for tooth brushing, as well as for a gentle gum massage. Just slide it on your finger, check it is secure, and use. We do not recommend that you use any toothpaste until your child is closer to 2 years old.
Please remember that the toothbrush should only be used for the purpose of tooth brushing and not as a toy, as it could be swallowed.

We are also sending you a leaflet ...... SPOT THE DIFFERENCE, which describes the development and progress of dental decay.

We would like to announce that our toll free telephone number 1800 333 370 has been established. If you have any questions or concerns, the best day to contact us is Wednesday, between 9 am and 5 pm.
We are convinced that working together will benefit your baby as well as yourself. Wishing you the best, with kind regards
Appendix B3.2:

2\textsuperscript{nd} round of health promotion material
Teething.

(The following material has been adapted from articles listed in References)

Tooth eruption (teething), usually starts during the 6th to 7th month of a baby’s life, but it can occur earlier or later (approximately ± 2 months from this period). By the 30th month of a baby’s life all 20 deciduous (also called primary, or milk) teeth have erupted. They look different from adult teeth. The colour of the primary teeth is whiter, the crown is shorter and the enamel and dentine layers are thinner.

Time of eruption of the deciduous teeth.

<table>
<thead>
<tr>
<th>Age of baby</th>
<th>6 ± 2 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 ± 2 months</td>
<td>Central incisor</td>
</tr>
<tr>
<td>18 ± 2 months</td>
<td>Lateral incisor</td>
</tr>
<tr>
<td>14 ± 2 months</td>
<td>Canine</td>
</tr>
<tr>
<td>24 ± 2 months</td>
<td>First molar</td>
</tr>
<tr>
<td></td>
<td>Second molar</td>
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<td></td>
<td>The deciduous arch</td>
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<td>Upper</td>
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<td>Lower</td>
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<td></td>
<td>First molar</td>
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<td></td>
<td>Second molar</td>
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<tr>
<td></td>
<td>Canine</td>
</tr>
<tr>
<td></td>
<td>Lateral incisor</td>
</tr>
<tr>
<td></td>
<td>Central incisor</td>
</tr>
</tbody>
</table>


Controversy exists about the effect teething has on a baby’s general health and well-being. Parents frequently report symptoms during teething, though there is no evidence of a direct link between teething and general symptoms. Most symptoms are minor and related to discomfort rather than physical illness. They are usually more noticeable 3 days before eruption, on the day of eruption and 4 days after the eruption of a tooth.
The symptoms are characterised by increased biting, drooling, gum rubbing, sucking, irritability, sleep disturbance, ear rubbing, facial rash, decreased appetite for solid food, mild temperature elevation. Increased congestion, stool looseness, and increased stool number are more frequent on days close to tooth eruption. While not all teething children have these problems, some non-teething children demonstrate these symptoms.

Decreased appetite for liquids, coughing, rashes other than facial rashes, temperature over 102 Fahrenheit or 38.5 degrees Celsius, and vomiting are not associated with teething and are signs of potentially more serious illnesses.

Discomfort associated with teething may be eased:

- by gently rubbing the gums with a clean, cool, wet washcloth

- by biting on: - a cool, clean, firm teething ring
  - a teething ring filled with water, kept in a freezer overnight
  - a chilled firm rubber teething ring.

  Cold acts as local anesthetic and the pressure soothes the gums.

- by medication such as Children’s Panadol - Baby drops (recommended for babies from 1 month to 2 years), or Nurofen for Children (for babies from 6 months).

- by medications applied directly onto the sore area, such as Bonjela Gel, Seda Gel, Seda Gel Lotion, Women’s & Children’s Chlorhexidine & Lignocaine Mouth Paint, and others, available over the counter.

Make sure that you check the amount of medicine / ointment and the way it should be applied, before you offer it to the baby.
These ointments are drug based, containing combinations of topical anesthetics, antinflammatory drugs or antiseptics. Their use can be helpful, but they can also cause some harm if use inappropriately. (eg ointment use too often and too liberally can cause chemical trauma, or later sensitise the baby to allergic reaction to some of the ingredients used in the ointment).

Relievers of oral teething pain that are rubbed on the infant’s gums probably are not much help, since saliva in the mouth quickly washes the medication away.

Avoid the use of:

- Biscuits, crackers, pretzels, they can break into small pieces and cause the baby to choke, plus they can promote tooth decay.
- Dummies dipped in alcohol.
- Teething powders and aspirin.

The best advice is:

1. Give the child cold teething objects to bite – cold brings greatest relief; keep them clean and cool them in the fridge.
2. If pain continues, use Children’s Panadol - Baby drops, according to the age/weight instructions.
3. If additional painkillers are required, use lignocaine-based teething gels such as Women’s & Children Chlorhexidine & Lignocaine mouth paint.


Sleep problems and Early Childhood Decay.

In its first year of life, a baby can have difficulties sleeping at night. A baby rarely goes through the entire night without waking several times. Studies that recorded all-night videos of sleeping babies revealed that when the baby wakes up during the night, it usually soothes itself, using a thumb, or finger, hand, or soft objects, allowing the parents to sleep during the night.

It is important for the parent to recognise that towards the second half of its first year of life — around 8 months of age — the child could wake up more often during the night than it did before. This reflects the developing individuality of the child. The child becomes aware of strangers and frightened by separation from its parents. This is usually the reason why night arousal, or awakening, becomes more frequent. Parents should delay their response so that normal arousal during sleep does not progress to complete awakening. Hunger usually does not cause night awakening unless the baby has been trained to be fed at night.

The management of night arousal is important in the prevention of dental decay, as the bottle is often used by parents to pacify the sleepless child, and in turn contributes to the formation of Early Childhood Decay.

Parents should be aware, that during sleep the flow of saliva generally declines and food, including milk, stays around the teeth longer, creating good conditions for development of dental decay.

Burham MM; Goodlin-Jones; Gaylor EE; Andrs TF. Use of sleep aids during the first year of life. Pediatrics Vol. 109 N4 April 2002

Tooth anatomy

(This information is universal for baby and adult teeth).

The tooth consists of a crown and one or more roots. Each tooth is composed of layers (see picture), each of which has a different function, and consequently a different structure. The outer part of the tooth crown, which can be seen, is called enamel. Enamel is considered to be the hardest of all tissues in the human body.

Interestingly, enamel is the only structure in the human body, apart from the cornea (the center of the eye), which doesn’t have a direct blood supply. Despite this there is constant interaction between the enamel and the environment where the teeth are located, the oral cavity.

In general, the major factors through which we can influence the oral environment are the type of foods we choose to eat, the kind of drinks we consume, and the quality of oral hygiene we practice.

Saliva is an important component of the oral cavity. Saliva not only softens food in the mouth, but also creates the foundation where all digestive process can take place. There are inherited differences in the composition of saliva among individuals, which can’t be influenced. The quantity of saliva depends on the amount and quality of the liquids we drink. Some drugs (eg. certain antidepressants, antihypertensives) may significantly reduce the flow of saliva.

The newly erupted teeth are highly susceptible to dental decay during the first few years after eruption as the enamel is not fully mature. This increases the importance of diet and oral hygiene at this time.

Sugar is the key factor, which negatively influences the environment of the oral cavity and creates favorable conditions for the development of dental decay.
How does it happen?

The bacteria in the mouth metabolize available sugar. The sugar from food or sweetened drinks rapidly diffuses into plaque. The main element in the plaque is bacteria and food debris. The longer oral hygiene is neglected, the greater the build-up of plaque. Plaque always accumulates in stagnation areas - between the teeth and around gums. Consequently, these are the typical places where dental decay starts.

Sugar is the source of energy for bacteria. As they metabolize the sugar, they produce acid. This makes the interface of plaque and the tooth surface more acidic, which can be measured as a change in the pH. The pH drop happens very quickly, within 2-5 minutes. When the pH reaches the value between 5.2 - 5.5, demineralization of teeth begins. During demineralization minerals from enamel are dissolved. The loss of minerals can be seen as a white spot on the enamel.

This is a stage of dental decay, which if spotted early, can be reversed back to healthy tooth. The conditions for reversal are the return to a near neutral pH, and an adequate amount of minerals to replace those lost. This process is call remineralization (repair of the tooth).

Saliva plays an important role in the process of remineralisation. The amount of minerals (calcium, phosphorus, fluoride) available in saliva influences the quality of remineralization. The higher the availability, the better the chance for enamel repair.

Of course, the pH in the mouth is never stable, as the sort of food we eat varies greatly. It is influenced by the overall balance of the types of foods eaten and the frequency with which they are eaten.

After acid attacks enamel, it takes up to one hour for the pH to return to its normal level, when remineralisation occurs. If during that hour another acid attack occurs (because we drink, or eat another food containing sugar), the pH will stay low, allowing further demineralization to take place, and dental decay to progress.

---

He likes: pure water, milk dairy products .......

-6-

He likes: soft drinks, lollies, bisquits .........
Can we influence the process of remineralization?  
(For parents)

Definitely. Through the food we eat and the regular use of toothpaste containing fluoride.

**Hard cheese** is considered to be the most useful food product that aids enamel remineralisation. The slightly acidic taste of cheese helps to stimulate saliva flow, which will neutralize the plaque acids. The high content of calcium and phosphates in cheese will diffuse into the affected demineralized areas of the teeth.

Chewing sugar free chewing gum will help the process of remineralisation, by stimulating the flow of saliva.

**Of primary importance is the regular use of fluoride containing toothpaste,** which has the greatest potential to aid tooth remineralization. Its effect can be enhanced by the use of **low concentration fluoride mouth rinses** as the frequency of fluoride use is of greater importance than its concentration. (Recommended for children above 7 years of age and then for life).
Acquisition of bacteria

Dental decay is considered to be an infectious transmissible bacterial disease. The bacteria is usually transmitted in the early months of a baby’s life. The critical time is between the 6th and 36th months of a baby’s life.

Scientists have identified that over 400 different bacterial types reside in the human mouth of a single person. One-milliliter of saliva is the home of up to 100 million bacteria.

The majority of these bacteria are harmless, and they live in equilibrium with each other and with the host. They are not of any concern. The bacteria primarily responsible for the development of dental decay are the Streptococcus Mutans (SM) bacteria.

Babies are born bacteria free. Then oral cavities are gradually colonised with various kind of bacteria. Different bacteria have different requirements for life.

The majority of bacteria in the mouth freely float in saliva. Streptococcus Mutans, however, needs to be attached to a tooth surface. The presence of teeth in the mouth is thus the prime requirement for the life of this bacteria.

The colonisation with SM can begin as soon as primary teeth become visible. This early colonisation with the bacteria is the reason why some people think that their babies were already born with decayed teeth. This is not possible.

The truth is, that the earlier the colonisation with Streptococcus Mutans occurs and the higher the number of transmitted bacteria, the more likely dental decay will develop.

Research has shown that bacteria are usually transmitted from the mother to the baby, seldom from the father to the baby, or other close members of the family. The bacteria are transmitted through saliva. The possible means of transmission are direct transmission through kissing or indirect transmission through objects which were previously contaminated with saliva such as spoons, pacifiers or nipples of the nursing bottle.

Preventing the transmission of Streptococcus Mutans into the baby’s mouth is one of the most important precautions in the prevention of Early Childhood Decay. Make sure that objects which the baby regularly puts in its mouth, such as spoons, dummies, tooth rings, etc are cleaned with water and not by sucking them yourself.

A mother’s good oral hygiene, which includes the use of an antiseptic mouthwash, is one of the major means in preventing Early Childhood Decay in her baby. (Slavkin HC, Changing patterns of disease and mucosal immunity, Insights on Human Health NIDCR)
Nutrition for babies 6–12 months of age.

The attached leaflet, “Foods for the First 12 Months”, outlines the recommended foods suitable for babies up to the age of 12 months. The information in this leaflet is based on the “Dietary Guidelines for Children and Adolescents”.

Please note, that the leaflet stated in the section “Starting healthy eating habits”

Babies do not need to have salt or sugar added to their food. The food may taste bland to an adult but is suitable for babies.

Mum, do you like sugar?

Many studies have demonstrated that eating habits established during the first year of life, are hard to change in later life. Many of these habits persist throughout childhood.

Children like the food that they are given the most often, and prefer what is available and acceptable in the parental household. If sugary foods are freely available, the pattern of sugar consumption is easily developed.

Therefore maternal influence plays a significant role in a child’s food choices. For instance, a mother’s sugar consumption will influence her child’s sugary food habits.

Mothers tend to feed their children in a less healthy way than they feed themselves. Specifically they feed their children more sweet products and less healthy bread and dairy products. In some cases 6 month old babies were accustomed to drinking sweetened water.
The only truly safe and best drinks for baby's teeth are plain water and milk.

Even maternal or plain milk, when continuously consumed by babies during the night can cause the development of dental decay.

Unfortunately many parents consider these drinks too plain for their babies. They prefer flavoured, sugared drinks for their infants, which are directly linked to dental decay.

The fact is that the more frequently sugary foods or drinks are consumed, the higher the probability of developing tooth decay.

Fresh fruits and fruit juices.

*Fresh fruits* contain natural sugar, but this sugar is unlikely to cause dental decay. This is because the sugars contained in the fruit are located in fruit cells, and thus sugar doesn't have direct contact with the teeth.

The frequent consumption of fruit can cause another problem. The natural acidity of fruit and especially of fruit juice can cause erosion of the teeth. *Erosion* is the loss of tooth enamel of the teeth, not as a result of bacteria, but due to direct contact between the tooth enamel and acid.

The leaflet (Foods for the First 12 Months) in the part "Suitable drinks for babies" recommended unsweetened diluted fruit juice after 6 months of age (dilute 1 part juice to 3 parts water). Give your baby only 1 to 2 small drinks of juice a day. We recommend offering the juice at the time when the main food is eaten, not between meals. Plain water is sufficient to quench thirst between meals.
Feeding at will.

Dentists along with other health professionals support breastfeeding. The advantages of breastfeeding lie not only in improving the emotional attachment between the mother and child, but also in better prevention of gut infection, obesity, asthma, and better immunological protection. From a dental perspective, breastfeeding aids the prevention of dental fluorosis, which can develop through the accumulation of fluoride from water, and other fluoride rich sources such as tea, fish, or baby formula.

To prevent the development of early childhood decay, the baby should sleep in his or her own bed (cot) and not beside its mother. The physical closeness of sharing the bed, make it easy for baby to access the breast during the night, and even to sleep with the nipple in its mouth. Breast milk contains “milk sugar” (lactose), which is less likely to cause decay than other sugars, unless there is continued long – term exposure.

Feeding your baby at will during the night, whether it be through breastfeeding or bottle-feeding, combined with frequent drinking of sweetened or acidic drinks during the day, always cause dental decay.

Never teach your baby to drink from the bottle during the night!!!

Start teaching your baby to drink from a cup at the age of 6 months. Babies that are breastfed for the first 12 months can go straight to using a cup and avoid bottle-feeding, and its possible complications such as dental decay, and middle ear infection (if the nipple of the bottle is not kept clean).


Patricia McVeagh, MJA Vol.177, 5 August 2002.
Oral hygiene up to 12 months of age

Introduce tooth brushing to your baby immediately after the first tooth erupts into the mouth. Do it playfully so the baby thinks of tooth brushing as a form of play. We do not recommend the use of toothpaste until two years of age.

Place the “finger brush” on your finger and gently brush baby’s teeth when you see food or plaque around the teeth. Brush teeth regularly before the baby goes to bed at night. Do not forget to clean the “toothbrush” after use.

Illustration picture

……..and what about dummies?

If baby is still using the dummy after the age of 6 months:

1. Keep dummy clean. Never clean a dummy by sucking it yourself, because this way bacteria from your mouth can be transferred to your baby’s mouth.

2. Restrict the use of the dummy to that time when baby is falling asleep. Remember that this may help prevent episodes of middle ear infection.

3. Never put glycerin, honey, sugar, jam, or other sweeteners on dummy.

4. Make an effort to discontinue its use at the age of 10 to 12 months.

Hygiene.
Pay attention to the hygiene of the dummy and finger toothbrush!!!
Clean them frequently with warm, soapy water. They can be easily contaminated.
Self care. (For parents)

Regular and efficient care is of great importance when maintaining your oral health. Maintaining good oral health is not only pleasant, it is also cost effective. You will benefit from this approach immediately, and in future as well. The pleasant feeling of a clean mouth will enhance the sensation of your personal freshness, brightness and wellbeing.

Another person who will benefit from your good dental care is your baby. By preventing the development of dental diseases for yourself, you can prevent the development of dental decay in your baby.

Just reminding you what we consider effective oral self-care:

- **Start oral hygiene with flossing the spaces between your teeth.** These are not easily accessible to the bristles of your toothbrush. Consequently the majority of food debris can be found in these areas, creating the right conditions for the growth of bacteria. Be careful and gentle when you use the dental floss. Control the movement of the floss carefully, looking in a mirror, as it is easy to injure the gums. Frequent injuries to the gums can cause gum recession in the long term. Use dental floss at least twice a week. Take your time and do this properly. Pay attention to the interdental spaces of back teeth, not only the front ones. If your back teeth have fillings, which have contact with gums, floss the interdental space daily!

  Brush your teeth two times a day, in the morning after breakfast, and in the evening after your last meal.

- **Use a toothpaste which contains fluoride.** The regular use of fluoride toothpastes (for adults) will help prevent dental decay.

  Use a mouth rinse, preferably one which contains chlorhexidine. You can buy it under the generic name SAVACOL. For the purposes of prevention use the concentration which is recommended for children (5ml of Savacol diluted with 5ml of warm water). Brush your teeth thoroughly, and then rinse with the mouth rinse for 1 minute. For best benefit do not rinse with water and do not eat immediately after using the mouth rinse. Use mouth rinse on the first seven days of each month or at least once a week, just before going to bed. Chlorhexidine is the most potent agent against the oral bacteria, but be aware that in the long term it may cause tooth staining. This can be removed by your dentist.
- If you don’t like the taste of Savacol, other mouth rinses including Listerine and Ultrafresh can be used instead, although their antibacterial potential is considerably lower. However, their use is always better than non-use.

- If you need to chew gum use a sugar free chewing gum. Chewing stimulates the flow of saliva, which helps to neutralise the acid created in the plaque around the teeth.

- If you think that you have a dental problem, which despite your self care doesn’t disappear (suspicion of decay, sensitive tooth, a broken tooth or filling, bleeding gums, dry mouth), visit a dentist as soon as possible. Treating the problem when it is small will not only be less expensive, but also less distressing.

Do not smoke. Smoking is associated with gum disease, as well as other chronic diseases. The response to treatment for gum diseases among smokers is poorer than it is among non-smokers. This is the reason smokers lose more teeth at an earlier age than non-smokers. When the missing teeth are replaced by implants, there is a significantly higher rate of dental implant failure among smokers compared to non-smokers. Smoking also increases the risk of oral cancer.

For assistance in quitting call the Quilline on 131 848.
HEALTHY TEETH

DIET
- breastfeed if possible at least for the first 4 to 6 months
- from 4 months introduce unsweetened solid foods
- when you stop breastfeeding, supplement fluids with plain water
- from 12 months introduce plain cows milk
- snacks: fresh fruit, bread, cheese, yogurt, low sugar cereals

ORAL HYGIENE
- after teeth eruption-gently wipe the teeth with a moistened cloth or brush with a finger toothbrush.
- at 12 months introduce soft toothbrush, do not use toothpaste
- at 2 years age introduce just smear of low fluoride toothpaste
- brush teeth after dinner, preferably twice a day

reversible decay
LIFT THE LIP

Watch for white, chalky spots near the gums of upper front teeth (in marked areas)

This is initial decay and can be halted.

If such spots appear seek dental care immediately!

Don’t allow the bottle to be used during the night!

Don’t use sugary drinks in the bottle!

It is best to stop bottle feeding at 12 months.

EARLY DECAY ___________ SEVERE DECAY

progresses in months to

CAUSES OF DECAY:

DIET
- drinks: sleeping with bottle containing sweetened infant formula or milk; using these drinks, and/or soft drinks or sugar water in sipper cup during the day
- snacks: avoid biscuits, cakes, lollies, chocolate, dried fruit
- habits: putting sugar, honey and other sweeteners on dummy

Oral hygiene - Frequently omitted

Gently wipe, or brush your child’s teeth twice a day!!!
Appendix B4.1:

Cover letter (number 2)
Dear mother and child

This is the third and last package of information we will be sending to your home address. The purpose of this package is to reinforce previous information and to add details relating to your child’s development and their oral health.

We hope that you found previous information useful and helpful in making the right decisions for your child. As we consider your feedback very important, we would appreciate any comments or suggestions, which would be used to improve our work. By doing so, you will not only be assisting us, but also helping the next mothers-to-be.

The information included are:
Child’s development (p1-2)
Nutrition for toddlers (p 3-6)
Child’s oral hygiene (p7)
...more about fluoride (p8-9)
The role of bacteria (p10)
Sleeping habits (p11)
When injury occur.... (p12 -14)

Further information.

As mentioned during your enrolment in this study, your child will receive a free dental check up when they reach the age of 18 months. As this time will arrive very quickly, I would like to give you some information about the future arrangements.

Just before your child reaches 18 months of age, we will send you a second questionnaire and the addresses of dental clinics where the examinations will be conducted. You will have time to decide which clinic is most suitable for you to attend.

The questionnaire will be sent with a reply paid envelope. We would appreciate if the completed questionnaire and your indication of the chosen clinic are posted back to us as soon as possible.

Please notify us of any changes of your home address or phone number in the meantime. With kind regards
Appendix B4.2:

3rd round of health promotion material
Dear Mum,

The health promotion program "Cavity Free Children", in which you enrolled your baby during your pregnancy, was designed to provide you information about the prevention of dental decay.

The program is delivered in three packages (1st during the pregnancy, 2nd at 6 months, 3rd when your child is 12 months old).

Each package of information reflected changes that are characteristic for each stage of your baby’s development.

Some mothers have asked for a summary.

We hope you will find it useful.

THE TOOTBRUSH IS GIFT FOR YOU, MUM!
Dear Mum

- Keep in mind that eating habits established during the first year of life are hard to change later in life. Children do not need to have salt or sugar added to their food.

- Night awakening – hunger usually does not cause awaking at night, unless the child has been trained to be fed at night!

- Feeding your baby on demand DURING THE NIGHT, whether it be through breastfeeding or bottle feeding (formula), combined with frequent drinking of sweetened or acidic drinks during the day, can causes dental decay.

- Avoid teaching your child to drink from the bottle during the night!

- If you think that the child needs your attention during the night, offer only the bottle with tap water.

- The best drinks for children are plain water and milk! Fruit juice (best diluted freshly squeezed fruit) should only be offered at the time when main food is eaten! Not between meals.

- If your child is breastfed for the first 12 months, go straight to using cup and avoid bottle-feeding!

- To prevent the transmission of bacteria (causes dental decay) to the child make sure that objects which child regularly puts in its mouth such as spoons, dummies, tooth rings, etc are cleaned with warm water and not by sucking them yourself.

- Restrict the use of the dummy to that time when child is falling asleep. Never put glycerine, honey, sugar, jam or other sweeteners on dummy. Discontinue use at the age of 10–12 months!

- Introduce tooth cleaning to your baby immediately after the first tooth erupts into the mouth.

- Cleaning your child’s teeth twice a day, in the morning after breakfast and especially in the evening before bedtime with a finger toothbrush, or infant toothbrush should become a habit.

- You should continue to supervise and brush your child’s teeth until he/she is able to do it by his / her self, which is around 6 years of age.

- We do not recommend the use of toothpaste until your child is 2 years old. Therefore up to 2 years of age tooth brushing is even more important in the prevention of dental decay.

Kamila Plutzer (08) 8303 3292
General Growth and Development of your Child

MY TODDLER’S DIARY

Maybe you noticed that I am no longer referring to your child as “baby” or “infant”, and instead using words like “child” or “toddler”. Yes, time has passed and your child has reached a new period of life, called Early Childhood. This period will last up to 4 years of age. It is then followed by middle childhood up to 10 years of age, and from 11 years of age..... can you believe it? Adolescence!

So enjoy the time you spend with your child.

The most frequently used name to describe a child from 1 to 3 years of age is toddler, with the period of younger toddler: between 12 – 18 months.

Understanding the changes your child is undergoing will help you to make more informed decisions, which will benefit your child, as well as yourself.

• Your child will not grow as rapidly during this period as they did during the first year of life, but other important changes will take place.

• There is a gradual improvement in walking and manual skills, which fascinate the child. Their newly discovered abilities and growing independence will lead them to explore “new territories”. Safety will become a big issue. Share the enjoyment of your child’s discoveries, but always check the safety of their surroundings. Try to predict what could become a dangerous attraction for your child, and if possible, take appropriate precautions. It is hard to hold your toddler back.
• **A child learns through imitating adults.** Step by step a toddler will try to do more things independently, to become like you. Toddlers like to feed themselves, using fingers, later learning to use spoons and forks. They like to undress themselves. Brushing their hair and teeth are other procedures, which toddlers will try to master.

Please do not forget, that a higher level of hand skill is essential for effective tooth brushing to be achieved. Therefore adults should supervise a child’s tooth brushing until the child has reached the age of six years.

• **Be patient with the mess** that often follows the child’s activity! Learning is a process that needs time and repetition.

• **Repetition is the main way of learning for toddlers. Toddlers like repetition.** Through repetition of activities such as dressing, hand washing, tooth brushing, as well as reading of stories and singing songs, they become familiar with new procedures and start to actively participate. And they will enjoy practising their new skills.

• **Toddlers also like routine.** Especially younger toddlers. Knowing what will happen in the near future makes them feel more in control and thus more secure. Established routine for meals and bedtime makes life easier for toddlers, and also for parents.

• Towards the end of child’s 18th month, the first signs of **social life will emerge.** The child will start to interact more with other people, (hopefully with me too - during the dental examination) and especially with children his/her own age.

• The growing need for independence often manifests with the **toddler answering – “NO”** to parents’ requests. Depending on how important the task is, sometimes we can accept the toddler’s decision, but other times we have to be firm. The toddler should understand the reasons behind our decision.

Information is based on the material produced by “The Baby Centre” (http://www.babycenter.com/news), 15/01/03.
Nutrition for toddlers.

In the second package of information, the leaflet "Foods for the First 12 Months" was attached. Now we have enclosed another leaflet, entitled "Food for Toddlers". It is based on the "Dietary Guidelines for Children and Adolescents" produced by the Australian National Health and Medical Research Council. The leaflet discusses common problems mothers face during feeding time, and offers possible solutions. It also reviews the contents of important nutrients in particular food groups. Please pay attention to this leaflet!

The driving force in nutrition.

Hunger and thirst are the basic human drives. The choice of food is influenced by many factors including taste, convenience, time and money.

We usually have an aversion towards bland foods, and prefer the high flavour intensity foods - sweet, spicy, hot, sweet - sour, salty, which will bring some bliss and fun into our life. Our visual perception of food, its glossy advertising and tasteful packaging, greatly influences our perception and choice of food. Influenced by such factors, we often become unable to control the impulse to buy promoted food, which is frequently of low nutritional value. In this way, problematic shopping patterns may arise.

How often do we consider the nutritional quality of the foods we buy? It is likely that if nutrition were the leading force in the selection of food, our food choices would be quite different.
A panel of experts working in pediatric health have expressed concern that today's children may have a lifestyle which increases their risk of developing diseases such as obesity, heart disease and diabetes later in life. Strategies for optimising health in children should promote sound dietary practices and physical activities to help prevent this outcome. (The Medical Journal of Australia, Vol.173, 7 August 2000, Supplement – Recommendations for nutrition and physical activity for Australian Children).

Our aim is to promote good oral health, as a part of good general health. In fact good oral health is necessary for good general health as proper nutrition can be achieved only with the help of a fully functioning teeth.

As mentioned in previous material, eating habits established during the first year of life is hard to change later in life. Around the first birthday the child is still willing to change some habits, but as they grow any change will become more challenging.

**Nutrition and oral health.**

**Should snacking be encouraged in children?**

**YES,** according to the opinions of nutritionists and pediatricians. The limited stomach capacity of small children means they cannot meet the energy levels required for growth and activity when eating three meals a day. They need to eat at least 5-6 times per day. The quality of these snacks is important in terms of their nutritional value and for maintaining healthy teeth.

It has been said that there is no such thing a good food or bad food; there is only a good or bad diet. Whether it is good or bad, relates to balance. **Chocolate, cheese are both energy giving foods,** which children need. **But from a dental perspective there is a big difference.**

Each time a child eats some chocolate or other sugary food, the mouth environment changes. It becomes more acidic. This helps to decay to start. How acidic the environment becomes depends on the nature of the food. Sweet food changes the mouths' environment dramatically and it takes longer for it to return to a neutral level acidity at which decay does not develop. Frequent food intake causes frequent changes in the mouth environment. This significantly increases the likelihood of developing decay.
In contrast to chocolate, cheese such as Cheddar, Mozzarella or Swiss cheese, helps to reduce harmful acids in the mouth. Cheese also helps to remineralise the teeth if some demineralization (early decay) has already occurred. (The process was described in the section “Tooth anatomy” - 2nd package of information).

**Smart snacks for children are the answer!**

According to The Australian National Nutrition Survey of 1995, children should be consuming more foods that contain calcium and iron. By limiting snacks containing hidden sugars and promoting snacks rich in calcium and iron (fresh fruit, bread, cheese, yogurt, low sugar cereals) you will be introducing your child to a nutritionally sound diet, which should be maintained for lifetime.

Examples of snacks that may cause decay: lollies, cookies, cakes, soft drinks, cordials, fruit juices, fruit rolls, dried fruit, breakfast bars.

If you want to give your child sweets, restrict them to mealtimes!

Do not use lollies, chocolate, cakes and other sweetened food as “rewards”! The child will pick up this pattern and ask for them more often on different occasions!

**Drinks**

Water and plain milk should stay the predominant sources of liquids, hopefully for life!

Stop using infant formula after the age of 12 months. This is time when you can switch to using cow’s milk.

Soft drinks and cordials should be thought of as “Liquid Lollies”. They offer limited nutritional benefit to your child. Sipping these drinks during the day puts your toddler at high risk of developing decay.

Avoid excessive consumption of fruit juice restricting it to the main meals. Dilute them as recommended in the leaflet (Food for Toddlers) 1 part water to 1 part juice and limit their consumption to 1-2 small drinks per day.
Your child should celebrate their first birthday:

**Without a bottle!**

Use a cup instead. The longer the toddler hangs onto the bottle habit, the harder it is to break it.

......and never put your baby to bed with a bottle!!!

If your child is still being breastfed, go straight to the cup and avoid the possible complications of bottle-feeding.

A training cup may be used as a transition to a cup, but not for long.

**Without dummies!**

Dummies are history!

Explain to your son, daughter, that NOW he / she is a BIG BOY / GIRL and doesn’t need dummies any more!

(The information on these topics has been given in previous information packages).
Child's oral hygiene

At the age of 12 months all upper and lower incisor teeth should have erupted. Shortly after the 1st birthday, the first molars should erupt and just before the age of 18 months, the canines (eye teeth) will emerge. Then the only missing teeth will be the second molars, which should erupt around the 2nd birthday. These eruption times represent average values, based on population studies. A degree of deviation can therefore be expected and is normal. Each child is different and is developing at his/her own pace.

With nearly all teeth erupted, oral hygiene becomes an essential part of maintaining healthy teeth.

Cleaning your child’s teeth twice a day, in the morning after breakfast and in the evening before bedtime, with a finger toothbrush (or infant toothbrush) should become a fixed ritual, for both you and your child. You should continue to brush your child’s teeth until he/she is able to do it themselves (which is around 6-7 years of age).

Try to make tooth brushing an interesting procedure, by talking to your child about attention-grabbing things. It is important to position the child in a way that enables you to see all tooth surfaces during brushing. Because we do not recommend the use of fluoride toothpaste until the age of 2, the tooth brushing is becoming even more important in the prevention of dental decay.

A good position for tooth brushing is to have your child lying on their back. In this position you can see all their teeth comfortably and they are easy to access. This is very similar to the position used by dentists when examining teeth. At the age of 2 years fluoridated toothpaste is added. For this reason, tooth brushing after 2 years of age must be conducted upright. But the rule remains the same – you must be able to see the teeth you are trying to brush!

These are our recommendation, but the final decision is yours. If you have decided to use the fluoride paste immediately, use the “child-strength” toothpaste with lower fluoride concentration. The amount of toothpaste should not exceed the pea-sized amount.

Be sure that toothpaste along with other dental products is kept out of your child’s reach. Many children like the taste of toothpaste and will eat and swallow it. The high amount of fluoride ingested in this way could lead to general health complications.
.....more about Fluoride.

In the two previous packages of printed material you received some information about the benefits of fluoride in the prevention of dental decay.

Now we would like to give you more information about fluoride and its influence on the development of your child's teeth. Our aim is to achieve excellent oral health not only in your child's primary dentition, but also in their adult, permanent teeth.

Just to remind you, fluoride has proved to be a critical factor in the prevention of dental decay. People of all age groups benefit from regular use of fluoride.

What is the mechanism, through which fluoride prevents dental decay?

Fluoride can influence the nature of the enamel before or after tooth eruption. The before eruption impact (through the body) influences only the enamel of developing teeth. The after eruption impact influences activities at the surfaces of all teeth in mouth. This most important impact of fluoride in the prevention of decay. And this is a reason why we should use fluoridated toothpaste through lifetime.

The mechanism of action lies in the chemical reaction that occurs between fluoride and the tooth. During this reaction the enamel becomes stronger and more resistant to an acidic environment.

However, the use of fluoride in children before the age of 6-7 years must be carefully controlled. Especially the use of fluoridated toothpaste.

Why? An excess of fluoride can cause an enamel developmental change called fluorosis. It is characterized by white spots on teeth, which are usually very mild and hardly detectable. In its more severe forms fluorosis can become a cosmetic problem.

only the pea-sized amount of toothpaste, please!!
The right amount of toothpaste for child between 2 and 6 years.
How to use toothpaste?

• Clean child’s teeth twice a day (after breakfast and after the last evening meal) with a clean toothbrush. Do not use fluoride toothpaste for your child before the age of 2 years.

• Between the ages of 2 and 6 years, use a pea-sized amount of low fluoride toothpaste on your child’s toothbrush twice daily. This requires approximately two tubes of toothpaste per year.

• Teach your child to spit out the excess of toothpaste when they have finished brushing.

• Supervise your child’s tooth brushing up to age of 6 - 7. (At this age the enamel of all front teeth has fully formed and there is no longer the danger of developing fluorosis).

References:

The role of bacteria!

In our previous information package attention was given to the acquisition of oral bacteria. As mentioned, previously the bacteria primarily responsible for the development of dental decay (Streptococcus Mutans) are usually transmitted in early months of child’s life, between the 6th and 36th months.

The most common way to get bacteria is from contact between the mother and her child (through kissing, or through objects contaminated with saliva, such as spoons, dummies, etc). The earlier the transmission of bacteria occurs, the greater the possibility of decay for your toddler.

Prevention is simple.

The possible transfer of bacteria to your child should be minimised. Take care whenever you are handling objects which could be contaminated by your saliva and which can get into child’s mouth.

Take good care for your own oral health and brushing your teeth twice a day using a fluoridated toothpaste. An antiseptic mouthwash should be used at regular intervals. (See “Self-care” – for parents).

Pay attention to the hygiene of your own toothbrush!

The prevention of dental decay is painless, safe and inexpensive.

Later you will be glad that you took precautions early.
Sleeping habits.

As a child becomes older their sleeping habits gradually change. This change is a result of the maturing central nervous system, and the ability of the child to eat more at each feeding. The 12 – 18 months old child needs to sleep an average of 13 –14 hours a day, including day naps (usually two). Over time, the need for day naps decreases. By 18 months of age a single afternoon nap is usually sufficient.

Sleeping through the night is critical for children as well as for mothers and families. A rested child has greater ability to tackle different tasks during the day, is more co-operative and happier, which in turn puts mothers and families at ease.

An unrested child is often cranky and tearful during the day. Food is frequently used to satisfy the frustrated child. This can lead to an unbalanced food intake, as the kind of food usually provided to pacify children is mostly unhealthy - lollies, cookies, chocolates, soft drinks, etc. Other parents will use dummies in an attempt to soothe their child. But it is never safe to put a child to bed with a bottle.

Some of these strategies may help the development of dental decay.

To help your child sleep well, develop patterns and routines that indicate to your child it is time for sleep. Follow the same patterns at the same time each day. Even if your child resists for a while, with your consistency they will quickly adapt to this regime.

An evening routine should start at the same time each night and include: bathing, tooth brushing, and getting changed into bedclothes. When the child is in bed: reading a bedtime story or singing a bedtime song (the same one, until the child is familiar with it), having a favourite toy in bed, saying goodnight with a short kiss and assurance that mum is nearby, is part of the routine.

Sometimes major changes in the child’s life, such as moving to a new place or a mother’s return to work can break up the developed sleeping pattern. To make the child feel safe again (with the routine mentioned above) is the key to an undisturbed sleep.

Reference:
When injury occurs

An increase in toddler activity, and their need for independence can give rise to accidents and injury. Accidents do happen, and even the best of care sometimes can't prevent them.

From the dental point of view the most common period for accidents to occur is between 1½ to 2½ years of age. This is also the time when the child is learning to walk.

According to the statistics, about 30% of children aged 6 years and younger, would have experienced some form of dental injury. The most frequently injured teeth are the front teeth, especially the upper incisors. The teeth can be fractured, displaced or knocked out. Displacement indicates that the tooth has moved to a different position as a result of an accident. It is the most common type of injury in the primary dentition.

An injury to the primary tooth should never be considered as insignificant. If dental trauma occurs, seek dental advice as soon as possible to assess the extent of the damage. Sometimes apparently minimal damage can cause the affected tooth to die. This results in tooth discoloration. The colour of the affected tooth can change to dark yellow, or blue-black depending on the changes occurring in the pulp chamber inside the tooth. Red or swollen gums may indicate dental infection. All these changes can happen without significant signs of discomfort.

With any injury to primary teeth, there is always the potential for disturbing the development of the permanent teeth. The development of permanent teeth starts very early and is specific for each group of teeth. The development of the front permanent teeth starts when a baby is only 3-4 months old. The tooth buds, as the developing teeth are called at this stage, are situated behind the roots of the deciduous teeth. Their close proximity can allow a blow to the primary teeth and subsequent movement to transmit an injury to the permanent tooth buds. This could cause developmental malformation of the affected permanent tooth buds.

X rays may be needed to determine whether the permanent tooth is damaged or displaced.
Observe the close proximity between primary teeth and developing permanent teeth.

**What to do when a tooth is completely knocked out?**

The management of injuries to the primary and permanent dentition is different.

**Deciduous (baby) teeth**

If the tooth is completely knocked out, **do not place it back in the socket**. There is more risk of damage to the permanent tooth than there is benefit gained by replacing it. Visit a dentist as soon as possible. Take any tooth fragments that were retrieved.

**Permanent teeth**

If a permanent tooth is knocked out **replant the tooth in the socket immediately**. When handling the tooth, be careful not to touch the root, instead handling only the crown of the tooth. If there is any debris on the tooth, rinse it in milk.

Never allow the tooth to dry out.

If you are unable to replant the tooth immediately, keep it wrapped in moist gauze or in a clean cloth. Research has shown that milk is the best medium in which to store knocked out teeth, compared to water and saliva. Therefore, if possible, store the tooth in milk! Visit a dentist without delay!

**References:**

**Toothbrush - a dangerous weapon?**

Toddlers often put sharp objects in their mouth. Their unsteady walk frequently causes falls and subsequent injuries with these objects. These injuries usually occur inside the mouth (intraorally). The soft tissue behind the hard palate is the most frequently injured area (pharyngeal area).

According to the British Medical Journal, the most common items responsible for these injuries include toothbrushes (often parents’), toys, stick pens, pencils and chopsticks.

The initial symptom of such an injury is minor oral bleeding. Many of these injuries heal spontaneously. But sometimes there are complications, which may be quite severe.

Any child with intraoral trauma should see a doctor.

Parents should be aware of the dangers of allowing to toddlers to walk around with any sharp objects in their mouth.

**The toothbrush is not a toy!**

Reference:

Appendix B5:

Structured telephone intervention
Questions / scenario for home visits / phone calls for mothers with babies between 6 – 12 month of age.

Hospital……Q/N……..Baby / Date of birth…………………………..Sex:………

Family Name……………….Given name……………….Material posted………

1. Ask for the most suitable time to conduct interview.
2. Has your baby got teeth yet? Yes……………… No (go to Q 6)
3. How old was the baby when the first tooth appeared?
4. When did you first notice the tooth?
5. How is the feeding going?
6. Is the baby breast-fed………………formula fed…………………………
7. Is he / she sleeping through the night?
8. Is he / she sleeping in his / her own bed?
   Dummy: Yes No
9. Is having the baby a bottle in the bed?
10. What sort of drink as usually in the bottle?
11. Are you cleaning your baby’s teeth?
12. When?
13. How?
14. Are you using toothbrush?
15. Does baby like tooth brushing?
16. In general how do you coping with the new situation (motherhood)?
17. Are you using the mouth-rinse?
18. Did you find the health promotion information useful? Yes No
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18. Did you find the health promotion information useful? Yes  No