FEEDING CHILDREN : MOTHER'S FEEDING DECISIONS AND THE DIETS OF THEIR CHILDREN FROM BIRTH TO TWO YEARS

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ABSTRACT

This study examines mother's decision making about their young children's diets, as well as examining the diets of the children. Qualitative methods are used to study the women's decision making at a time when their children's diets are characterised by change. Semi-structured interviews were used to gain the perspective of mothers. Dietary information was collected using five day food records for a sample of thirty-three children under the age of two years. The dietary data is used for individual children to discuss feeding practices and reasons for these practices. On the whole the children's diets were found to be adequate in terms of the RNI, except for low intakes of vitamin E and iron among some of the children. The feeding practices were the result of an interaction between the mother and the child. The mother's decision about what food to offer the child took into account many factors. The women considered the effect of dietary practices on their child's health, but they also considered other aspects of child care and household management. The women's focus of concern changed in response to the immediate situation and broader contextual factors. They were actively learning about their child and applied the information they received from many sources to their own situation. The women's multiple concerns and their process of actively learning about their child would be best served with an active partnership approach to nutrition intervention.

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CHAPTER ONE
INTRODUCTION

This inquiry was motivated out of interest in the diets of young children in New Zealand, particularly in light of evidence of iron deficiency in the population (Crampton, Farrel & Tuohy, 1994; Wham, 1994) and the current dearth of information on dietary patterns and nutrient intake for this age group (Nutrition Taskforce, 1991).

As a nutritionist, information about the diet is of interest so that dietary changes to promote health can be identified. Identifying practices to be changed and acting on this information is a value-laden process, requiring nutritionists to examine their own, often unspoken values (Achterberg & Trenkner, 1990).

Several different philosophies, or working models, can be identified in nutritionists' work. It has been suggested that a partnership, or "therapeutic alliance" may be the most appropriate model for nutrition interventions, both in terms of effectiveness and philosophy (Achterberg & Trenkner, 1990; Parnham, 1990; Rody 1988; Kent, 1988). In a therapeutic alliance the health professional and the client are actively involved in defining and solving problems. Working within this model the health professional accepts that at times a person will not do what the health professional believes to be best.

This is not a call for absolute relativism. A therapeutic alliance is based on the assumption that biomedical knowledge of the relationship between diet and health is valuable and of interest to caretakers, but this biomedical perspective should not dominate others.

Research contributes to nutrition practice, and as such should rest on a similar philosophical base. If nutrition intervention is planned in the model of a therapeutic alliance then the tendency of nutrition research to identify how people have failed to learn is inappropriate (Gillespie & Brun, 1992; Usinger-Lesquereux, 1994). Rather the

role of the researcher is to elucidate the individual's perspective of the situation and possible solutions, as well as to identify constraints to action. In addition the researcher needs to examine the situation from the biomedical perspective to help clarify the health professional's contribution to the partnership.

This thesis will examine the diet of young children with the model of a therapeutic alliance as a philosophical basis. To this end the perspective of health professionals and the children's caretakers will be considered.

Outline of the Thesis

The background to the inquiry will be outlined in the second chapter, including the recommendations of nutritionists regarding feeding young children, the available information on children's diets in New Zealand, and information about the influences on diets. The latter will be explored from an ecological perspective, by examining the interacting influences on the child's diet of the child, the caretaker, the household and the wider context.

The third chapter is an overview of the philosophy which guides the inquiry. A constructivist approach is taken and the methodological implications are discussed. The following chapter, chapter four, details the methods used in the study. Information about young children's diets was collected from their primary caregivers using a five day diet record. Semi-structured interviews were used to obtain the caregiver's perspective on the child's diet. These methods were supplemented with participant observation, discussion groups and document analysis.

Chapter five presents the women's view on feeding their children, focusing on factors which influence their decision making. Chapter six presents the children's diets, analysed for nutrient intake. This is accompanied by the women's accounts as to why the diets were as they were. Chapter seven contains a discussion of three case studies which illustrate how a variety of factors interact in an individual situation to result in observed feeding practices.

The final chapter, chapter eight, contains a discussion of the issues raised and the implications for practice, as well a discussion of the limitations of this study.

CHAPTER TWO
BACKGROUND

This chapter provides a background to the issues which motivated and guided this inquiry. It will begin with an examination of the basis for nutritionists' actions, including feeding recommendations and the standards against which children's diets are assessed. This will be followed by a review of literature related to children's diets in New Zealand. The last section examines influences on children's diets from an ecological perspective.

2.1 Feeding Young Children: A Nutritionist's View

Diet during the first two years after birth receives special attention from nutritionists as it changes "from breastmilk to family food" (World Health Organization [WHO],1989). Research into diets and health during this period addresses four general areas:

1) nutrient adequacy (e.g. Dallman, 1986; Whitehead, Paul, Ahmed, 1986),

2) short term health effects, other than those related to nutrient adequacy (e.g. Hide, 1992; Ziegler, 1990),

3) long term health effects of diet (e.g. Lucas, 1990), and

4) formation of eating habits (e.g. Menella & Beauchamp, 1994; Birch, 1987, 1992).

The existing research is distilled into recommendations which are used to assess intakes and provide information to parents and health professionals. Interpretation of the available literature, which at times is not extensive, as well as politics and personalities all enter into formulation of feeding recommendations (Beardsworth, 1995). At any one time there are disagreements about recommendations. Several issues at present include:

-the optimal amount of fat in the diet of young children (Committee on Nutrition [CON], 1992a)

-the age at which breastmilk is no longer sufficient as the exclusive source of nutrients (e.g. Dewey, Heinig, Nommesen & Lonnerdal, 1993; Siimes, Vuori & Kuitunen, 1984; Whitehead, 1985)

Feeding recommendations change as research reveals new problems with existing diets or new evidence of links between diet and health. For example, in 1992 the American Academy of Pediatrics revised its recommendation regarding the timing of introducing whole cow's milk from 6 months of age to the current recommendation of 12 months of age (CON, 1992b). This was based on evidence of iron deficiency in the population, the low dietary iron intakes of infants under one year fed cow's milk, and increasing concerns about effects of iron deficiency.

Lastly, social and cultural forces influence recommendations. The influence of food patterns is most obvious. For example the Australian Recommended Nutrient Intake (RNI) for iron for children 6-12 months of age is based on the consumption of infant formula. Presumably cultural values influence the decision of which criteria to use when setting the level of the RNI (cf. Truswell, 1990).

2.1.1 Feeding recommendations and guidelines

Feeding recommendations are given in terms of foods and take into account nutrient adequacy as well as the other dietary issues relevant to health (Truswell, 1990). The wider focus requires negotiation of seemingly contradictory goals. An example of this is the dilemma of how to ensure children receive an energy dense diet with sufficient fat while at the same time learning "prudent" dietary habits.

Recommendations for infant feeding consider three overlapping periods and their transition: 1) exclusive milk feeding, 2) weaning diet, and 3) modified adult diet (Hendricks & Badruddin, 1992).

The Statement on Weaning from the Nutrition Committee of the Paediatric Society of New Zealand states

> Weaning should commence when the child's appetite is clearly no longer satisfied with breastmilk/formula alone. This is rarely before four months of age, but may more often be closer to six months. This statement must not be construed as

> recommending that infants must commence weaning at four or five months (p. 222, Birkbeck, 1992).

Other sources more clearly recommend that solids be given between the ages of four and six months (e.g. CON, 1985; WHO, 1993). Delayed introduction of solids has been associated with an increased risk of iron deficiency among breastfed children (Calvo, Galindo, Aspres, 1992; Siimes, Vuori & Kuitunen, 1984), although not all children exclusively breastfed to one year of age are iron deficient (McMillan, 1976). Birkbeck (1992) points out "the adequacy of body iron levels have not been sufficiently studied" (p.222). More recently than the publication of the weaning statement there has been publicity in New Zealand about the possibility of low iron stores in breastfed babies, including seminars for health professionals on the topic.

In general an infant's level of "contentment" may not be a good indicator of nutrient sufficiency (Fomon & Nelson, 1993). Likewise it is possible that an infant will appear dissatisfied while receiving sufficient breastmilk, this issue is not addressed.

The Nutrition Committee (Birkbeck, 1992) goes on to say,

> Appropriate foods to start weaning should be almost liquid in consistency, provide useful nutrients, and be of low allergenicity (p. 223).

They suggest that wheat, rye, oats, egg white, unmodified milk protein, cottage cheese, yoghurt, fish, green leafy vegetables, citrus fruit and chocolate "not be offered before 8-9 months of age, and preferably delayed until 12 months in infants with a strong family tendency to allergies" (p. 222). Soy products, strawberries, and tomatoes are also listed as foods to which sensitivity is "common".

In addition, "cow's milk which has not been modified by heating should be offered only after about a year of age" (p. 222). This statement implies that heated milk is acceptable, although the authors go on to say

> It is recommended that before that age, if breastfeeding is not continuing a proprietary formula, or infant follow on, should be used (p. 222).

The rationale for not offering cow's milk is not clearly articulated, but would presumably be due to the increased incidence of iron deficiency anemia among infants fed cow's milk (Czajka-Nairns, Haddy & Kallen, 1978; Penrod, Anderson & Acosta, 1990); the high solute load of unmodified cow's milk (Ziegler, 1990); along with the fact that cow's milk is one of the more common causes of food allergy (Lessof, 1992). The association of cow's milk with iron deficiency has been attributed to the low iron content of the total diet (Ernst, Brady & Rickard, 1990), as well as to gastrointestinal blood loss (Ziegler et al. 1990).

Birkbeck also recommends that honey and tea not be offered children and that fruit juice be diluted. In addition suitable starter foods are listed (e.g. infant cereals; pureed apple, pear, banana; pureed potato, squash, pumpkin) and meat is recommended as a source of iron.

2.1.1.1 Feeding recommendations and family diet

There is a potential for misunderstanding about child feeding when parents try to apply guidelines they have learned for their own diet to the diet of their young child. This is particularly true regarding the recommendations that adults increase fibre intake and decrease dietary fat. There have been cases of children failing to thrive when given a diet very high in fibre and low in fat (Parental health beliefs, 1988).

Hegsted (1990) points out an oversight in the development of infant feeding recommendations. These recommendations are specific for a particular age group, and ignore the fact the infants will soon be eating family food, and that even as infants they are part of a family situation. Interestingly neither guidelines for adults nor infants and toddlers address this issue directly, although guidelines for children do suggest that low-fat milk products not be introduced until the child is two years of age and that the child's diet not contain excess fibre (Public Health Commission [PHC], 1995b; 1995a).

2.1.2 Recommended nutrient intakes

The Australian Recommended Nutrient Intakes (RNIs) are based on the following definition adopted from the 1980 United States Committee on Dietary Allowances

> Recommended dietary allowances (or intakes) are the levels of intake of essential nutrients considered, in the judgement of the Committee... on the basis of available scientific knowledge to be adequate to meet the known nutritional needs of practically all healthy persons (National Research Council [NRC], 1980, cited Truswell, 1990, p. 20).

Recommended nutrient intakes are formulated using an estimate of the average daily requirement. This is then adjusted for the usual rate of dietary absorption for that particular nutrient and adjusted to cover the dietary needs of 97.5% of the population (Truswell, 1990; NRC, 1986). Thus most people will meet their individual dietary needs with an intake less than the RNI. But the further the level of dietary intake falls below the RNI the greater the risk of an inadequate intake.

There is a relative lack of experimental information for young children on which to base the estimates of daily requirements. Nutrient intakes for children in the first year of life reflect the composition of breastmilk, differential rates of absorption of nutrients from breastmilk and other sources, and the level of nutrients accumulated during growth (Truswell, 1990; NRC, 1989). Recommended intakes during the following years are a result of extrapolation from data on adults while taking growth into account.

The Australian RNIs contain separate recommendations for breastfed and artificially fed infants to six months of age. The RNIs for breastfed infants are included mainly as a reference since "rarely a mother's milk is lacking in a particular nutrient" (Truswell, 1990, p. 22). The recommendations for children older than six months do not differentiate between those children who are and are not receiving breastmilk.

Because of the special nutritional properties of breastmilk the usefulness of the RNIs for infants and children who receive some breastmilk in addition to other foods is unclear. Although breastmilk contains relatively low concentrations of iron, calcium and zinc,

these minerals are more readily absorbed from breastmilk than from other sources[1] (Pipes, 1993).

Another difficulty in assigning recommended intakes during the first year or two of life is the high percent of iron in some children's diets obtained from iron fortified foods. The lower rate of absorption from fortified iron is taken into account in the calculation of the RNI for children six to twelve months old; the assumption being that only 10% of dietary iron is absorbed (Roeser, 1990). This is thought to be the rate of iron absorption from infant formula, which has added vitamin C, but overestimates the rate of iron absorption from iron fortified infant cereal which may be as low as 1% (Cook & Bothwell, 1984). The rate of absorption from breastmilk is higher (about 50% (Saarinen, Siimes & Dallman,1977), but this may decrease when solid foods are added to the diet (Oski & Landaw, 1980).

One can imagine groups of children whose typical diet is different than that used to calculate the RNIs. For example the majority of their dietary iron may come from infant cereal or from modified "adult" foods. The distribution of dietary requirements for these groups of children would be either lower or higher than that on which the existing RNIs are based[2]. These differences can result in misleading conclusions when nutrient intake is assessed.

2.1.3 Dietary assessment

Diets are assessed both on the basis of nutrient intake and in relation to adherence to feeding recommendations.

1 This issue is somewhat clouded by Oski and Landaw's (1980) findings that the introduction of solids decreases the absorption rate of iron from breastmilk.

2 This would be the case for all age groups, but it is particularly obvious during infancy with the consumption of breastmilk and iron fortified foods.

2.1.3.1 Nutrient intake

Adequacy of diets is often assessed by comparing the average nutrient intake for a group to a fixed cutoff value. The cutoff value is usually a fraction of the RNI in recognition that the majority of the population does not need an intake of 100% the RNI in order to meet their individual requirements. But there is no clear rationale for any particular cut off value, for example choosing 60% of RNI as opposed to 75% (NRC, 1986).

Alternative approaches which address the existence of a range of requirements have been suggested (NRC, 1986; Truswell,1990). These are based on a concept of increased risk with lower intakes, but at present the information necessary for practical application is not available.

The use of average nutrient intake to describe a group has also been criticised for hiding variation within the group (Pelto, Jerome, & Kandel, 1980). Hidden variation is a particular problem with young children's diets, a high nutrient intake from fortified foods by some children can mask low nutrient intakes of children whose diets do not contain these foods. Results from a study by Wham (1994) investigating the dietary intake of children aged 9-24 months illustrates this issue. The mean iron intake for the group was 6.6 mg/day, or 66% and 80% of the RNI for children 6-12 and 12-25 months respectively. But within the group seven children had an intake of less than 2 mg/day, or less than 30% of the RNI. The dietary data used in Wham's study was from a 24 hour recall, so it may underestimate the usual intake of these children[3].

Another approach to assessing diets is to examine the distribution of nutrient intakes within a population in relation to the RNI (Truswell, 1990). This allows some feel for the level of nutritional risk in the population. Such an approach requires nutrient intake information to be collected which represents the usual intake of an individual. The twenty-four hour recall often used to collect dietary data is not adequate for this purpose (Block, 1982).

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3 In a low income group of children in the U.S. iron deficient children were more likely to have a consistently low iron, where as non-iron deficient children had a higher and more variable iron intake.

2.1.3.2 Feeding practices

Comparing actual feeding practices to recommendations is another strategy used to assess dietary practices. Non-compliance suggests an increased risk of some problems as outlined in section 2.1.1.

2.1.4 Influencing Child Feeding

Nutritionists' ultimate aim is to improve health through diet. As Mayer (1986) stated, "By its nature, nutrition is a set of scientific disciplines whose end is action" (p. 714). The actions taken to improve health include providing nutrient supplements, food fortification, regulation of food composition, food subsidies and nutrition education. The latter is the main means used in New Zealand to influence diet (PHC, 1995c), and probably the most common globally in terms of numbers of programs. These actions taken by, or motivated by, nutritionists are often based on implicit, unexamined assumptions. These assumptions determine the action taken and the relationship between the individual and the health professional (Achteberg & Trenkner, 1990; Haughton, Gussow & Dodds, 1987).

Nutritionists have tended to act in a paternalistic way[4] (Achteberg & Trenkner, 1990; Rody, 1988), probably because of nutritional science's roots in western medical science. Brinkman et al (1982) describe paternalism as a model of helping others in which the individual receiving help is assumed to be responsible neither for the problem nor the solution; their only responsibility is to do as they are told. This type of action leads to dependency, which is at odds with the emphasis on empowerment in the *Ottawa Charter for Health Promotion* (WHO, 1986). New Zealand's *National Plan of Action for Nutrition* (PHC, 1995c) emphasizes the importance of the *Ottawa Charter.*

Paternalism results in a situation where a person may be coerced or manipulated. Fortification of children's foods can be viewed as paternalistic if it is done without informing parents and ensuring that they have other available options. This

4 Termed the "medical model" by Brinkman et al. (1982).

philosophical basis for nutrition education results in the assumption that an individual has failed if they do not adopt the suggested practice (Usinger-Lesquereux, 1994).

In addition to ethical concerns about paternalism there is also reason to believe that the model is not always the most effective way of helping (Parnham, 1990; Rody, 1988). In a paternalistic model the problem and solution are defined by the nutritionist in terms of the biomedical view of health. People who do not share this limited view of health are less likely to "do as told". Parnham (1990) in discussing the assumption that obesity is a harmful condition states

> We need to remember that good health is not an end in itself, but a *means* towards achieving the end of improved quality of life (p. 194).

In addition a paternalistic model does not address constraints to an individual's actions.

The compensatory model has been suggested as a better option for nutrition educators (Achterberg & Trenkner, 1990; Parnham, 1990). In this perspective the individual is not held responsible for the problem. They are considered to be

> deprived or suffering, not from their own deficiencies, but from the failure of their social environment to provide them with goods and services to which they are entitled (Brinkman et al. 1982, p. 372).

In this model individuals are responsible for the solution to their problem (Brinkman et al. 1982). This perspective acknowledges individual's autonomy, but it can lead to stress if a person tries to solve numerous problems for which they are not responsible (Achterberg & Trenkner, 1990; Brinkman et al. 1982). Thus there is a clear role for a "helper".

The role of the health professional, in the compensatory model, is to form an active partnership, or "therapeutic alliance" (Schwartz, 1987 cited in Achterberg & Trenkner, 1990) with the individual. Together they work to define the problem and the solutions. The health professional's role is to help "mobilize resources", both the individual's own

resources and external ones (Achterberg & Trenkner, 1990). Working within this model the purpose of nutrition education (or any nutrition intervention) is to

> progressively empower learners to act on food and nutrition-related issues such that the learner is gradually freed from the intervention and the materials (Achteberg, 1988).

This may be a difficult task given the complexities of today's nutrition messages (Haughton, Gussow & Dodds, 1987).

2.1.5 Summary

Nutritionists' recommendations for feeding young children are based on current knowledge. They are intended to minimize risk of nutrient deficiencies and other adverse health outcomes. Feeding recommendations take into account nutrient adequacy as well as other issues, such as limiting the likelihood of allergic reactions.

Diets can be assessed for nutritional risk based on nutritionists' recommendations. The average nutrient intake in a population does not provide much information about the risk of individuals in a heterogenous group. This is the case with diets of young children which are heterogenous in terms of the usual milk feed and regular use of fortified foods.

Nutritionists tend to act using a paternalistic model. This model may not be the most effective. A "therapeutic alliance" between health professionals and individuals may be more productive as well as providing a better fit with some people's values. Which ever model for change is used nutritionists need to know about existing diets and their influences on them in order to plan their activities.

2.2 Diet of Young Children in New Zealand

There has been little information systematically collected on the diets of young children in New Zealand. Two recent surveys have collected some dietary information on a nationally based sample (Essex, Smale & Geddis, 1995; Ford, Schluter, & Mitchell,

1995). More detailed information about nutrient intake is available from two small local surveys which collected information on diets of children under two years of age (Dennison, 1993; Wham, 1994). These local surveys provide valuable information about dietary practices, but nutrient intake information was collected by 24 hour recalls so is most appropriately used for examination of the intake of the group as a whole. A study by McMahon (1990) of preschoolers' diets also provides useful information.

In the following sections the available information about children's diets is compared to current feeding recommendations and the RNIs.

2.2.1 Breastfeeding and bottle feeding

In a randomly selected cohort of New Zealand children born 1990-1991, 94% were exclusively breastfed at birth (Essex, Smale, Geddis, 1995). The breastfeeding rates, partial and exclusive in the next six months are as follows[5]:

	Partial	Exclusive
six weeks	80%	68%
three months	71%	48%
six months	56%	2.5%

All the infant formulas on the New Zealand market are iron fortified.

In two small studies unmodified cow's milk was not given before 6 months of age and less than 20% were drinking it at 9 months (Dennison, 1993; Wham, 1994).

2.2.2 Tea drinking

The regular inclusion of tea in the diets of children has been suggested as contributing to the high rate of iron deficiency amongst Polynesians (Quested, et al. 1980). Tea was regularly consumed by 11% of children in a group in Auckland (Wham, 1994) and by 30% in a group of predominantly Polynesian children near Wellington (Dennison, 1993).

5 This data can be assumed to be more representative of the population than the statistics routinely collected by Plunket nurses because of declining rates of clinic attendance as the child gets older.

Neither Dennison nor Wham were able to document a statistically significant link between tea consumption and iron deficiency.

2.2.3 Age solids are introduced

Not all children are receiving their first solid foods at the recommended time, between the ages of four and six months. In a national study 20% of children received solids before 12 weeks of age, 50% by 16 weeks and 90% had received solids by six months of age (Ford, Schulter & Mitchell, 1995). Dennison (1993) reported 21% of mothers recalled giving solids to their child at three months, 30% by four months, and 19% after six months of age.

2.2.4 Weaning foods

The recommendations related to the weaning diet mainly refer to foods which should be avoided (see section 2.1.1). This aspect of the diet is not covered in the literature, with the exception of the use of whole cow's milk as indicated above.

Seventy three percent of the women Dennison (1993) interviewed reported having given their child iron fortified infant cereal as their first solid food. Use of other commercial foods is not documented.

2.2.5 Nutrient intake

Average nutrient intakes for groups of children exceed the RNI with the exception of iron (Dennison, 1993; McMahon, 1990; Wham, 1994). This does not necessarily mean that the diets of all the children are adequate, as discussed in section 2.1.3.1.

An individual with a nutrient intake greater than the RNI has a very small risk of an inadequate intake, while an intake much less than the RNI indicates a much greater risk. Keeping this in mind, the average zinc intake which is close to the RNI may mask individual intakes well below individual requirements[6]. The generally high calcium

6 Low intakes could be present for any nutrient. Because the distribution of intake is not the same for all nutrients it can not be assumed that a lower average intake, relative to the RNI, indicates a greater risk of deficiency within the population.

intake for this age group may also hide a very low intake for a few children whose diet does not include dairy products (PHC, 1995c).

2.2.6 Overall diet

Nutritional status depends on diet over time. Dennison (1993) addressed this problem by using a scale to assess factors which had potentially influenced the child's iron intake and absorption over time. Out of a possible risk score of eleven, indicating high risk, only one child had a "moderate risk" of six, nineteen children (43%) had mild-moderate risk scores of three to four, and seven children (17%) had no apparent risk factors for iron deficiency.

Thus while the children's diets were not ideal in terms of recommendations related to iron status the majority of children had only one or two risk factors, rather than a few children with a dietary pattern of high risk.

Presumably children are eventually weaned onto a version of adult's diets. As a group New Zealanders consume more fat, and less calcium, fruits, vegetables, and breads than recommended (PHC, 1994). The relation of these concerns to young children's diets is not clear.

2.2.7 Nutritional status of infants

Diet is of interest because it is an indicator of nutritional status. There is limited information on other indicators of nutritional status of young children in New Zealand. The only clearly nutritionally related problem is iron deficiency.

2.2.7.1 Anthropometrics

Children are regularly weighed and their height measured by child health nurses. This information is used for monitoring the growth of the individual child. The Royal New Zealand Plunket Society collected anthropometric information on a national sample in order to design new growth charts (Binney, Smith, Spears & Geddis, 1991). Otherwise there have been no recent representative surveys on the nutritional status of children.

2.2.7.2 Iron deficiency

In the 1960s a number of studies found high rates of iron deficiency, over 50%, among groups of Maori children (Prior, 1968; Tonkin, 1960). Although this high level of iron deficiency has declined more recent studies have reported results from a number of small studies indicate that iron deficiency is still a problem in at least segments of the population (Crampton, Farrell & Tuohy, 1994; Dickson & Morison, 1992; Moye, O'Hagan & Armstrong, 1990; Poppe, 1993; Quested et al, 1980; Wham, 1994).

Quested et al. (1980) reported that infants with iron deficiency had lower iron and vitamin C intakes. More recent attempts to show an association between iron status and dietary iron intake have not succeeded (Dennison, 1993; Wham, 1994). This may be due to the difficulty in assessing iron absorption as opposed to iron consumption. Both Dennison and Wham tried to take into account diet since birth, but there is not a clear protocol of how to assess and weight various factors. The picture is further clouded by the potential non-dietary influences on iron status including maternal iron status during pregnancy, length of gestation, cord cutting procedures at birth, and rate of growth. Thus a child may have had what appears to be an adequate iron intake but it is not sufficient for his or her individual needs.

2.2.7.3 Cot Death, asthma and eczema

Although not a traditional indicator of nutritional status, the high rate of cot death and asthma in New Zealand, relative to other western countries, may be nutritionally linked. The risk of cot death is less among infants who are breastfed (Mitchell, et al. 1991). Other research has examined a possible link with vitamin E and selenium status, but has not been able to statistically prove the link (Money, 1992). This is of particular concern in light of the low selenium content of New Zealand grown foods.

Diet is not thought to be a major factor in childhood asthma but a low dietary intake of vitamin C has been suggested as a risk factor (Hatch, 1995). Food sensitivities have also been associated with asthma in some children (Lessof, 1992). Adverse reactions to food are accepted as a factor in childhood eczema (Lessof, 1992). In a New Zealand

group of children the risk of eczema was increased for children who were consuming a variety of solid foods before four months of age as compared to children who were not (Fergusson & Horwood, 1994).

2.2.8 Summary

There are no obvious widespread nutritional problems in the New Zealand infant and toddler population, although optimal practices, in terms of nutritionist's knowledge, are not universal. Iron deficiency is a problem of undefined prevalence, and while a clear nutritional cause has not been shown, diets of some children are low in iron.

The lack of other obvious problems does not mean that there is no need for further information. In New Zealand, as in other western countries, the focus is on optimal health and nutrition. To this end a clearer picture of present dietary practices and associated nutrient intakes is needed.

2.3 Influences on the Diets of Young Children

Given the scant information about the diets of young children in New Zealand it is not surprising that there is also little information on influences on, or correlates of, nutrient intake and dietary practices. Research findings from other western countries provide some insight, but are not directly applicable to New Zealand due to the unique contextual factors, including cultural and social aspects, food availability and the health system.

Influences on diet can be viewed from an ecological perspective as nested levels of influences (Achterberg, 1988a; Bronfenbrenner, 1979). Each level exerts its influence through interaction with the others. For example, the influence of a child's preference on his or her diet may be modulated by the food preferences of other household members, and both may be modulated by the household income and the food available in the local store.

2.3.1 The child

A perplexing aspect of the literature on child feeding is the role of the child. Caliendo and Sanjur (1978) comment,

> the common research situation involves the preschooler as the subject being acted upon, rather than as an individual capable of exerting an independent influence over his/her environment.

More recently Piwoz, Black, de Romana, Kanashiro, and Brown (1994) state,

> Most studies of the determinants of infant feeding practices assume a unidirectional, causal relationship between maternal and household characteristics and feeding practices, and fail to take into account the infant's influence on the decision making process (p. 858).

While research has tended to follow this approach women have made it clear that the child influences dietary decisions (Dairy Advisory Bureau [DAB], 1995; Walker, 1995).

The child's age, gender and birth order have been found to be statistically associated with nutrient intake (e.g.Caliendo & Sanjur, 1978; Persson, Johansson, & Samuelson, 1984; Rasanen & Ylonen, 1992), but the interpretation of this information is troublesome. These factors may directly determine the amount the child will, and can, eat or they may exert an influence through the mother's[7] perception of an appropriate diet. For example in some cultures the child's gender has implications for foods which should not be offered to the child.

2.3.1.1 The child as regulator of intake

In an experiemental situation bottle fed infants have been shown to maintain energy intake when given milk of varying energy concentrations (Fomon et al. 1975). As Wright (1987) points out, the mother must would been aware of the change in volume consumed and must have acted as an accomplice to the child's self regulation.

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7 Mother will be used throughout this section because most research was carried out with mothers and children and because mothers are generally responsible for food preparation and feeding.

Self regulation appears to continue to an extent after the introduction of solid foods. In Davis's often cited experiment orphans given a variety of "health foods" regulated their intake (Davis, 1928). Most children are not given such an opportunity nor the same limited options of food, although it has been shown that energy intake at one meal is statistically associated with energy intake at the following meal (Birch, Johnson, Andresen, Peters & Shulte, 1991; Shea et al. 1992). Presumably there is a limit to adaptability, and routinely providing children with foods of high or low energy density may lead to obesity or undernutrition, respectively.

An interesting correlate of energy intake is the method of milk feeding, e.g. breast or formula feeding. Breastfed infants have lower energy intakes than artificially fed infants (Heinig, Nommsen, Peerson, Lonnerdal & Dewey, 1993; Hoffmans, Obermann-de Boer, Florack, Kampen-Donker & Kromhout, 1986) even after solid foods are introduced. But this difference disappears when they are no longer breastfed (Hoffmans et al. 1986). The method of milk feeding has also been found to be associated with the age at which solids are introduced (Adair, 1983). This has been attributed to maternal factors, but it is possible that infant factors are also involved.

2.3.1.2 The child as indicator

It would seem to be clear that the child influences his or her own diet through interaction with the mother (e.g. DAB, 1995). Piwoz et al (1994) report that in a Peruvian population the slowing of the child's weight gain predated a change in feeding practice. They hypothesize that the mothers may have been responding to their child.

The move away from schedules to breastfeeding on "demand", more or less (Millard, 1990), may be accompanied by an increased level of influence by the child on other aspects of diet. Children's food preferences have been a focus of study in relation to "feeding problems" (Herztler, 1983a). While these studies have focused on slightly older children their potential to influence diet even in very young children is noted in discussions of feeding children in the child care literature. For example

> From quite an early age they can have definite likes and dislikes. Try to respect those, within reason. (J Wattie Foods Information Service, 1991b).

If women are to acknowledge their child's preferences they will have to ascertain them from observation during the pre-verbal stage. An interesting New Zealand based observation was that Maori women reported their two year old children to have fewer food dislikes than did women of European descent (Davidson, van Rij & Grey, 1977). This raises a number of questions as well as illustrating the dictum "If men [sic] define situations as real, they are real in their consequences" (Thomas & Thomas, 1928, p.572, cited in Bronfenbrenner, 1979, p. 23). In other words, whatever the cause of the difference in perceptions amongst the two groups of women it can be expected that the women will act according to those perceptions.

Women may also vary in the level of consideration that they are willing to give to their child's preferences. Pill (1983) found that women in the UK who "admitted to asking the child what he or she felt like eating today" (p. 120) were less likely to see food as being directly related to the cause of illness.

2.3.2 Maternal cognitive processes

Nutrition research into the diets of young children has tended to focus on mothers or characteristics of the general household. In many situations the mother is the one who purchases, prepares and offers the food to the child, so her interaction with the child and the environment is of interest. This has lead to an examination of her knowledge and attitudes, which have been found to be associated with feeding practice by some researchers (e.g. Caliendo & Sanjur, 1978; Phillips, 1978).

Gillespie and Brun (1992) note that this type of research can slip into a mode of "blaming" the mother, rather than recognizing her perspective of the situation and any constraints she may encounter. Several authors have examined the perspectives of women and why or how they make food choices.

The importance of perspective is most striking in non-western cultures, where the dominant belief structure may be different from the bio-medical view which guides most nutrition research (e.g. Cassidy, 1980; Launer & Habicht, 1989). But differing perspectives must also be considered in western cultures, including New Zealand. For example women's conceptualization of breastfeeding, as described by Beasley (1993), did not "fit" with the bio-medical perspective. Likewise, the decision of women living on low incomes to try new foods is based on economic reasons rather than health concerns (Jamieson, 1994).

People consider many issues when choosing food. Kirk and Gillespie (1990) identified five perspectives, or mental frameworks, which a group of American working women used when making food choices. These were nutritionist, manager/organizer, economist, meaning creator, and family diplomat. They were also influenced by seasonality, husbands, and guilt.

Pill (1983) concluded that women were making food choices in what they saw to be the best interests of their family. In the group of working class women that she interviewed there were two general views of the relationship between health and diet. This underlying belief structure could be seen to influence their dietary practices and had direct implications for the diets of children. The women who did not believe that diet was related to becoming ill were more likely to let their child eat what he or she wanted. Pill comments,

> Half our sample did not perceive "diet", or any other area where individual choice could be exerted, as relevant to the causation of illness, yet the majority of these same women considered food to be important in keeping their families fit and healthy (p.121).

She suggests that the women did see food as important for growth and development of children and as "fuel" for both adults and children.

A difference in the perceived needs of adults and children was also noted by Charles and Kerr (1988) in their study of another group of women in the U.K. The women were

concerned that young children "get enough of the right food", but as the child got older this gave way to concern that they "eat a proper meal".

Women may also perceive information about diet and health to be relevant to either adults or children. Devine and Olson (1991) reported that in a group of American women those with young children at home focused on what they perceived to be the child's nutritional needs, at the expense of their own. One woman for example commented that she did not use low-fat milk because "the children need fat".

Similar information is not available for New Zealand women. It is likely that there are some differences in perceived need of children and adults, as indicated by the presence of special baby foods in the stores. In an informal survey of parents of young children Allen (1992) found that parental concerns related to their child's diet included "fussy feeding", allergies, hyperactivity, and over eating. When directly asked, half said that they considered the calcium content and 15% considered the iron content of their child's diet, these may or may not be concerns in their own diet.

Allen (1992) comments that the caretakers of children in New Zealand are heterogeneous in their concerns and who they consult. Fifty percent said that they would consult a Plunket nurse first with a diet related concern and few had consulted a dietician.

Presumably the sources parents consult will influence the information they receive. A recent qualitative survey commissioned by the Dairy Advisory Bureau (DAB, 1995) provides more information on women's response to advice about feeding their children. Two "types" of care givers were identified, the historians and the modernists. The historians relied more on "grass roots information", they tended to be "slow to follow 'current thinking'". Modernists were more "Plunket oriented" and relied on published information as well as consulting other sources. They were more likely to adopt changes, although these could be either "fads" or recommendations from health professionals.

2.3.3 Maternal and household characteristics

Demographic characteristics are the contextual variables most commonly included in research about dietary practices. In New Zealand a small number of studies have examined these factors, with ethnicity gaining the most attention.

Davidson, van Rij and Grey (1977) compared young children's diets and nutrient intakes of rural Maori, urban Maori, and urban New Zealanders of European descent. There were differences in food and nutrient intake among the three groups. Dietary practices associated with nutrient intake included use of fortified milk powder by rural Maori and more use of juice by those of European descent. The Maori children in both locations had a higher energy intake and drank more milk.

This study provides an illustration of how contextual factors interact, i.e. the influence of location and ethnicity. A third factor which probably influenced the children's diets was socio-economic status, in that the fathers of the Maori children were less likely to be employed in a professional or technical occupation; these children were also part of larger households.

A high prevalence of iron deficiency has been found in predominantly Polynesian communities lending credence to the probability of ethnicity being associated with dietary practices (Crampton, Farrell, Tuohy, 1994; Moyes, O'Hagan & Armstrong, 1990; Poppe, 1993; Quested et al. 1980). But once again ethnicity is closely tied to lower socio-economic status, a factor linked to iron deficiency in the United States (Expert Scientific Working Group, 1985).

In Dunedin both ethnicity and socio-economic status were found to be statistically significantly associated with breastfeeding duration (Msuya & Harding, 1990). Other significant factors included family composition and education.

In the existing New Zealand based research it is difficult to disentangle the effect of ethnicity and socio-economic status, both of which can be expected to have some impact

on diet. Neither factor is associated with an entirely different dietary pattern. Research in both Maori and Pacific Island communities indicates that the traditional foods are not the mainstay (Ashcraft, 1985; Dennison, 1993; Horwarth et al. 1991). Although there do appear to be some differences in eating patterns between ethnic groups (Howarth et al. 1991).

Lower income is also associated with slight differences in adult food choices, as measured by a food frequency questionnaire (Howarth et al. 1991). Most probably the situation in New Zealand is similar to the United States where Finchin (1981) found that lower income households aspired to the food practices of the majority.

Demographic characteristics are markers for a person's situation, they do not explain what they mean to the person and how they experience the situations (Bronfenbrenner, 1979; Williams, 1989). For example, Campbell and Sanjur (1992) collected information on "perceived income adequacy" as well as income position in a study on preschooler's diets[8].

Gillespie and Brun (1992) comment that researchers need to be clear as to whether they believe behaviour is caused by an outside force or is controlled by the individual. If the researcher accepts that behaviour is not caused solely by the effect of outside factors then in order to understand dietary practices we need to understand the interaction of the individual with the environment.

2.3.4 The broader context

Factors in the wider environment influence children's diets. Contextual factors with potential influence are very wide ranging and could include aspects of child care and parenting, women's roles and the agricultural nature of the economy. However, the present inquiry is focused more narrowly on factors immediately related to the selection of foods to offer children. These factors exert their influence through the parent and

8 In this study perceived income adequacy was related to "strain" but not to diet diversity. While income position was related to diet diversity and not to strain.

child's interaction with them. For example the presence of nutrition information pamphlets does not in itself influence a child's diet. The parent must read it and act accordingly, or perhaps receive the information from someone else who read the pamphlet.

There is not much information about the effect of various contextual factors on children's diet in New Zealand. In the following sections a number of factors which may be influential are described.

2.3.4.1 Nutrition and food information for parents

Nutrition information is published and distributed by the government, non-governmental organisations, the food industry, and books written by those with very varied backgrounds. This topic will be discussed here in some detail because it is the main activity through which New Zealand's Nutrition Policy is implemented (PHC, 1995c).

Information for parents about child feeding is available during one to one consultations with health professionals such as Plunket nurses, GPs, dieticians, homeopaths, etc., from classes, and from written materials, including pamphlets and child care books.

One to One consultation

Most young children in New Zealand have regular well-child visits with nurses. The Plunket nurse provides the widest coverage, with 90% of children under two years of age seen regularly by the Plunket nurse and most of the remainder seen by public health nurses (Essex, Smale & Geddis, 1995). The Royal New Zealand Plunket Society was founded in 1907; visits by, and to, the Plunket nurse are an important part of being a mother in New Zealand.

During visits with the child health nurse the child is weighed and measured and the results plotted on a growth chart in the child's Health and Development Record (Department of Health [DOH], 1983) which is kept by the parents. Advice and information on child care, such as when to offer solids, when immunisations are due,

and how to help the child sleep, is also written into the book. The visits are short, about fifteen minutes, and the nurses appear to rely on pamphlets they distribute to provide more detailed information.

Individual Plunket nurses can be contacted by phone if a question arises between clinic visits. Since July 1994 a toll free national telephone help service has been operated by Plunket nurses. In the first year of service 20% of the calls included a question about a nutrition related topic (Royal New Zealand Plunket Society [Inc.], 1995).

There is no published information on the nutrition information actually communicated by Plunket nurses. A survey of Plunket nurses found disagreement among the group on a number of infant feeding issues, as well as disagreement with accepted nutrition knowledge (Howie, 1989). For example, 40% disagreed with the statement "Overweight toddlers do not usually become overweight adults".

Most women interviewed in a recent survey valued Plunket nurses as a source of information (DAB, 1995), although this does not say that they followed the advice given. Loveridge (1992) describes how the Plunket nurse's actions and tone of voice, along with her association with the medical profession legitimise her knowledge. Beasley (1993) found that women did not challenge the Plunket nurse, they either did as told or appeared to agree with her advice and then did otherwise. It appears that in general the relationship between the mother and the nurse is paternalistic.

Groups

Plunket nurses began to offer a series of classes, one of which covers feeding and nutrition, at the time the number of individual Plunket consultations was decreased. Parent's Centre run post-natal classes, and La Leche League meetings are other situations where more or less formal instruction is given on child feeding.

Group classes, because they last longer than clinic visits provide an opportunity for sharing more detailed explanations as well as for demonstrations. During these classes

a reason is often given for recommendations, although it is not always the reason which a nutritionist would choose[9].

Other gatherings provide informal opportunities to share information about food, nutrition and feeding children. New Mother's Support Groups and Plunket organised Plunket in Neighborhood (PIN) groups provide an opportunity for new mothers in an area to meet together. Some women also get together routinely for children's playgroups. Coffee mornings were suggested as the preferred way to obtain information on parenting by a group of first mothers (Binney & Geddis, 1991).

Written Materials

Pamphlets which include information on child feeding and related topics are published by a number of organisations including the Ministry of Health, the Public Health Commission, New Zealand Beef and Lamb and infant food manufacturers. (See Appendix 1 for samples of these.) These publications are distributed by Plunket nurses and Public Health Nurses, and may be available in clinics and at classes.

Although the content varies between the pamphlets, the information contained is consistent with the recommendations from the New Zealand Paediatric Society (Birkbeck, 1992). All pamphlets contain suggestions of foods to give children at various ages. General recommendations, e.g. "by about 6 months they are ready to start solids" (PHC, 1995a) are accompanied by varying amounts of explanation. The pamphlets published by governmental organisations make more reference to discussing decisions with a child health nurse or doctor than do the other pamphlets. Not surprisingly the pamphlets published by commercial interests mention their products.

A large number of child care books is available in libraries and bookstores in New Zealand, all of which contain information on feeding. In addition magazines for parents sometimes have articles on food and nutrition, or include questions answered by an

9 For example, avoiding allergies may be the only reason given for avoiding cow's milk in the first year (Weber & Wiseman, 1995).

"expert" on the topic (e.g. *Little Treasures, Kiwi Parent, New Beginnings*). Loveridge (1992) describes how these authors present themselves as "expert non-experts".

> In various words, they claim they are not another "expert" telling you how to do it, rather their aim is to increase parents confidence (p. 468).

But they go on to "establish their credentials" and do actually offer advice (Loveridge, 1992).

This conflict between letting parents make their own decision and telling them what to do is obvious in the discussion of when to start children on solid foods. *Getting Started On Solids* states

> Although babies experience growth spurts at about 6 weeks and 3 months and may seem to be very hungry, what they need is more milk... After the first 4-6 months, when your baby is interested in putting things into her mouth or still seems to be hungry after a milk feed, that's the time to think about giving solids (J Watties Foods Information Service, 1991a).

There are still clearly right and wrong decisions to be made when feeding a child. Thus while there appears to be a recognition that a paternalistic approach is not appropriate an alternative has not been acheived.

Written materials have the advantage that they can consistently present information to a large number of people, assuming adequate literacy skills in the population. The disadvantage of these materials is the inflexible nature of what is included. Mothers want answers to their specific questions, not necessarily information on the general topic. In the United States, Weng (1952) found that only half the top ten infant feeding issues women wanted to be included in pamphlets were actually in the 66 pamphlets she surveyed.

Written material available in New Zealand does not cover all the topics in which parents have expressed interest. A survey in New Zealand found that 35% of mothers wanted "much to moderate" advice on "what to expect on baby's bowel motions", a topic which does not feature in available pamphlets, while less than 30% wanted the same level of

advice on "solids", the focus of several pamphlets (Binney & Geddis, 1991). Other topics of concern to parents, such as obesity and allergies (Allen, 1992) are also given little attention in publications.

The most responsive form of written material is that which has direct parent input, such as letters and questions to experts. It is conceivable that a series of parents' letters on a topic may be the written equivalent of a coffee morning.

Written information on nutrition and food is also published for the general population, for example *Healthy Eating for Adult New Zealanders* (PHC, 1995b). These publications do not mention children, with the exception of the Beef and Lamb Board publication listed above.

Advertising is another source of consumer information. Infant and toddler foods are mainly advertised in parent oriented publications, such as those mentioned above. Some of these contain nutrition information, most notably being advertisements for follow-on formulae which comment on the child's need for iron. (See Appendix 1.)

The World Health Organization (WHO) Code on the Marketing of Breastmilk Substitutes is voluntarily followed by infant formula manufacturers in New Zealand. But the code is interpreted as referring only to breastmilk substitutes for infants under 6 months, thereby omitting reference to follow-on formulae (PHC, 1996). Interestingly, in the available pamphlets iron is not mentioned in relation to the recommendations about cow's milk in the first year, nor are follow-on formulae discussed.

2.3.4.2 The Food supply

The food available for the general population affects the composition of home made weaning foods. These foods also become the foods the children eat as they are weaned on to the "family diet". The possible implications for children's diets will not be described here. It is worth noting that until 1995 relatively few foods were fortified

with vitamins and minerals, these included marmite (a spread for bread), milo and other drink mixes, a few breakfast cereals, and "calcitrim" milk.

Another relevant factor is the low selenium levels in New Zealand soils resulting in a relatively low selenium concentration in locally grown foods. Increased consumption of imported foods has been linked with increased selenium content in the diet (Winterbourn, Saville, George & Walmsley, 1992).

The availability and composition of foods manufactured and marketed mainly for young children is another consideration. There are commercial infant and toddler foods on the market in New Zealand, including infant and follow-on formulae, iron fortified cereals, rusks, juice. Canned foods include vegetable and meat mixtures, fruits, and "desserts" such as custards. New introductions to the market (since the time the field work was carried out) include instant powdered meals, containing added iron, and toddler yoghurts. Use of commercially produced infant foods in New Zealand is not well documented.

Legislation in New Zealand touches on the composition and marketing of foods for infants. The food regulations contain reference to infant formulae and "supplementary foods for infants and young children". The latter were one of the few foods permitted by the 1984 Food Regulations to contain added vitamins and minerals. The levels of nutrients in these foods was not specified. An interesting stipulation in the food regulations is that the label of packages of skim milk, or non-fat milk, must state "not suitable as a complete milk food for infants" (clause 98, *Food Regulations*, 1984).

Manufacturers of supplementary foods for infants and young children have changed the composition and range of foods offered in recent years, presumably in response to expert and parent opinion. These changes include the elimination of added sodium and the availability of foods not containing sugar or milk proteins. A line of organic baby foods has also been introduced to the market.

2.3.4.3 Economic environment

Socio-economic status has not received much attention in relation to diet in New Zealand. This may be partially because of the myth of an egalitarian society, and because, unlike in the United States, food has not been part of the society's social welfare package.

Concrete evidence of the effect of social inequality on diet is the existence of food banks, indicating that for some people their existing income is not always enough to cover this essential commodity. While it is possible that using a food bank is a "one-off" situation, people using food banks have spoken of not always being able to provide their children with the variety or quantity of food that they desired. For example they talk of not being able to always have fruit in the house and having to limit the amount of bread the children could eat (Jamieson, 1994; Weber, 1990). They also are less likely to try new foods due to the risk associated with the food not being eaten (Jamieson, 1994).

Because one third of New Zealand children are in families whose income is below the poverty line it seems likely that their diets will be affected (O'Hare, 1996).

2.3.4.4 Cultural norms

Culture defines what is considered a "food" and often prescribes foods for conditions and ages, including childhood (Beadsworth & Keil, 1990). Aspects of the cultural norms of feeding children in New Zealand can be gleaned from the results of past studies on infant feeding, (e.g. Davidson, van Rij & Grey, 1977; Market Research [N.Z.] Limited, 1962) and the advice and information in older books, particularly *Modern Motherhood,* the Plunket Society's "official handbook" (Deem & Fitzgibbon, 1955)[10].

The results of a recent survey (DAB, 1995) suggests that some women are more likely than others to continue following existing practices.

10 Culture here refers to the dominant New Zealand culture.

2.3.5 Summary

The context in which a child is fed/eats can be viewed as concentric levels of influences, with each level interacting with the others. While research has tended to ignore the child's influence it is clear that the mother, or other caretaker, is interacting with the child and that this interaction will probably influence dietary practices.

The mother's beliefs and attitudes are important, but the focus in much nutrition research on nutrition knowledge and attitudes often assumes "free will" in the case of the individual. This has lead to "mother/wife" blame (Gillespie & Brun, 1992). This is avoided when context, from the perspective of the individual, is taken into account.

A number of aspects of the New Zealand environment may influence children's diets. These contextual factors influence diet through an interaction with individuals. There are a variety of sources of nutrition information available, and parents do interact with them. Children's caretakers are consciously, or unconsciously interacting with a number of other environmental factors, some of which could be influenced by nutritionists.

2.4 Summary and Objectives

There is relatively little information about the diets of young children in New Zealand, although there is evidence that, from a nutritional perspective, there could be some improvements. The first step needed is to identify existing dietary patterns and associated nutrient intakes so as to determine what, if any, dietary changes would be beneficial from a nutritionist's point of view as well as identify dietary practices to be positively reinforced.

Collecting information about diets at the level of the individual allows examination of a range of practices and nutrient intakes which exist. This approach is particularly appropriate in New Zealand where there does not appear to be any serious widespread nutrition related problems among young children, but where at the same time optimal nutrition is not yet the norm. Policy planning needs more information about unusual dietary practices as well as those which are more typical.

There is also relatively little known about the effect of various influences on the diets of young children. In order to determine the best ways to help individuals as part of a therapeutic alliance health professionals need to have a better understanding of the perspectives of the people who make the feeding decisions. Not only is the New Zealand society heterogenous in terms of ethnic groups and socio-economic status, but there is also a diversity of views related to food, health, child care and sources of information. These need to be understood in relation to children's diets.

The objective of this study is to examine young children's diets from the perspective of both the nutritionist and the child's caretaker. Both of these perspectives must be considered for a therapeutic alliance to exist. From the nutritionist's perspective, dietary practices will be examined along with resultant nutrient intakes in order to identify those associated with various degrees of nutritional risk. The perspective of the child's primary caretaker of the child's diet and factors influencing dietary choice will be described.

CHAPTER THREE
RESEARCH PHILOSOPHY:ASSUMPTIONS AND ASSOCIATED IMPLICATIONS

There are two main parts to the inquiry: 1) examining dietary patterns from a nutritionist's point of view and 2) understanding why the diets are as they are. The ultimate goal is to obtain optimal nutritional health for young children in New Zealand, a value-laden objective.

Achterberg and Trenkner (1990) state that because of the clear role values play in nutrition it is important that nutritionists are clear about the values and general philosophy, or perspective, which guides their actions. They suggest a "compensatory model" of helping is appropriate for nutrition education, an argument which could be extended to all nutrition interventions. From this perspective a person is responsible for the solution to a problem, but is not blamed for its occurrence. (See section 2.1.4)

Within this philosphical perspective the health professional and the individual form a "therapeutic alliance" (Schwartz, 1987, cited in Achterberg & Trenkner). Together they work to define the problem, identify possible outcomes and ascertain how the chosen outcome can best be reached. At times the concern of a nutritionist is not the same as the client's concern. Within this model the nutritionist is obligated to acknowledge this disparity rather than act as though there is only one desirable outcome. This has clear implications for nutrition research; the perspective of the people involved must be obtained.

Qualitative methods have been chosen as a way to obtain the perspective of the individual. The term "qualitative methods" often indicates an underlying philosophical paradigm as well (Achterberg, 1988b). A constructivist view is used here as the

paradigm guiding the research. The basic premise of this view is that meaning is "constructed" by each individual (Lincoln & Guba, 1985, 1994; Steedman, 1991)[1].

In the remainder of this chapter the basic assumptions of the constructivist view and its implications for research will be outlined. In doing so differences with the positivist/post-positivist paradigm, which underlies much nutrition research, will be highlighted.

3.1 Assumptions and Implications

The basic assumption underlying the constructivist view is of multiple, created realities, as opposed to the positivist and post positivist view which posit the existence of a single, knowable reality (Lincoln & Guba, 1995, 1994; Steedman, 1991). This does not deny the existence of entities or situations, but proposes that the meaning they have is individually created. In this view the knower cannot be separated from the known and no one person's view can be judged as right or wrong. In Lincoln and Guba's (1994) words,

> Constructions are not more or less "true", in any absolute sense, but simply more or less informed and/or sophisticated (p. 111).

Therefore, if a parent thinks a child eats too much food this is not proven true or false by a nutritional assessment of the child, rather the results of the nutritional assessment are another view. A more sophisticated construction could be the combination of the parent's view and that of the nutritionist. This is not to question the "reality" of the child's weight (for instance), but the meaning that the parent gives to that entity (the number on the scale) is the parent's alone to give (Steedman, 1991).

1 Lincoln and Guba (1985) used the term "naturalistic inquiry" in their 1985 publication by that name. Later they adopted the term "constructivism". Schwandt (1994) describes various interpretations of constructivism. My understanding is primarily formed through reading Lincoln and Guba (1985, 1994), Patton (1980), and Steir (1991).

Context is an important part of understanding another individual's construct. As Bronfenbrenner put it

> What is perceived, desired, feared, thought about, or acquired as knowledge, and how the nature of the psychological material changes is a function of a person's exposure and interaction with the environment (cited in Achterberg, 1988, p. 183).

Because of the numerous permutations of the environment we can hope to come to an understanding of a person's view or action, but we can not hope to predict it.

Another important assumption which follows from both the constructivist view and from Bronfenbrenner's ecological model is that of "mutual shaping". Rather than a clear linear model where A leads to B, the assumption is that A and B are interacting and shaping each other. This is an appropriate assumption for human behaviours including decisions about diet because diet at one point in time influences subsequent dietary choices. For example preference is an influence on food choices, but after a food is eaten there is an immediate small decrease in preference for that food (Birch, 1987).

If we assume that reality is constructed it follows that the investigator and the participants in the investigation together create, or construct, the findings. Thus the investigator is not attempting to discover a pre-existing entity, but aims

> to distill a consensus construction that is more informed and sophisticated than any of the predecessor constructions. (Lincoln & Guba, 1994, p. 111)

This aim has implications for research design and for judging the inquiry.

3.2 Research Design

Within the constructivist paradigm the inquiry takes place in a natural setting with a holistic approach since an individual's construct of reality can not be understood outside of its context (Lincoln & Guba, 1994). Because the goal is not the description of a single reality the views of individuals are valued for their uniqueness and not just as part of a group average. Therefore the sample is chosen to increase understanding, rather than to be statistically representative (Patton, 1980).

Analysis is carried out concurrently with data collection and informs subsequent sampling decisions. Ideally sampling continues until relatively little new information is being gained (Lincoln & Guba, 85), termed "saturation" by Glaser and Strauss (1967)[2].

Ideally the design is emergent to allow the researcher to pursue what is learned about other people's views. Even the focus of the inquiry may change as the research progresses[3] (Lincoln& Guba, 1985).

Semi-structured interviews were chosen as the main data collection method for this inquiry because of the difficulty of observing natural patterns of child feeding in the home and because even if observation were possible the parent's meaning would need to be obtained through questioning. The in depth, semi-structured interview has been described as a "guided conversation" (Kirby & McKenna, 1989), a shared event which the interviewer leads and controls for brevity (Schatzman & Strauss, 1967). An interview guide includes the general topic areas to be covered in each interview, but both the interviewer and interviewee are part of the "process" out of which "meaning arises" (Weaver & Atkinson, 1994). This process is more explicit and open to investigation if a research journal is kept in which the researcher reflects on his or her role.

The focus of the questions influences the findings, but this is the case in all research. Wolcott (1994) comments

> Everything has the potential to be data, but nothing becomes data without the interaction of the researcher who takes note and often makes note of some things to the exclusion of others (pp. 3-4).

2 There is always something new to be learned or a refinement of an existing category, but at some point the "cost" of obtaining new information is not worth the "value" of the information gained (Lincoln & Guba, 1985, p. 234)

3This is the ideal. The degree to which a truly emergent design is followed depends on constraints and, in this case, the researcher's confidence.

3.3. Analysis

Findings are "created", so the emphasis of the inquiry is on discovery, not verification. This is accomplished with inductive data analysis and theory grounded in the data (Glaser & Strauss, 1967; Lincoln & Guba, 1985; Patton, 1980).

This is not to say that existing theories cannot be used, but rather the theory should "fit" the data, rather than be imposed upon it (Geertz as cited in Schankman, 1984; see also Glaser & Strauss, 1967; Patton, 1980). Likewise the theory should "work", in other words, aid understanding. Consulting the literature is one strategy to help the emergence of theory (Glaser & Strauss, 1967).

The findings of the inquiry are presented with careful description of context, ie. "thick description" (Lincoln & Guba, 1985; Patton, 1980). Lincoln and Guba (1985, 1994) recommend the use of a case study. Description allows others to make their own judgement about the findings and to assess how applicable they might be to other situations.

3.4 Judging the Inquiry

The assumptions of the constructivist paradigm also lead to implications for judging an inquiry. If there is not "one reality" then validity as it is normally understood does not exist. Lincoln and Guba (1994) suggest that an inquiry be judged for "trustworthiness" and "authenticity".

Trustworthiness is Lincoln and Guba's equivalent of validity and reliability, the concept also encompasses "credibility", "transferability", dependability", and "confirmability". Lincoln and Guba (1985) go into this issue in much detail, but in a later paper they state that the concepts' "parallelism to positivist criteria makes them suspect"(Lincoln & Guba, 1994, p. 114). Undoubtedly these aspects have been useful in gaining acceptance for research carried out within this paradigm in disciplines where the tradition is research based on positivism.

Authenticity refers to the usefulness of the findings, including their ability to "empower" to action, increase understanding of other people's constructions, as well as expand one's own constructions (Lincoln & Guba, 1994, p. 114). This is similar to Wolcott's (1990) suggestion that an important criterion for judging an inquiry is whether or not it helps "understanding". Judging the quality of an inquiry based on its usefulness is a reflection of the explicit role of values in this type of inquiry.

3.5 Ethics

Lastly the constructivist paradigm has implications for ethics. The construction of the findings by both participant and researcher suggests that the participant's acceptance of the findings is important ethically. Munhall (1989) comments that traditional informed consent is static, which does not fit the concept of an emerging design. She suggests that it is the researcher's obligation to continue to inform the participants. In addition Bergum (1989) comments on the ethical responsibility of the researcher as a result of possibly raising the participant's awareness or causing the participant to reflect on issues as a result of being interviewed. This responsibility does not end with the interview because the participants may recognize themselves in print.

3.6 Dietary methods

The preceding sections have discussed the application of the constructivist paradigm to qualitative research. But, the research objectives also indicate a need for quantitative dietary intake information. Quantitative information about people's diets is usually collected and analysed within the scientific (positivist/post-positivist) paradigm. This at first appears to be a lack of resonance between theory and methods, but Lincoln and Guba (1985) suggest that it is in the interpretation of the data, and not in the type of data itself, that the fit with the overall research paradigm is achieved.

Bryman (1990) suggests the use of quantitative and qualitative methods in the same study provides different perspectives. This is the purpose of this inquiry.

It is also worth noting here that the constructivist view is not necessarily one of absolute relativity (Ravn, 1991). The research act is value-laden. The values of a nutrition

researcher include views on diet and health. These values define what is to be examined and by being aware of these values the researcher can be open to the possibility of different values.

Lastly, for the collection of quantitative dietary information to fit with the proposed strategy the information collected needs to be related to an individual, not to groups of people.

3.7 Summary

The constructivist paradigm is chosen to guide methodological decisions based on its recognition of the role of values in research and its resonance with the values for nutrition intervention set out by Achterberg and Trenkner (1988). The assumptions of this paradigm underlie this inquiry. They have implications for how the inquiry is to be carried out and evaluated. The next chapter will describe the actual procedures followed in carrying out the inquiry.

CHAPTER FOUR
METHODS

This inquiry has two parts, the wide ranging objective to "understand" feeding decisions and the context in which they are made, and the specific objective to collect dietary information on individuals. The approach used was to purposively choose a sample of parents from whom to obtain both dietary information and information about their decisions. My understanding of influences on child feeding was further expanded through observation as a participant, holding discussion groups and analyzing material written for parents.

4.1 Research Location and Sample Recruitment

Research was conducted in the lower part of the North Island of New Zealand, between Palmerston North and Wellington.

Recruitment proceeded in two steps. Parents[1] of children aged between two months and two years were given an information sheet and a brief verbal description of the study by either the researcher, a health professional with whom they had contact (e.g. public health nurse, Karitane nurse, La Leche League leader) or by a friend. If they were interested in participating they were asked to provide their name, phone number and contact address. Supplying this information did not imply consent to participate[2].

The women were contacted by the researcher, usually by telephone, and asked if they would be willing to participate. Consent was obtained verbally at this time and written consent was obtained before starting the interview.

After the first interview women were asked if they were willing to be interviewed again in three months time. A sample of the women willing to participate in additional

1 Mothers were the primary care givers reached through this recruitment method. In one case the primary care giver was the grandmother. Three fathers were present for part of an interview and provided input.

2 The health professionals could not provide parents' names and contact details without consent, but they did not have the time to explain the study fully and answer questions. Thus the distinction of consent to be contacted and consent to participate. I was also concerned that some women, if approached by their health professional, might feel obligated to participate or to say the "right things".

interviews, was contacted for up to four more interviews (at intervals of three to six months). The participants for these additional interviews were chosen to represent the diversity in the sample.

The aim of the sampling strategy was to obtain participants with a variety of experiences related to feeding their child, and an associated variety of dietary practices. A variety of sources was used for recruitment in an attempt to reach women in different socio-economic circumstances, and with different sources of information and peer group norms[3]. It was anticipated that diversity in these factors would result in diversity of dietary practices. In addition I directly approached women whom I heard discussing an experience or practice of interest, for example the mother of a child who had been diagnosed as iron deficient.

In total 42 women participated in formal interviews. Of these, 22 were interviewed once; 6 participated in two interviews, 2 in three and 12 in four interviews. The majority were part of a two parent household with one child. Seven of the children were second children, and three lived with two or more older children. Four of the women were solo mothers on the Domestic Purposes Benefit (DPB) and one family income was from the unemployment benefit at the time of an interview. Two of the women were living with their parents at the time of one interview and another had lived with her mother for the child's first year. A third woman had lived with her mother after the child's birth for a year, but had since married and was living with her husband at the time of the interview.

Ethical approval for the study was obtained from the Massey University Human Ethics Committee, the Ethics Committee of the Manawatu-Wanganui Area Health Board, and the Ethics Committee of the Royal New Zealand Plunket Society (Inc.). The latter two organisations required that their ethics boards approve the study before nurses employed by them could help with recruitment.

3 A decision was made not to intentionally recruit women of different ethnic groups.

4.2 Data Collection

Data was collected from interviews, food records, participant observation, discussion groups, and documents.

4.2.1 Interviews

Interviews were the primary source of information. They were conducted in the participant's home, or other convenient location of her choice, and lasted about one hour. The interviews were tape recorded and notes were taken by the interviewer.

A semi-structured interview format was used. All interviews included the woman's description of her child's diet and a recall of all foods consumed by the child in the previous 24 hours. They also covered the relationship between the child's diet and that of the rest of the family; plans for the future; sources of information about infant feeding; and the woman's description of what she considered when deciding to feed the child. (The interview guides are in Appendix 2.) Topics which had been raised in other interviews or during analysis were also included. This served as a form of member check (Lincoln & Guba, 1985).

Subsequent interviews covered the same topics, with the focus on changes since the previous interview.

At the time of the interview informal observations were made regarding the food available and situations when food was offered to, or requested by, the child.

Interviews were usually preceded by phone conversations. Follow-up phone calls were used to clarify comments or solicit diet records when necessary. In some cases these conversations were mini-interviews, particularly when a face to face interview was not possible in the near future.

4.2.2 Diet records

A five day diet record was chosen as the means to collect quantitative information about the individual child's diet. Parents have been found to report on the food they provide

to their child with reasonable accuracy (Klesges, Klesges, Brown & Frank, 1987). More than one day of information is required to estimate a child's usual intake (Black, Coles, Wiles & White, 1983; Nelson, Black, Morris & Cole, 1989; Persson & Carlgren, 1984). As a compromise between a desire to obtain an accurate estimate of the children's usual dietary intake and not wanting to over-burden the participants, a five day recording period was chosen. Preliminary enquiries suggested that collecting data for a longer period of time, or requesting that participants weigh portions of food would not be feasible for some women, thus limiting the diversity in the sample.

The diet record forms (see Appendix 2) were given to the women at the end of the interview and the researcher explained how to complete them. Amounts were to be estimated using existing utensils, the child's usual bowl and cup (if available) was noted at this time. The women were asked to record what the child ate for the next five days and to post the form back to the researcher in the envelope supplied.

4.2.3 Participant observationn

Participant observation was carried out with various groups of mothers, including classes, social gatherings and play groups. At times I was primarily an observer, for example when attending a class held by a Plunket nurse. At other times I was primarily a participant with the consequent difficulties in observation (Field, 1989)[4].

As I was the mother of a young child observation in my daily life provided useful information. For example people gave me advice about what to feed my child or asked me what he was eating.

Observations focused on occasions when food was available, and on discussion of food, cooking, child feeding, and related child care issues. Notes were made following observation periods.

4 Field (1989) discusses the difficulty of doing fieldwork in one's own culture, which Wolcott (1994) describes as the need to make the everyday seem strange. This was somewhat facilitated by my being new to motherhood, having lived only two years in New Zealand at the start of fieldwork, and having spent time living in non-western cultures. In addition, as a trained nutritionist my view of food and nutrition was different to that of many of the women. The women tended to view me as of the same culture, which did present problems.

4.2.4 Discussion groups

Discussion groups were held with three groups of women who were already meeting on a regular basis. They were held in homes and were tape recorded. Brief notes were also made at the time. The topics for the discussions were similar to that of the interviews. One discussion group was held before interviewing commenced. Two were held during the interviewing period, they were used as an opportunity to check on emerging hypotheses.

4.2.5 Document collection

Pamphlets, and other materials given to mothers were collected (see Appendix 1). *Little Treasures*, a New Zealand parenting magazine which some of the women mentioned was scanned for relevant information. Child care books, which more than one of the women identified as a source of information, were also read and relevant sections were identified for analysis. The books are *Babies* by Christopher Green (1988); *Baby and Child*, by Penelope Leach (1988); *First Baby, First Year*, by Tessa Copland (1987); and *The Womanly Art of Breastfeeding*, published by La Leche League International (1991).

4.2.6 Researcher's journal

I recorded reflections, thoughts, and insights in a journal throughout the inquiry process. A brief overview of my perspectives, which changed over the course of the inquiry, is found in Appendix 4. Inclusion of this reflexive material is in recognition of the role of the researcher in creating the findings and provides information to help in assessment of the trustworthiness of the inquiry (Lincoln & Guba, 1985).

4.3 Data Processing and Analysis

The data collected was of two types:

1) qualitative data consisting of tape recordings of interviews and group discussions, notes from observations, and documents; and

2) quantitative dietary data in the form of five day diet records and 24 hour recalls.

The two types of data were necessarily handled differently.

4.3.1 Qualitative data processing and analysis

I transcribed and coded the data during data collection period. A summary sheet was written for each interview. Transcriptions, notes and documents were all treated in the same way.

The raw data (ASCI files) were entered into QSR NUD*IST (Non-numeric Unstructured Data Indexing, Searching and Theorizing) computer software program (1993). This program was used for data processing and analysis.

Analysis was influenced by QRS NUD*IST's capabilities (Richards & Richards, 1991; Weaver & Atkinson, 1994). Paragraphs were used as defining segments for coding[5]. In NUDIST, codes are the "addresses" for nodes. Although each code can stand alone the program is designed to facilitate their arrangement in an inverted tree hierarchy. Thus a code for "Plunket nurse advice" was a subset of "health professional advice" which was a subset of "advice, sources".

Coding was initially based on substantive content, e.g. "Plunket nurse advice", "early start to solids", or "crying baby". Segments were coded with as many different codes as were relevant. These were combined under broader category headings. Topics from the literature offered obvious categories, for example the influence of Plunket nurse, and the influence of family income. But in the initial sorting a conscious attempt was made to let categories "emerge" from the text by using the "constant comparative method" (Glaser & Strauss, 1967).

After several segments were included in a category a definition was written as a "rule" for future additions to the category. Further additions to the category had to meet the rule. The comparison of data segments to these rules could lead to a change of rules, or even a to a change in the structure of categories (Glaser & Strauss, 1967). The definitions, as well as other comments and thoughts about the category were written as "memos".

5 NUDIST allows segments to be defined as lines or paragraphs of text. The decision to use paragraphs affected how the tapes were transcribed.

As analysis proceeded the emphasis shifted to the relationships between the categories (Weaver & Atkinson, 1994). Links between categories were in some cases obvious, while in other cases they were examined by asking questions of the data. One strategy used was to search the index system, for example segments coded by both "crying baby" and "early start solids" could easily be located. This approach could also be used to search for negative cases.

Searching the index system in this manner tended to take the focus away from the holistic nature of the data. It was necessary to check back to the original context of data segments to ensure that relevant contextual factors were not overlooked (Kleinman & Copp, 1993).

In addition to manipulating and examining the index system analysis took place using matrices (Miles & Huberman, 1984; Patton, 1980), drawing diagrams showing the relation of categories to each other (Kirby & McKenna, 1988), and lastly, writing. Writing has been described as a "method of inquiry" (Richardson, 1994, p. 516), as well as the qualitative analogy to repeated computer runs (Achterberg, 1988).

4.4.2 Dietary intake data

The information from the diet records was entered into the DIET/1 (1991) diet analysis program. This involved obtaining food composition information from other sources, including manufacturers, product labels and a tables of food composition (Pennington & Church, 1985; Whitney & Hamilton, 1987). These sources did not have information on vitamin E and selenium[6].

Recipes the women used were also added to the data base. Measures of foods recorded on the diet records which did not match those in the data base were estimated using the average of five weighed samples.

6 This will result in a small underestimation of their intake. The foods for which nutrient information had to be collected were mostly commercially manufactured baby foods. They comprised a large part of the diet for only a few very young children.

Average daily nutrient intake from each individual's five day diet record was exported from DIET/1 to EXCEL (1994) for further analysis. Because complete dietary intake information was not available for children who were breastfed their nutrient intake data was analysed seperately from non-breastfed children. Nutrient intakes of both individual and groups of children were compared with the Australian RNI's (Truswell, 1990).

CHAPTER FIVE
MILK TO FAMILY FOOD: AN OVERVIEW

The transition from milk to family food is a general plan which defines diet in the first year or two after birth. At birth the child is given only infant milk (breast or formula). From the time non-milk foods are introduced the range of foods considered acceptable increases and the number of foods consciously avoided decreases. At the same time the preparation and content of foods become more similar to the diet of the rest of the family.

Thus there is an underlying transformation over which daily dietary decisions are made. Descriptions of diet and the factors which influence it relate to both the daily decisions and to the general direction and outline of the diet[1]. Factors which influence dietary decisions will be addressed in this chapter, these include the mother's goals and concerns, her knowledge, and contextual factors, particularly the child him or herself.

5.1 The Starting Point: A Milk Diet

The period of exclusive milk feeding was not included as a topic in this inquiry. But the women's experiences in feeding the child were clearly tied to that period. Both the process women used to get to know their child and the pattern of milk feeding started during this period.

Women mentioned that they demand fed, meaning that they observed the child, interpreted what was wanted or needed and responded appropriately. This process of observation, interpretation and responding led some women to decide their child needed infant formula. Similarly observation of the child indicated when the child needed or wanted solid foods, and the parent continued to observe and respond as they offered new foods to the child.

1 Dietary description for all people is a combination of the general and the specific, but for children in this age group there is also a very clear progression towards a goal.

There were differences between children in the frequency of milk feeds and the regularity of the schedule[2]. In addition to differences in the children's "demands" there were also differences in the use of breastfeeds. Some women said that they intentionally did not put their baby to sleep breastfeeding while other women did. Likewise some used the breast for comfort, for example after a fall, while others did not. More frequent, less scheduled breastfeeds meant that it was less likely that a feed would be "dropped" and replaced by a meal of solids later in the first year.

Another lasting influence was the impact of advice and information received during the exclusive milk feeding period, which affected receptivity towards later input.

5.2 The Family Diet

Even before the child was eating the same meal preparations as the rest of the family much of the food he or she ate was the same as that usually available in the home. This was convenient and cost effective. It also made sense to the women because these were foods which they thought tasted nice and, at least some of the foods, met their understanding of "healthy".

> The other reason I think it [the child's diet] is a reasonably healthy diet is because it's basically what I eat, or what we would eat, and I don't seem to get sick a lot.

As the child got older he or she ate fewer specially prepared or purchased foods.

5.2.1 The family diet as the goal

The "family diet" is the assumed end point for infant feeding by both parents and the parenting literature. Around the first birthday women would respond when asked what their child ate "he's on family food now". Likewise Christopher Green (1988) in his

2 This information is from interviews and dietary records obtained after solids were begun, but there was no reason to believe that the pattern of milk feeding had changed markedly at this time.

book *Babies* says, "By his first birthday your little gourmet should be able to cope with cut-up food from the family table" (p. 118).

It is easier when the child eats the same food, at the same time, as the rest of the family. The family diet represented a compromise of existing factors, including budget, women's concern about nutrition, the need to meet the preferences of all family members, and cultural understanding about food. This aspect of compromise was acknowledged by some of the women; "it's not perfect, but it's what we eat". While most were satisfied with the result of their compromises one woman served sausages often because "they are on the budget", that compromised her health concerns and she was particularly unhappy about the fact that her daughter would share the same diet when she got older.

In spite of the acknowledged shortcomings in the New Zealand diet (PHC, 1994) there was a noticeable lack of general nutrition pamphlets in the bundle of publications distributed to parents[3]. In some of the literature for parents the family diet is assumed to be adequate

> Give baby his food from meals prepared for the family. This is easy and gets baby used to family cooking (DOH, 1990).

Other publications mention the connection between the baby and family diet.

> If you have a healthy diet, then your baby probably will too. (J Wattie Foods Information Service, 1991a).

The goal in feeding the child was a progression of the child's diet towards the family diet, but the end point often changed, sometimes in response to the child.

5.2.2 Influences of the child on the family diet

The expression "breastmilk to family food" indicates that the child's diet starts as totally separate from the existing family diet and eventually becomes the same[4]. In fact the

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3 The Public Health Nurses were an exception because their brief is to care for the health of the entire family, not just the child. The general lack of input may be unfortunate given Schafer and Keith's (1981) finding that young families are more open to nutrition information.

4 "Family diet" is used here to refer to foods served to, or eaten by other members of the family, as distinct from family food purchases which would include foods eaten only by the youngest child such as canned baby food.

child often influenced family diet to a greater or lesser extent. This influence could start during breastfeeding, most noticeably when the mother eliminated some foods from her diet in order to breastfeed. Other examples were changes in meal patterns or cooking responsibilities due to the added demands of a new baby, or conscious attempts to improve the family diet in anticipation of the child's involvement[5].

As the child ate more foods the influence on family diet increased in some cases. These can be broadly classified into three types of influences which are illustrated with examples in Figure 5.1.

5.2.3 Why change?

The changes to the family diet were sometimes made for practical reasons, such as not wanting the child's drink to stain the carpet if spilt. They were also made for health reasons, for example omitting salt from cooking, or they were made because of child preferences.

> I buy kumera for her, cause I mean I like kumera and [partner] can't stand kumera. So some vegetables I'll buy specially because she'll eat them and I quite like them, but the rest of the family doesn't like them.... When sweet corn comes in again I'll get that, it's something else that he hates.

In some cases the changes were intended to last only as long as the child was too young for the alternatives, for example purchases of white bread, white rice and homogenised milk.

> We usually eat brown rice but she can't handle brown rice, it just comes straight back through. So we eat white rice now.

Other changes were more permanent, the intent being to improve the whole household's diet, for example omitting salt from cooking.

5Another view is that when the child is breastfed his or her diet is part of the family diet. Menella (1994) suggests that the flavours in the mother's milk are the beginning of the child's acceptance of cultural food patterns.

Figure 5.1: Changes to the Family Diet

Substitution of food products

- switch from coloured cordial to colour-free
- buy different brand of biscuits
- switch from brown to white rice

Purchase of new food

- buy calci-trim milk (calcium fortified, low fat)
- buy white bread
- buy homogenised milk
- buy new fruit or vegetable

Changes in practice for family meals

- not add salt when cooking
- try to eat more whole meal bread, less white bread
- purchase take-aways less often
- not skip meals
- eat "naughty" foods when kids in bed, e.g. chocolate biscuits
- add salt or sugar to food away from the table so child does not see
- omit dairy products

> I'm trying to stop that [adding salt] though. Like I'm getting into the habit of not doing that for her, you know so that we can all have the same thing later.

"Sneaking", in order to avoid exposing the child to what were perceived as bad habits was probably temporary, only because it would eventually become impractical to hide the practice, although it was possible that sneaking could lead to a change in standard practice.

5.2.4 A routine

Once the child was eating the "family diet" feeding the child became more of a routine as long as things went smoothly. The conversations between women about what their children ate diminished and in interviews women offered less information unprompted.

Feeding did not become, or remain, a routine if the child did not eat an acceptable diet in the mother's eyes. This could refer to the amount or content of the diet. Routine was also lacking when the child had an unresolved health problem which was possibly related to diet. At these times the decision making about the diet was closer to the process during the weaning period which mothers referred to as "trial and error".

5.3 Introducing New Foods: A Trial and Error Process

Trial and error was how a number of the women described the process of introducing new foods to their child.

> It's trial and error with us, we'll try something if he doesn't seem to like it then [we'll try something else].

The women's description of trial and error was often a description of action similar to a planned experiment. Foods to offer were chosen on the basis of the woman's belief that her child was old enough to "handle" them. The choice also reflected the taste and texture the women expected their child to like. (See section 5.4.2.3.)

Feedback was an important aspect of "trial and error". The women observed their child's response in a number of respects and interpreted it in light of their knowledge.

At times they would search for more information or advice to help them with their interpretation.

The women were most conscious of this process when introducing the child to a new food, but as a general approach it can be seen as a framework for all feeding decisions. The strategy became less obvious as the child's diet became more like the family diet, but it would reappear when there was a problem.

A "trial and error" framework explains how foods and the general diet are evaluated. But it raises two questions: 1) How are decisions reached as to what foods to trial? and 2) How is the composite diet decided? These issues are addressed daily by the women; how they go about this is described in what follows.

5.4 Decision Making/Problem Solving

What is eaten during a day is the result of many individual decisions. Many of our food decisions are habitual, but in the months after solids were introduced to a child this was often not the case. For some women this was their first close experience with feeding a child, but even those who had prior experience found that they were learning about this particular child. As Ann, a mother of four said, "each one is different".

On a general level the goal was to wean the child to the family diet, but on a daily basis the woman made decisions based on their child's current menu. Many of the daily decisions become routine, aided by a daily meal plan. The woman was then left with the decision of which specific food to fill in at each meal. But this routine was only temporary, for example baby rice for breakfast gave way to baby muesli, then weet-bix.

Thus there are two general types of decisions, that of what to offer on a daily basis and the decision of when to make substantial changes to the basic menu, either in terms of foods or food preparation. While the description of each one's decisions varied, all took into account the situation and the same basic concerns.

To examine the process more thoroughly a consumer problem solving framework has been adapted from Peter and Olson (1992).

Use of a decision making/problem solving framework focuses the attention on the woman's cognitive processes, but it does not imply totally free, unconstrained choice. Free choice requires complete knowledge, access to options and lack of pressure (East, 1990). None of these requirements can be assumed in the infant feeding situation.

The New Zealand environment as described in section 2.3.4 influences the decisions, but in each case it is an individual who interacts with the environment. Grace (1989) points out the paradox in the healthy public policy model is that it disregards individual choice. Although all of the women were constrained by the environment in some way all could also express individual preferences and power to some extent.

This model is not intended as a model of how the women thought. It is used to identify and organize concepts which the women expressed in a way which may be useful.

5.4.1 Issues

The women expressed many concerns or issues[6] related to their dietary decisions. These can be broadly classified as pertaining to seven general areas:

- -caring for the child's physical well-being
  - -nourishment
  - -physical health problems
  - -future health
- -socializing the child
- -caring for emotional well-being
- -modifying the child's behavior
- -budget management
- -time and household management

6 I have adopted Hutton's (1989) use of the terms "issue" and "focus of concern" as opposed to "problem". She states that problems often invite a single solution while the alternative terms suggest resolution. Resolution better describes the outcome anticipated, and obtained, by the women.

-caring for their own psychological needs, including self esteem, being a mother, and being seen to do the right thing

It is not surprising that the women were concerned with more than the effect of diet on the child's physical health. These issues are similar to the six perspectives which Kirk and Gillespie (1990) identified in relation to working women's food choices for their family[7]. Kirk and Gillespie comment that women used several perspectives when choosing foods.

In this study women also gave evidence of considering several issues at any one time. In addition, when describing dietary decisions in a range of situations, many women indicated that they had at some time considered each of the above issues. Those women that did not give evidence of a particular concern also did not give evidence that this was never a concern. Not only were multiple issues considered at one time, but the priority or focus of concern also changed over time[8] and in response to individual situations.

Ideally there was a balance, or sense of equilibrium in relation to these multiple concerns, so no one issue dominated at the expense of others. While each issue might not be optimised, they were all met to a satisfactory level. For example Caroline would have preferred to offer her child more organic foods, but they were not easily available and they cost more. She thought that they would be better for her daughter's health, but her daughter did have good health and in general Caroline was satisfied with her diet.

There were situations when balance was not achieved due to a contextual factor(s) beyond the woman's control. Causes of imbalances included a child's allergies, his or her refusal to eat, or budgetary constraints. For example, when I asked Liz if she would

7 Kirk and Gillespie (1990) asked the women about food choices in general, not related specifically to a young child. Thus it is understandable that aspects relating to socializing a child and modifying behaviour were absent. The woman's own needs were not one of the perspectives Kirk and Gillespie identified, although the theme of "guilt" identified indirectly in that study probably incorporates those concerns.

8 There was not a clear progression in change of foci as the child got older, although how the concerns were met did change with the child's age. But it was not uncommon for a change in the general situation to occur which might change priorities, this is similar to a theme identified by Jamieson (1994) "time marches on".

describe feeding the child as balancing concerns she said, "No, it's not balance. It's trying to get him to eat".

For Paula the first concern had been ensuring her child did not eat any dairy products, but she explained that she was trying a different approach,

> I didn't go out a lot to play groups and that sort of thing for ages. She'd end up eating other kids foods and that sort of thing and it was easier not to go, but I've decided that was wrong and we're going now.... one child gave her a cheese slice and she ate that and the next two days were [terrible]. When accidents like that happen I'm a real optimist, I'm hoping she'll grow out of it.

More often women described temporary imbalances which occurred in response to a change in context. These might better be described as a shift in focus, because when the diet as a whole was considered balance could still exist. For example at a family gathering the focus might be a desire for the child to socialize and the mother's need to keep the peace. The child might eat cake and drink fizzy, but she knew that tomorrow he would have a "good" diet.

Not surprisingly the effect of any one contextual factor could not be understood in isolation. For example the focus on modifying a child's behaviour was greater in a public place or at a social gathering than at home.

The existence of multiple concerns and changing foci helps to explain the differences between the women's stated intent and actual behavior, which is discussed further in section 5.4.4. Multiple concerns also help explain some miscommunication which took place between women and health professionals.

One area of miscommunication is the unspoken assumption by health professionals that avoiding any risk to the child's physical health should be the main focus. This issue was raised in relation to starting the child on solids. Several women reported being told that their child would become iron deficient if they did not start giving him or her

solids. This was a dilemma because the child would not accept solids. One woman clearly stated the options as she saw them when she said that she would rather her child become iron deficient than force him to eat. All her other comments showed that she valued the child's physical health, but that was not her only issue of concern.

5.4.2 Relevant knowledge

The women considered their understanding of the situation and knowledge about options in order to decide how best to meet their concerns. For some decisions, such as when to start solids, most women had been given an "answer" by their Plunket nurse. Many women did decide to follow recommendations, if the advice made sense in their situation and did not cause conflict among their concerns. In these cases they may not appear to consider any other options.

Sometimes recommendations did not make sense in light of the woman's other knowledge. For example when Sue's child was 6 weeks old her Plunket nurse suggested that she give him orange juice. She said,

> There was no way I was going to give him orange juice (why was that?) his little stomach wasn't ready for it..

Marie was told to give her child a little bit of egg yolk for iron, but she did not do it. She said,

> She [Plunket nurse] said as much as my thumb nail, well if that's all she's not going to get much iron from it.

In Marie's case the recommendation did not make sense, but it also conflicted with convenience, another of her concerns, since she would have had to specially prepare the egg. If she routinely had a hard boiled egg for breakfast and could have easily given the child a small amount she may not have considered whether or not the amount of iron was useful.

Recommended advice could be perceived as not meeting concerns when there was a problem. Lynn's child was very unsettled. She had switched from breastfeeding to a

bottle trying to calm him. When he was three months Lynn's aunt came to visit and said "he's hungry". She told Lynn that in the U.K. they started solids at 3 months of age. Lynn tried it and "he was fine".

Lynn's case illustrates several factors which were shared in a number of situations when official recommendations were not followed. First she had a focus of concern which was not being resolved by the status quo (following the Plunket nurse's recommendations). Secondly she had another option which might help the problem and which she knew other people had successfully used. Lastly, the substance of the "official" recommendation, to her knowledge, was procedural knowledge of "what to do", which she supplemented with her own understanding of feeding children. It was not surprising that her assumption was that the recommendation was based on the child not being able to "handle" solids, in other words that there might be a physical problem. This is the assumption behind the "trial and error" approach, that the mother will be able to judge for herself which option works for her child.

When women did not follow official recommendations they appeared to have thought through the probable consequences. This usually entailed making their own meaning of the reasons behind the recommendations, since many recommendations are only procedural, i.e. "what to do". In situations where following official recommendations caused no conflict with other concerns the women had no motivation to understand the reasons behind them (Hatuno & Inagki, 1992)[9].

It is notable that much of the literature for parents contains procedural knowledge, and leaves many assumptions unspoken. This can become a problem when the assumptions of the health professionals regarding the reasons behind recommendations differ from the assumptions of the parents.

9 Some women did "make sense" of recommendations even when they did not need to question it, but it was not uncommon for me to ask, "Why do you think they suggest that?" and have the first response as "I don't know, I guess maybe...".

5.4.2.1 Means-ends analysis: How to get from a to b

The links between foci of concern and actual feeding options include general concepts, such as variety, specific food attributes, such as salty and contains calcium, and consequences of specific attributes/actions. A means-ends analysis (Peter & Olson, 1992) can be used to examine individual links.

Figure 5.1 shows how feeding one food can have conflicting impacts on various issues. These situations required a compromise in order to resolve them. In the case of Sarah the negative effects on the child's socialization and her frustration at the child's not eating were counteracted by the positive aspects of offering the child milk. The potential negative effect on health was only a possibility.

Miscommunication can occur when the links a parent makes are not the same as a health professionals. In particular concepts which appear to refer to health may actually be important to the mother for another reason. For example, Sarah said the Plunket nurse suggested the amount of milk her daughter drank could be the reason for her poor appetite. The nurse suggested that Sarah cut down the amount of milk she gave the child. But Sarah framed the problem as primarily social and emotional and did not see a link between poor appetite and poor nourishment (the child was healthy). She understood the nurse's suggestion from that point of view and responded, "but she doesn't have to live with her", referring to the behavioural difficulties which could arise[10].

Similar miscommunication was also evident in the discussions of foods to avoid, suggestions of foods to give the child and menu plans. Some of these concepts are discussed in the following sections.

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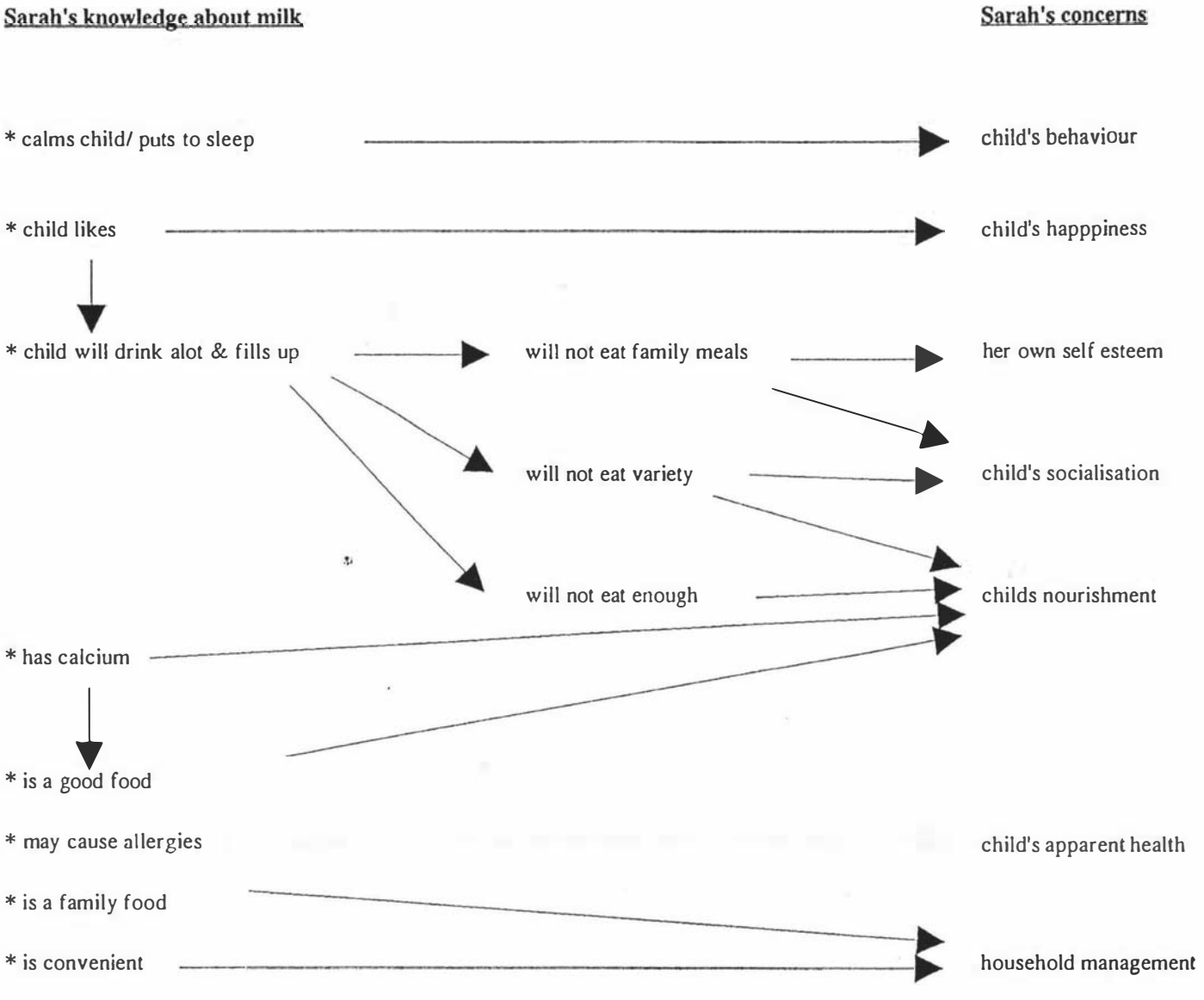
10 Interestingly, two other women in similar situations reduced the amount of milk they gave their child after being told that the change might help resolve an ongoing health problem. This was a clearly articulated link between the child's health and a dietary practice. This is not to say that a clearly articulated link with the *possibility* of iron deficiency would be sufficient motivation to deal with the possible behavioural outcomes.

Figure 5.1: Means-ends depiction of Sarah's knowledge related to feeding her child



5.4.2.2 Assumptions about differences between children and adults

The women had a lot of knowledge about food, nutrition and related topics, but to apply it to a child's diet required assumptions, often unspoken, about the differences between children and adults. For example, grapes which were too expensive to buy for the rest of the family, were not too expensive when only a few were bought for a young child. Chocolate pudding that was "yummy" might be "too strong" for a young child.

Differences between the young child's diets and the rest of the family generally focused on special food preparation and on foods which the child should not yet be given. Assumptions pertained to the child's physical ability to eat, his or her ability to digest food, and the suitability of spicy and fatty food.

When asked if she made sure her nine month old child had anything special Jane replied,

> There's a shelf in my pantry that has got his foods on it, and yes I try and keep, you know a few tins and a few jars and a few packets of food that you mix with milk or boiled water just as stand-bys, because he doesn't have what we have all the time. There are somethings that he can't eat, those things that I mentioned, hot spiced things, you know, so they're really good just to have there.... By the time they're one they say the child should be eating most of the family diet, so until he's at that point I'll keep buying those tins and jars.... (Do you think he needs anything in addition to what you need?) Not in addition, but I think he needs less fat, and less, well no salt, and as small amounts of sugar as possible. The only sugar I give him is on weet-bix and that's because brown sugar acts as a laxative... (Do you think it's more important for him than you, or equally important?) Probably it's equally important, but I'm more careful with him than I am with ours. Sometimes if I'm too tired to cook tea we just have poached eggs on toast, where as I'd never do that for him, I'd never give him a quick easy meal, if I was too tired to go to a lot of trouble... I'd open a tin of chicken dinner or beef dinner.... I'm really conscious of his needs because he's growing so fast and it's so important that he get the right food at the right time, at the

> time he's hungry. Because I don't know what he'd feel like if he didn't... when he does start eating at the table he will fit in with us, but I might take a bit more care in the preparation of our meals as well.

Jane has mentioned a number of concerns, and while most are related to physical health she is also concerned with how he would feel if he were hungry. This concern was shared by other women. Similarly, other women also focused on what they were not going to give their child and there was evidence that they too thought that it was more important for their child to have a good diet than it was for themselves. For example Alice, solo mother, said, "I hate the kitchen, I only cook for the kids". Others commented that they did not have take-aways as much since having children.

The belief that the children were forming habits was one of the reasons that women consciously avoided giving their child some of the foods that they themselves might eat. Sue was consciously not giving her child salt. She did not like to use much salt herself both for taste and health reasons. She said,

> I really don't feel that babies need salt. I think that adults use salt as a habit... we don't do it because we want it, we do it because it's a habit.

The women who raised the issue of fat were divided in their beliefs about its relation to a child's diet. Few women mentioned that they were trying to avoid fat in the diet, as Jane did above, but fatty foods such as fish and chips were not considered to be acceptable for young children, because they could not handle them. A few women mentioned that children need fat, or that they can eat more fat than adults. This issue was raised in relation to milk.

Five of the eight women who used trim milk regularly bought homogenized milk, or balance (1.5%) milk for their child. In one home there were three different kinds of milk in the refrigerator, one each for the woman, partner and child. These women had

decided through various paths that trim milk was not suitable for the child[11]. The majority of women interviewed used homogenized or full cream milk in their home, so they did not make a conscious decision about which milk to use for their child.

5.4.2.3 Food attributes

Applying what they knew about food and children, along with a consideration of the family diet resulted in two general categories of food: foods to offer and foods to avoid. The contents of these changed as the child got older, with generally more foods being offered and fewer avoided. Some women also implied that some foods are "required".

Health concerns were predominantly focused around foods to avoid, with some interest in "required" foods.

Foods to offer

The menu for young children was different than that for the rest of the family. When children first started eating solids the menu was very limited. As the children got older the women added new foods to the active menu and removed some baby foods.

When solids were first introduced the emphasis was to include foods that the mother thought the child would like and be able to "handle".

As new foods were "trialed" they became either foods to offer or to avoid. [Sue] said, "silver beet came right through, that's off the menu for a while." But she described how she tried orange and "he liked it". Likewise, Joan described the day when she first gave her Paul homogenised milk. She said, "it wasn't a problem, I didn't think that it would be."

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11 The choice of which milk to give was an example of conflicting concerns. Buying homogenized milk for a child who only used a small amount each day could lead to waste. One alternative was to offer no milk at all. Three women gave their child trim milk. One switched to homogenized when she was told by the Plunket nurse that "it wasn't a good idea." Another bought calci-trim especially for her youngest daughter and herself, and hoped that her older daughters would begin to drink it too. The third had given her son trim milk on her doctor's recommendation.

Women were often looking for "ideas" of foods to offer (see section 5.5.1.1). These included foods, and ways of preparing them that might be acceptable for a small child. Women often shared "ideas" with each other.

Commercial baby foods were often considered an acceptable option. Some women assumed they were a good choice, as long as the child's age matched that on the label. But looking at the label could be confusing when the ingredients included foods the women thought they should be avoiding in their child's diet. For example some baby foods for children under one year contained milk powder.

Much of the information in pamphlets on infant feeding appeared to be "ideas" of foods to offer, e.g.

> When baby is about 7 months old, you can begin adding some iron-containing foods like cooked and finely minced lean lamb, chicken, liver or kidney. Offer cooked egg yolk too (PHC, 1995a).

It was not always clear when information from "official" sources was "ideas" and when it was a recommendation that should be followed, in other words "rules".

Required Foods

Some women believed some foods "should" be offered. This could be for social or for health reasons. Sometimes it was not so much that a food itself was required but that the mother felt obligated to do as she had been told.

Part of the understanding of a food being required was based on the authority of the Plunket nurse. The following statement was recorded in the Health and Development Book (DOH, 1983) of a child at the four month check up.

> Solids- baby rice 1-2 tspns with breastmilk or pureed fruit after breast.
>
> Veges- cook and sieve any three of following-potato, kumera, silver beet, zucchini, carrot, pumpkin. Mix with vege juice and give 1-2 tspns

This kind of input could be viewed as a prescription. As Liz explained, "She [Plunket nurse] would write it in the book and I would dutifully go home and try it". Similarly, Grace said, "The Plunket nurse said to give him bam, bam, bam, so I gave it to him". For these women following the Plunket nurses's advice on feeding was partly an element of doing the right thing and being a "good mother". Even if the women did not follow advice it was clear from their explanation and justification that some did not feel entirely free to do so. An indication of this was Mary's description of her trip to the Plunket nurse when her child was four months old.

> When I left she said "I'll expect her to be on solids next time" . I felt like saying, "Excuse me, who's baby is this?"

Part of doing the right thing for some women was exposing the child to a variety of foods. Buying special foods, for example papaw or pineapple for the child to taste was related to the child's enjoyment of food and perhaps a general exposure to the world. Wendy pointed out foods on the Karitane information sheet[12] which she would not be able to give her child because of their cost.

> If I had the money I would buy avocado, apricots, and nectarines [which] are very expensive... If I have more money then she can try them.

She was not happy with the situation, but she did not think the child's health would suffer.

Vegetables, in some form, were generally seen as important for health and needed to be given once a day. Providing vegetables, preferably home prepared, was evidence of doing the right thing. Marie said of her mother-in-law,

> She's kinda all for vege at night. She's cringed a bit when she saw me give up on vege and get the weet bix out of the box.

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12 This one page sheet published by Karitane [manufactures] and distributed by Plunket nurses. It lists foods to give children at various ages. It was the written source of information most commonly mentioned, several women had them on their refrigerators.

Milk was obviously needed for a young child during the weaning period and some amount continued to be required. Margaret's daughter did not like to drink milk. During the 24 hour dietary recall Margaret gave the matter some thought.

> That book says there, and some where else I read, they say that they should be having 600 mls of milk a day, well she wouldn't have that in a day, in fact I was wondering if I shouldn't contact Plunket. I mean, you can't force her to drink, so I don't know, I mean I've never actually measured it out ... but she probably is getting enough because the weet-bix will probably have close to a cup... then if I make rice pudding at night that's ... a half a cup, plus if she has custard with it that's also got milk in it, the yoghurts and that have got, so she doesn't exactly look like she's fading away.

Margaret translated the "rule" about milk to mean dairy products and later mentioned calcium. Other women also mentioned calcium in relation to dairy products. Paula's daughter had a prescription for Infasoy, a soy based infant formulae. The prescription stopped when she was two years old, so Paula had begun trying Pritikin's Alpha Whey milk[13]. I asked her if she thought it was important that the child continued to have some milk. She answered,

> I think that for calcium, and that you can get that in other places. Like I was told the other day that sesame seeds are very good in calcium, and I didn't know that. So I sort of thought, well there's no reason I can't make scones with sesame seeds on them[14].

The difference between "ideas" and "rules" regarding which foods to offer was not clear cut, either in the women's descriptions nor in the literature the women received. If advice fit with the woman's other concerns then often they would follow it and not wonder if, and why it was necessary. Julie explained that she was diluting homogenised cow's milk for her daughter to drink, to supplement the breastfeeds and then she

13 This milk powder does not contain all the proteins found in milk and is promoted as appropriate for people with dairy allergies.
14 Several women told me that sesame seeds were a rich source of calcium, with a teaspoon, or tablespoon, being equivalent to a cup of milk.

wondered why she was doing it. I asked if it had been explained when suggested and she said,

> no, ... you take it as read, and true, and the other thing of course is that you can't remember what sort of day it was at the time, I might have been tired on the day and just took it [advice]

A judgement as to whether a recommended practice was required or just an idea only had to be made when the woman decided not to, or felt that she could not, follow the practice for some reason (e.g. Wendy's financial constraint or Margaret's daughter's dislike of milk as described above). The ambivalence in the literature for parents in relation to "rules" is not surprising given the range of possible food combinations which can result in a nutritionally "adequate" diet. None the less it is surprising that much of the literature does not discuss guidelines in terms of serves from food groups or similar[15].

Foods to avoid

"Foods to avoid" are foods which were available but the child was not given. These included specific foods, or groups of food, which the woman consciously avoided giving to the child. Women could list these foods, the most common being cow's milk and eggs. Other frequently listed were sweets and spicy foods. Other foods were avoided on a case by case basis in relation to the woman's evaluation of their suitability. For example Paula did not think that pickled onions were suitable for her 20 month old child.

There were three categories of foods to avoid: 1) foods which the child was too young to "handle", 2) foods which contained "baddies" such as sugar, salt, fat, colourings, etc. and 3) known problems, foods which had been tried and caused a problem or were rejected.

15 Wattie's Pamphlet *Healthy Food for Babies* does state "As they are weaned babies begin to need foods from each of the four basic food groups every day, to get all the nutrients they need".

Sometimes there was miscommunication between women and health professionals on why a particular food was to be avoided. Honey is an example. On the Karitane information sheet honey is one of the foods to "leave until after 12 months". This was somewhat confusing to women because most of the foods were ones they associated with allergic reactions, but they did not expect this to be the case with honey, so they assumed that it was to be avoided because it was sugar, in other words it was a "baddie"[16]. The implications for avoiding a "baddie" are different than that of a food a child can not "handle" as is described in the following sections.

Being able to "handle" a food was a broad concept which included being able to physically eat it (chew it, not choke on it, and no sharp edges), digest it, and have no physical reactions to it. These concerns primarily relate to the child's physical health. There was also concern about foods with a "strong" taste.

Some women believed that offering a food too early could cause an allergy, while others believed that the allergy was there any way[17]. These different viewes understandably resulted in different assessments of the risks associated with "trying" a food before the child was the age recommended for its introduction. The belief that either a child had an allergy or not lead to an all or nothing view; in other words if the child had been given a food once, perhaps by mistake, and there was no reaction there was no harm in continuing to give the child the food.

The women's beliefs about allergies had implications for the use of cow's milk in the first year of life. For example, Sue was giving her child "dilute" forms of dairy products, such as custards and yoghurt, she was not going to give him cow's milk as drink because it might "aggravate" his eczema. She hoped he would not get eczema, but thought "if he's going to get it he's going to get it whether I give him dairy products or not".

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16 Honey may contain spores of *Clostridium botulinium* which can cause botuli in young children. Some of the child care books mentioned this as a reason for avoiding honey (e.g. Green, 1988, p. 123; Copland, 1987, p. 83)

17 This split of views is also seen in the literature for parents (e.g. Green, 1988, p. 117).

Foods could be defined as too difficult to handle if the child had been given the food and a problem had resulted, or if the woman had been told that the food should be avoided until a given age. Lists of food to offer at various ages, such as the *Karitane Feeding Guide for Babies*, were also a source of this information since it was implied that the foods should not be offered at an earlier age.

Of course this is not fool proof, because all possible foods are not listed in any publication. For example papaw and pickled onions are not listed on the Karitane sheet for any age group. This is where the women's knowledge of a food would be used to evaluate its suitability (this would usually only be an issue if it was available). Texture and taste where characteristics often used to evaluate a food. This partly reflected a concern that the child enjoy the food and not waste it.

Avoiding "baddies" was partly for health reasons, such as avoiding dental caries and hyperactivity, partly because the child "doesn't need it", and partly to stop the formation of bad habits. Mary clearly described the concern about habits in a note after her child had eaten a tissue during an interview.

> It seems contradictory to be making an effort to control Jessie's food and then to allow her to eat tissues and other paper, so I thought about it some more. I decided that it has to do with eating habits. Eating paper is a habit I am sure she will grow out of, especially if I don't make a fuss. However I am avoiding sugar because I want her to develop the habit of eating healthy foods.

The particular foods avoided and the comprehensiveness of the avoidance varied greatly between women. Some of the women saw moderation, as opposed to avoidance, as the appropriate or practical approach. Jane explained,

> She [my mother-in-law] put a little golden syrup on her finger, and I probably was overreacting it didn't hurt him at all, but I didn't really like that. I didn't say anything at the time, ...if she gives him a drink of water she puts a wee bit of sugar in it, just a bit which won't hurt him either, and he will drink that rather than plain water, but I like him to drink plain water, but that's not a big thing.

Several women described similar conflicts between their desire to avoid sugar in their child's diet and their desire not to damage relationships with the child's grandparents.

Women relaxed their avoidance as the child got older, this was for practical reasons as well as from a desire that the child enjoy food. Caroline, the mother of a one year old child, said of the child's first solids,

> I was very careful not to feed her any sugar or salt, even now I only put a wee touch of salt in her porridge, or if something isn't really sweet I have added a bit of honey now and again.

It also became harder to avoid giving the child foods when he or she knew what they were, especially when other children were eating them. When foods were no longer avoided the concept of "balance" became important.

Avoiding known problems, foods the child had reacted to in the past could be a major focus in choosing foods. Paula explained how she altered the family diet in order to feed her dairy allergic child.

> Most recipes you can just chuck in margarine instead of butter and it's not really a problem, it's only when you go out, like when you go out for dinner and they've put cheese in the lasagna, then it's a problem. Or I'll put cheese on half a pizza or something if [husband] wants cheese.

She hoped that her child would grow out of the allergy as she got older.

5.4.2.4 Meals and diets

Individual foods had to be appropriate to offer, but they also had to fit into an overall structure and plan. This plan was primarily social and practical, but the women also considered implications for health.

Meal patterns

An important concern for some women was the combination of foods served at a particular meal. Ellen said her daughter was eating two meals a day and she talked with the Plunket nurse who said she should be having three meals. She went on to say

> I called up the Plunket nurse and said, "What do you give them for lunch?"

The types of food preparations served at different times of the day largely reflected typical adult meal patterns. Cereal and/or toast was general served for breakfast, sometimes with fruit. Vegetables were served at dinner, with or without meat. The vegetables, always several mixed together for children who were not eating the family dinner, were more consistent than meat. Some women always served meat mixed with vegetables while others gave it only occasionally.

Pudding or dessert was offered after dinner by some of the women. One woman explained that she offered it when the child was still hungry after finishing her meal of vegetables and meat. I was confused as to why she would not be offered more of the same and the woman found my suggestion of such a possibility equally confusing. A comment in the 1955 handbook of the Plunket Society, Modern Motherhood helped explain her view.

> A few children are not satisfied with one course at lunch time, and should be given milk pudding and fruit in addition. Similarly, a coddled egg at the tea meal may have to be followed by milk pudding and fruit. (p. 95)[18]

Lunch was the meal that caused the most difficulty because the young children could not eat sandwiches. Part of the women's concern was for variety or difference from other meals, but there was also an element of "rightness" which was difficult to articulate. When Fran made a comment about later afternoons being busy I asked her why she didn't give her child vegetables at lunch time and yoghurt at dinner (the latter not needing preparation). She said,

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18 Perhaps this was the origin of the milk pudding or yoghurt 'meal' that some mothers now feed for lunch.

> I guess I could, but he doesn't have any trouble sleeping. Vegetables can be heavy.

Some women did give vegetables with or without meat around noon, a pattern which changed as the child ate more family food. Yoghurt was another popular food for lunch.

Foods appropriate for snacks, or morning and afternoon tea, were less strictly defined. Fruit, sweet biscuits and cracker biscuits were the most common snacks. In social settings the foods offered were generally baking, preferably homemade. Cracker biscuits and fruit were sometimes provided, generally intended for the children.

The "ideal" pattern was three meals and two snacks in a day although there were many variations on this. One variant shared by several was to feed the child his or her dinner (vegetables) at four or five in the afternoon and then have the child sit at the table while the parents ate later in the evening. From a nutritionist's point of view this pattern ensures that the child eats a quantity of vegetables and meat as well as introduce him or her to the family foods and meal time practices[19].

Variety

Variety is a term commonly used in nutrition information and was also frequently used by the women. Notably the women's main interest in variety was not generally nutritional[20]. They hoped that introducing the child to a variety of foods would avert picky or fussy eating behaviour later- behaviours that were difficult to attend to at home and could cause embarrassment socially.

> I thought maybe if we get her into a different variety of things, I figure then somewhere if someone gives her something different it's not going to be a hassle, but then that's stupid because you have those problems with eating anyway.

19 This was obviously more work, but from a nutritionist's point of view, some of the children who ate only at the family meal sometimes consumed quite small amounts of meat and vegetable. The full nutritional situation of course depended on what they had been fed earlier in the afternoon, examples include fruit and a sandwich or a piece of cake.

20 A similar conclusion about mother's view of variety has been reached by other authors (DAB, 1995; Adair, 1983).

> So she [mum] got us used to a variety of foods so if we went anywhere she wouldn't be embarrassed and we would grow up good children [laugh] and eat our food. (so for sort of a social) yea, and it's good for you, I think it's probably good for your body to have more of a variety of food, like fresh vegetables and fruit and things like that too.

As Sarah indicated, there was an assumption that variety was beneficial for health. Serving a variety of foods was also seen as a way to ensure the child enjoyed eating. This was important in itself and also helped ensure that the child did not get bored and consequently did not eat "enough".

The widespread practice of serving vegetable mixes was partially a means of serving variety. The women thought the mixes were tasty, and there was a strong normative backing to this practice, perhaps based on the 'typical adult meal of meat and "three vege". In addition, Plunket nurses suggested women make mixtures of vegetables and vegetables were only available in commercial foods as mixes at the time of field work[21].

Variety was considered a good thing, but not always practical. The practice of mixing up a batch of vegetables, or vegetables and meat, and freezing them often meant that the same mix was served for a meal for four or more days. One way around this situation was to prepare and freeze individual vegetables and meats separately. Sue had a selection of pureed vegetables frozen in ice cube trays in the freezer,

> At tea time I go, "What do you want?" I go, "one of those, one of those", it's like a buffet and stick them all together and put them in the nuclear reactor and zap them and it's ready. It's much easier and then he gets a bit of variety too I think. Because some weeks I haven't got many veges, you know potato and

21This emphasis on mixed vegetables appeared to contradict the recommendation to start new foods one at a time. Three women commented on this contradiction, one of whom decided that there was no need to bother introducing the vegetable singly after watching a Plunket nurse's demonstration of making mixed vegetables.

> kumera and a few carrots or something, that's all the kid's going to get all week, where as this way he gets a bit of variety.

Another approach was to add a small amount of another food to the mix for flavour, for example grated cheese, parsley, gravy or canned baby food.

The importance of variety sometimes had to be reevaluated in response to what worked. Margaret had been concerned to give her child variety but when she was about 18 months it was easier, and more effective in terms of getting the child to eat, to give the same foods.

> I'm not going to give her variety. If I know that she likes beetroot and cheese I'll serve that up until she's sick of it. [laugh]

The concept of variety is implied in the literature for parents by the lists of foods to try. This is readily interpreted by the women as they see it, which is predominantly in a social sense.

Balance and moderation

Choosing foods for "balance" and "moderation" generally related to nutritional concerns. Balance could refer to eating foods from different food groups.

> I suppose I try to give her some sort of balance, the same with everybody, some sort of a balance, of meat, vegetables and fruit, not so much on the cereal side because I honestly can't get that much of any of the cereals or anything into her, I just can't. And I try to get some milk, apart from breastmilk, to get her used to it more than anything. So I try to get a balance and I try to make it interesting, so variations important too.

A balanced diet was assumed to meet needs for specific nutrients.

> I try to, within reason, to boost her health and well being by giving her [healthy] food, balanced protein nd fibre and stuff like that, along with vitamin C.

The concepts of balance and moderation allowed the women to meet health goals while taking into account other concerns. Elaine said that she did not want to give her child a lot of sweet foods. When I asked if she felt quite strongly about not giving sweets she replied,

> Well, no, I think it's healthy to have a balance. I think I grew up deprived [laugh], you know that other kids had them and I guess I spent my pocket money on them.

Alice commented that her child's grandfather bought the child lollies which did not make Alice particularly happy, "but when you see her eat all her dinner and all her veges you can't really moan" she said.

Social situations were often a time when balance in the overall diet was considered. Jane described how, when at someone else's house, she might quietly take a chocolate biscuit from her child and give him a cracker, but only if she could do it without making a fuss. Similarly, Margaret said,

> Like if she went to someone else's place and had jelly and ice cream that would be OK, but that would not be the sort of diet I would want her to have every day.

While women felt constrained in social situations some described tactics to minimize the effect. For example a child would be fed a meal at home before going out to a bar-b-q, or she might take a plate of fruit or cracker biscuits along to an afternoon tea to as an alternative to sweet biscuits and cakes.

5.4.3 Integration

Integration is the term cognitive psychologists use for the process whereby a person considers their goals and options and comes to a decision, a bit like a "black box" (Peter & Olson, 1992). Researchers and theoreticians in the field have proposed "formal" integration methods, which include a "multi-attribute method", similar to an economic model of maximizing utility. But they suggest that most people make decisions using

simple rules or heuristic devices (Barsalou, 1992; Peter & Olson, 1992). It is beyond the scope of this inquiry to compare methods of integration, but there were clear examples of the use of heuristic devices. Examples include

-Offer a kind of fruit not already eaten today.

-Cook fish fingers if dinner is something the child won't eat.

-Give her the same thing for lunch today as she had yesterday as long as she's still happy to eat it.

-Do what the Plunket nurse suggests.

Menus for particular meals, as described in section 5.4.2.4, may act like a script (Shank & Ableson, 1977), they provide a framework of what to offer. As feeding becomes more routine scripts and heuristic devices take the place of having to work through the consequences of individual actions. As long as they work there is little incentive to try another option. This may be one reason why women with previous experience with children do not always follow new advice, particularly when that new advice does not include a discussion of why it is superior to old advice.

For example, Chris had started her first child on solids at 3 months, at the Plunket nurse's advice. With her second Chris said she thought she would start him around the same time although "they're saying a bit later now".

5.4.4 Plan/Intent

As part of the problem solving process a woman makes many decisions. In discussing decisions about diet it helps to view the decisions as taking place at two levels. The first are general plans, made at some time removed from the actual feeding event. This could be the decision to avoid a particular food until the child is older, or the decision to purchase a food in the supermarket. The second are decisions made at the moment before food is offered, or not offered, to the child.

Plans for the future are not always followed in practice. This is the gap that is often observed between practice and intent (e.g. Shephard, 1990). Women described actions

different from their earlier intent as a result of a change in focus caused by a change in the situation, or as a result of a change in knowledge. It could also be the result of action by the child, for example refusing to eat a particular food.

An example of a situation leading to a change in focus was when Elaine watched her child be offered, and eat, an orange segment at a coffee morning. Elaine had intended to avoid oranges in her child's diet for a while longer, but when it was offered to the child and Elaine was across the room she allowed the child to eat it (by not intervening)[22]. Likewise, Robyn knew her parents gave her child sweets when they looked after her. Robyn was not happy about it, but her main foci were the practical issue of having her child cared for and of maintaining a relationship with her parents.

An example of a change in knowledge was when Gayle saw the price of avocados and changed her plan to offer them to her child. New knowledge was often the result of observing the child's response to food. Sometimes the child instigated the change. For example Chris had planned to feed her child before she and her husband ate because her husband was not home from work until six in the evening. But when the child was about 18 months he refused to eat at five.

> He would not eat, I would cut out his afternoon tea, no afternoon tea, he would be really hungry, that didn't work.... This went on for about a week and a half, he just wouldn't eat, he wanted his father to feed him.

At the time of the interview the child was regularly eating the evening meal with his parents. In this case repeated action lead to a change in intent.

5.4.5 Offering food and feedback

Food offered to the child was not always eaten. Nor did children always eat the food in the way or quantities which the mother had planned. Nutritional status is dependent on what is actually eaten, but to the mother the entire process was of interest. A

22 Elaine could have shouted across the room and asked the woman offering the orange to take it back from the child.

description of what a child fed commonly included how he or she ate it, and if it was enjoyed, for example, "she loved it" or "he spat it out".

In some cases offering the food was only the start of the feeding interaction. Women reported a range of feeding practices directed at trying to encourage the child to eat[23]. Some women distracted their child or used other tricks to get them to eat. Others accepted that the child would eat when ready. Alice wrote on a completed five day food record, "Susan is a good eater, but she picks and chooses her time".

Watching the child's response to food offered was one way of learning about the child (see section 5.5.2). At the same time the mother's observation of her child and interpretation of what she saw was partly a result of her existing knowledge about the child. It is also the result of her existing understanding of diet and food, an understanding which can change. Two women commented that keeping the five day diet record lead them to view their child's diet differently. Helen wrote at the bottom of one page of the diet record sheet, " Jo ate more today than I realised. She snacks all day".

5.5 The Context

While the preceding discussion was of the women's cognitive processes it was clear that the situation influenced them. Their foci of concern and their knowledge were both influenced by contextual factors. Most of the influences the women explicitly connected with their feeding decisions were in their immediate environment. But the influence of broader societal factors was also evident in places, and their manipulation can be hypothesized to influence the children's diets.

In the following sections the influence of selected contextual factors will be briefly discussed. Influence of these factors has been commented on at various points in the preceding sections.

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23 Presumably the child was also making meaning of the feeding/eating event, but this inquiry only has the woman's perspective.

5.5.1 Immediate environment

5.5.1.1 The child

The child was the most consistently influential contextual factor. He or she directly influenced the diet by eating or refusing food, but from the mother's point of view the child is part of the context. The child's influence was continual, but the child was changing, both over time and moment to moment. The women were continually revising their knowledge about their child (see section 5.5.2), as well as applying that knowledge in the immediate situation. For example, Margaret, knowing how much food her child normally ate would make a judgement as to whether or not she had had enough.

> Well if she doesn't eat as much from her evening meal then I think either she's not hungry or she doesn't like it, and just to make sure that she's got something in her tummy I top her up with one of those yoghurts.

Aspects of child care were often part of the woman's focus of concern. Although the child's health was important it was not the only issue. Margaret went on to say,

> It could be the fact that she's sick of eating vegetables most nights, it might not be that, she just might not be hungry. But if I think that she might wake if she's hungry I always give her yoghurt to finish off.

Feeding the child enough in the evening was mentioned by several women. In the majority of cases the women had not actually noticed their child waking because he or she had eaten too little but they were aware of the possibility.

5.5.1.2 Food availability

Food availability was also important. In a real sense it determined what could be offered at any one time, but it also helped define the range of options. For example when her family was eating curry Lynn decided it was too hot for her child, a decision she may not have considered had the curry not been served.

Food availability was in turn influenced by the family diet and the food preferences and health concerns of family members, by household finances, by the day of the week, and

by social occasions. Food availability, and these associated factors might fluctuate in the short term as well as change over time (for example see section 5.2.2).

5.5.1.3 Social situations

Social situations, such as family gatherings and play groups, were also influential. In addition to presenting a change in food availability they also could influence the woman's focus of concern, with socializing for herself or the child gaining in importance. Getting prepared for a social event could also cause a shift in focus, for example the woman might have less tolerance for her child getting covered in food if they were going out. Social situations also offered a chance for gathering new information (see section 5.5.1).

5.5.1.4 Health professionals

Contact with health professionals was also influential, both because of exposure to knowledge[24] and because of pressure to do as "told" before the next visit. The women's experiences with health professionals differed greatly, no doubt the result of the women's personal characteristics, those of the health professionals and the particular situation. For example when Fran's child would not accept solids at six months of age this led to a conflict with the Plunket nurse, a situation which had not occurred when taking Fran's first child to clinic visits.

The child's progress as an influence on the mother's relationship with the Plunket nurse was also noted by Beasley (1993) from her interviews with women breastfeeding for the first time. She suggests that the Plunket nurse provided a "rubber stamp" if progress was good. Loveridge (1992) describes a home visit by the Plunket nurse and her statement that the child's behaviour was "normal" reassured the mother.

Another influence on feeding decisions which could result from contact with health professionals was that of "support". For example Mary talked of La Leche League support enabling her to continue to breastfeed and not push solids; Jane talked of

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24New knowledge consisted both of what they were 'told' as well as growth and any other assessments of their child.

support from the Karitane nurse who answered her questions and suggested books, and Barb talked of the public health nurse helping her to come up with new ideas to calm her daughter.

5.5.1.5 Household income

Household income influenced food availability by constraining purchases. A number of women mentioned food choices they made in which a less desirable food, in their mind, was purchased for financial reasons, for example purchase of cordial instead of juice. Some, like Wendy (see section 5.4.2.3), said there were foods that they could not afford to buy. Alice said that if she had more money to spend on food she would spend it on fruit,

> yea, I'd go for fruit, like watermelon and things, I know she likes watermelon.... I like rock melons, I'd like to try her on all those things like that.

As with Wendy, Alice wanted to let her daughter experience foods that were enjoyable. Alice was generally happy with her daughter's diet, but she had mentioned that they did not eat much fruit. I asked her if that was because of the price as well. She said,

> Oh, I can't afford them, [older child] was lucky to have a couple of apples in her last week of school, she'd mainly been having yoghurt, because we can get that from the milk man.

Alice paid the milk man directly from her bank account so could be ensured of a continual supply of milk and yoghurt[25]. The difficulty of keeping fruit in the house has been mentioned elsewhere in connection with managing on a limited budget (Jamieson, 1994; Weber, 1990); cheese was another food that seemed to disappear. In the majority of situations the women did not feel that financial constraints resulted in a "bad" diet for their child, just one which was not optimal and perhaps less enjoyable.

25 Having the milk automatically paid for was one of the benefits Alice saw in changing her daughter's milk drink from infant formula to homogenised milk at six months of age.

But there where examples were limited income constrained a woman from caring for her child's health as she would like to. For example Joy, who was on the DPB wanted to try the Pritikin Alpha-Whey milk which was promoted as a possible alternative to cow's milk for those with an allergy to dairy proteins. But it had to be purchased in a relatively large amounts and she was concerned that it would be money wasted if it did not work.

The financial situation could influence diet in other ways as well. Living on a limited income could cause a shift in the foci of concern. For example Ann was feeling stressed after a drop in household income. Not only did it affect her food purchases, but she said, "I can't be bothered with a routine", which she felt resulted in a less than optimal diet.

The level of disposable household income could also influence purchase of books, trips to the doctor, and in at least one case, the woman's feeling of comfort in a group mothers[26] (all of which were sources of other information and perhaps support).

5.5.1.6 Broader Context

Elements of the broader context which could be seen to impact on the women's decisions include the content of nutrition recommendations, the training of health professionals, particularly with regard to nutrition and nutrition education, the level of social welfare benefits (and health care subsidies) and regulations surrounding them, nutrition information in the community, and food cost and availability. While these are important influences they lie outside the scope of this thesis.

5.6 Sources of Knowledge About Food and Related Issues

Knowledge is not static. It is continually being created and revised through the woman's interaction with her environment. The foregoing discussion has touched on examples where women were given information or when they created meaning out of

26 Women from antenatal classes often kept meeting after the birth of their babies. Differences in child raising ideas were often reported to be tolerated in the groups but at times women reported feeling left out. One woman felt this way when the other women talked about things they were doing for their child's room which she would love to have done and yet could not begin to afford.

observations. Both of these processes take place throughout life, but they were particularly evident at this time.

In this section the various sources of knowledge directly relevant to feeding decisions will be discussed.

General knowledge[27] about food, nutrition, cooking, etc. had accumulated through the women's lives. In addition women had some knowledge about feeding children, or basic assumptions which would guide the application of their general knowledge to the specific situation.

Some of the women also referred to experiences with feeding children in the distant past, the most common example being a critique of how their mother controlled meal times or eating sweets. Some women were clear about changes they wanted to make from the way they were fed.

> It's his motivation that made him do it [eat the food], cause I'd not like him to do like I did when I grew up and I stopped eating all the things that my mother had fed me, made me eat ... because I was sick of being told.

Others basically thought the pattern of their upbringing was a good one.

More recently, some of the women had older children whom they remembered feeding (at least aspects of) as well as remembered advice they had been given at the time. Others had observed the children of friends and relatives. All this background was present when the child was born and they started creating knowledge about this particular child and receiving, and searching for, input from other sources.

In spite of their varied backgrounds, feeding a young child was an unusual situation for most women. Even those who had older children had forgotten the particulars of each

27 The term knowledge is used to refer to beliefs (both explicit and tacit), attitudes and values. No attempt will be made to distinguish between them.

stage. They also found that "all children are different". Therefore all the women were open to input about feeding the child.

The situation in New Zealand may be similar to the United States where Schafer and Keith (1981) found that young families were especially receptive to nutrition information. Devine and Olson's (1991) finding that women with young children were most concerned with the children's diet suggests that the information that they are looking for must be seen as relevant to children's diets[28]. This would fit with a problem solving model, where the problem, or issue, is how to feed the child since the women already had a routine for feeding themselves and the rest of the family.

While they were open to new information it was understood in light of her existing concepts (Novak & Gowin, 1984). Some of these concepts were described in section 5.4.2. Thus the same input had different meanings for different women.

5.6.1 Recent input

The women were continually receiving input relevant to feeding the child from external sources. Sources included their Plunket nurse, public health nurse, doctor, dietitian, family, friends, other mothers, pamphlets, books, magazines, radio, tv, and food labels. Classes run by the Plunket nurse, La Leche League meetings, mother's coffee mornings, and play groups were all situations where information was obtained. Most of this information referred to feeding children, or to feeding this child in particular, although some sources also provided general nutrition information (such as the media and food labels). Ideas for feeding the family were also shared between women.

The Plunket nurse, other mothers and family members were most often mentioned as sources of input. The woman's exposure to each of the sources depended on a number of factors including: the location of her family members, the composition of her extended family (for example if there were any nephews and nieces), whether there was

28 Women did consider information on food and health of a general nature as relevant to children's diets. For example Chris commented on a program on the radio about diabetes as one of the reasons she wanted to limit the amount of sugar in her child's diet.

a Plunket-Karitane Family Centre in town, the length of time she had lived in the area, the woman's tendency to join groups, her inclination to read for information, disposable household income and the foods present in the stores where she shopped.

The few people who had seen a paediatrician or a dietician had been referred to one by their GP after some insistence on their part. It was surprising that more referrals had not been made. Of particular concern were three women's experiences of having a GP suggest a dietary change as a possible solution to a problem, e.g. to improve a child's behaviour. The comment appeared to have been made in passing. In none of the cases was detailed information on diet provided, neither what to avoid nor what to include. In all cases the diet was only tried for a few weeks, but of concern was that in two of the cases the GP who mentioned the diet was not their regular family doctor, indicating that these would have been no follow-up unless the woman asked for it.

The input that the women received about food and nutrition was generally related specifically to feeding children, with a focus on the first year after birth. More general information was some times received through the media or from friends and family.

Women reported favouring the use of information from one or two sources.

> You get heaps of advice, all conflicting, that's why I decided... I would use an official person, like Plunket, and I would get my mother.

> If I'm in doubt I get out one of my books and see what it says and then make a decision based on that.

There was evidence of different ways women gain and evaluate information as indicated by the DAB typology (1995). But the typology as presented (see section 2.3.2) does not describe the variety of approaches represented by the women interviewed in this inquiry. For example, Elaine did not agree with her mother's or the Plunket nurse's approach. She valued published information and the experience of others, and tried dietary changes to influence her child's health. There were several other women with similar profiles,

women I would call "searchers"[29]. Some of these women may have met Knauer's (1985) description of being a "natural mother", who are "committed to a specific way of mothering" and do not rely on the medical profession.

There were other variants on the typology but a further refinement did not lead to much explanatory power in terms of observed dietary practices. One of the difficulties is that it assumes a uniform "professional" or "family" in terms of information offered, and similarly that "reading" is equivalent. In addition how women weighed up the information from different sources depended somewhat on the specific decision and surrounding context.

Sue considered many sources, her decisions did not consistently reflect any one set of recommendations. Her Plunket nurse suggested she give the child orange juice at three weeks, solids at three months and cow's milk at six months. She thought three weeks was too early to start orange juice, and she had read that cow's milk should not be given so soon, so she did not follow those two pieces of advice. She had not intended to start solids until he was four months old, "because I don't think their little tummies are mature enough to handle it until about four months". But "the Plunket nurse, she said I think it's time he had solids", and Sue thought this agreed pretty much with what she had read, and he was hungry. She started feeding him solids at three months. Sue had read a couple of child care books and said that she took what the Plunket nurse said "with a grain of salt". She went on to say

> If I want advice on what he could eat I talk to someone I know who's got a child a little older and say, hey, have you tried giving your kid this and they'll say oh yea, but [it made him constipated], or oh yea, he really loved it, that sort of thing. Or I ask mum. And I put everybody's advice together, including the Plunket nurse's and I sift through it and I pick out the bits that make sense.

29 These women also had the interesting characteristic of being 'risk adverse' in the introduction of new foods to their child.

Other women also chose what advice to follow based on the situation, particularly on their perception of their own child's needs. Helen talked about not just following anyone's advice, but taking the responsibility herself for her decisions. Cheryl said

> Instincts for me prevail over information.... I am guided by instincts and gut feelings and I sort of read and think...

Cheryl also mentioned information she had received from the Plunket nurse, doctor, other women and the media. She was interested in health, diet and nutrition in general and considered all the information she had in deciding about her daughter's diet.

The women also differentiated between the types of input they received. Helen said she drew on other women's experience, she also read books and heard what the doctor and Plunket nurse said. For her the main distinction seemed to be the type of information that was offered by each source; she wanted "advice based in experience."

The same person could give more than one type of advice. Barb had "a bit of an attitude" towards her Plunket nurse after being told to leave her child "to cry for as long as it takes for her to go to sleep". But she said that her ideas of what to feed the child were helpful,

> She [Plunket nurse] was quite helpful of when to introduce particular things and she also suggested cheese on her vegetables, and I found that really helpful because I just wouldn't have thought of that.

The way the women experienced input can be roughly classified into three types: 1) shared experience and "ideas", 2) "advice", and 3) "facts"[30].

5.6.1.1 Shared experience and ideas

Hearing, or seeing, what other children ate was inevitable if women went to a coffee group or play group or if they had relatives with children of a similar age. This was the source of a lot of ideas. For example Jane bought nutragrain cereal for a snack after seeing her child eat it a coffee morning. It was also an opportunity to ask for ideas.

30 "Ideas" was a term often used by the women to describe suggestions. "Advice" and "facts" are my terms.

Sarah's sister-in-law had some children,

> I'm "oh, what do I do in this situation?". You know, like behaviour wise, or food, what would you do, how can you make food more interesting for them....with vegetables I give her tuna fish from the can, she quite likes that, or grated cheese in hers, cause she's not really a great meat eater.

The women's mothers and mother-in-laws were also sources of common sense ideas, even for those women who considered that things "are different now".

Hearing about other people's experiences was also a source of information about the possible consequences of different practices. Chris felt sure that her child did not have any food allergies but she knew that they could be a problem.

> He's got a little friend who's allergic to everything just about. She goes hypo if she has egg, any red food colouring, she goes, she climbs the wall.

Hearing what others experienced could be supportive. Tracy had been to the Plunket nurse and was told that she should not be giving her daughter so many bottles.

> I sort of quite felt like, hey, you know, I'm doing it all wrong... I'm in a support group from Plunket, we meet once every six weeks and they sort of said had the same thing said to them. So it was obviously at six months this is what you get told, so it wasn't an isolated incident.... it just wasn't me being paranoid.

At other times hearing other people's experiences could result in comparisons and dissatisfaction. Liz said,

> I listened to other people say that their child ate two weet-bix and toast for breakfast, and Sam will eat two mouthfuls of weet-bix and a bite of toast.

Being outside the norm could be disconcerting, particularly when it was because the child would not cooperate. Sharing with others what your child was doing, when he or she was not meeting others expectations could lead to unwanted suggestions. One tactic women came to use was to lie, or mislead, about their experiences with their child.

5.6.1.2 Advice

"Advice" had more a quality of telling someone what to do. This was what some women wanted and expected, particularly from the Plunket nurse. But other woman experienced a negative feeling towards some advice. One consideration was whether or not the advice had been requested. Jane found,

> one thing I have found there's nothing like a baby for inviting advice and criticism, especially unasked for advice.

Alice said,

> you could be walking up the street ... she could have an ice cream in her hand and someone will say "oh, you shouldn't be feeding her that" ... they don't know what they're eating here [at home].. well I don't have to explain nothing to them, because I know what they eat here.

Part of the problem was that people might not know the whole situation, including what the child ate at home, what the woman had already tried, or why she didn't want to try their suggestion. Some advice resulted in feeling "pressured".

> Advice is something people give and nobody wants it. People should never give advice... if you want some information on it, take it or leave it, read it yourself. Advice is information with pressure.

Women reported feeling pressured by family members and Plunket nurses. These were people who they had to see again and to whom they may feel a need to justify their actions[31]. These are also relationships where there were often inequalities of experience, along with age differences.

5.6.1.3 Reasons

"Reasons", as the term is used here, was input which was offered by way of an explanation and which gave the impression of being backed by "science". For instance,

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31 Barb reported that her Plunket nurse said there was no reason for people to get defensive. She, the nurse, was just offering suggestions and it was up to them to decide what to do. I imagine that was how the advice was offered, but the meaning that some mothers got was different.

"she said my milk doesn't have enough iron in it anymore" or "she said they need the fats [in milk]".

Reasons were often presented in conjunction with suggestions or advice. This could lend emphasis to the suggestions or advice. Sometimes the women did not remember the reason but remembered that the person had given them a "good reason". Other times facts could add to the woman's perception of pressure. The most common example was the advice to start solids by six months combined with information about the risk of iron deficiency.

> She said to me to start introducing liver now, well probably preferably from six months because your iron stores, I don't know if it's their own, or the iron they get from me, is finished at six months.

This combination of advice and reason could leave a woman feeling trapped between what she was told was necessary for her child's health and what she felt able to do. In these cases there appeared to be only two options: poor health or follow the recommended practice.

It is worth noting that these reasons still left room for the women to come to their own understanding of them. For example Margaret had been advised to start liver because of iron needs, but her child did not accept vegetables mixed with liver so she gave her silverbeet instead. Concern about iron deficiency also led women to assess their child's apparent health. Sue commented that she did not want her child to get anaemic. She said,

> We don't want you getting all pasty and sickly looking. Although he's fairly energetic, so I don't think he would be anaemic, because I think I would notice if he did become less energetic and just veged out.

In other words, the women could accept the information they received and make their own meaning for their situation.

5.6.2 Knowledge about this child

Each woman was continually creating knowledge about her child, although the intensity decreased during periods of more settled routines. Knowing the child could only take place within the woman's existing frameworks. These were subject to change, either as a result of her experience or from input from other sources.

Creating knowledge about the child largely consisted of observing the child and interpreting what she saw. The process had started at birth, or even during pregnancy, with assessments of the child's activity level and personality. Most of the women had "demand fed" to some extent, which by its nature relies on a process of observing and interpreting the child's behaviour.

Women commented on the child's health, activity levels, sleep patterns, sociability, and happiness. They learned about how their child reacted to certain foods, including his or her preferences, appetite, and any adverse responses. Observing what the child ate, how she or he ate it, and the response, if there was one, provided a continual feedback from the child's existing diet to diet planning.

All women observed their child, but the details they attended to, and those which they connected to the child's diet, were not all uniform. The most commonly commented upon observation was how a particular food was accepted, such as, "he ate it..", or "she wanted more...", or "she spat it out and turned head away". Often they gave an interpretation to the observed behaviour. For example they said, "she loved it...", "he hated it...", and "he wasn't fussed...". Sometimes this indicated the child's actual preference for a food, while at other times eating behaviour could indicate other aspects of the child's health and personality, such as being tired, sick or grumpy.

During the months after solids were introduced, especially when new foods were being introduced, the women were attentive to physical signs indicating that the child could not "handle" a food. The women differed in what they attended to and in their understanding of which signs indicated which kind of a problem, if any.

Observation of the child's bowel motions was a common indication of how a food was tolerated. Other symptoms women interpreted as related to the child's diet included wind, unsettled behaviour, nappy rash, eczema, changes in sleeping patterns, "hyper" behaviour, and moodiness. Each of these symptoms had the potential to be observed, and even cause concern and yet not be connected to the child's diet. Alice explained that her fifteen month old child had boils. She took her to the doctor. She related,

> they suggested it could be an eating disorder... I said get out of here, she eats everything.

Alice framed the issue as to what her daughter's diet might be lacking. This was relatively uncommon, most women would have assumed that the diet contained food(s) which caused the problem, in other words a problem of a food sensitivity. For example, Grace's child had eczema and she was not happy with conventional medical treatment. She visited a woman who divined allergies and as a result her child was on a restricted diet which she, the mother, believed helped the skin condition. Both Alice and Grace observed their child's health, interpreted it based on their knowledge, and responded as they saw appropriate.

Caring for a child could lead to new beliefs. For example Paula's daughter was diagnosed by a pediatrician as having a milk allergy. Paula said that she had not wanted to believe that it was an allergy, she had never really "believed" other people when they said their children had allergies.

In the case of a suspected food allergy the women did not just observe and interpret, they experimented by removing the suspected food(s)[32]. This was a major commitment, especially with a food like milk. One woman explained that the most difficult part about changing the family diet was accepting that she "had to do it", as the only way to control her child's behaviour.

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32 Input from a dietician was only received by one of the women whose child had been diagnosed allergic to cow's milk protein by a paediatrician. Alternative health care consultants gave comprehensive lists of foods to avoid. The women's description of advice did not include foods to use to replace those omitted.

Once a food was removed they observed their child to see if there was any improvement. Some women commented that they were not sure that the food had been the culprit, but the symptom had disappeared with the omission of the food and they were reluctant to try it again. Although Paula came to view "accidents", when her daughter ate prohibited foods, as a chance to see if maybe this time "she might not react... I wait and hope nothing's going to happen".

Eliminating or including a food in the diet could be the result of knowledge about this child. The women also used their knowledge of the child to assess whether the current diet was adequate. They discussed this most often when there was reason to question the diet, for example when the mother thought the child ate too little, or if other people were saying that the child should be eating differently. In these circumstances the women looked to the child's growth, activity, skin, hair and general level of wellness as indicators of nutritional health.

Some of the concerns of nutritionists are not easily observable, for example iron deficiency. Others, such as growth, can be viewed in a number of ways. Even with the use of a growth chart the interpretation of a child's growth was not clear, in some cases the Plunket nurse gave the mother the impression of being concerned, but the mother was not; while at other times the mother was concerned and the nurse was not.

5.7 Summary

The children's diets go through general stages, from milk, through "trial and error", to family diet. Using a decision making model allows the exploration of the interaction of a woman's foci of concerns, her relevant knowledge and the context. Each of these is continually changing in response to each other. The child is the most influential of the contextual factors, actively shaping his or her diet and in turn being shaped by it. The woman is actively involved in learning.

CHAPTER SIX
DIETARY PRACTICES AND NUTRIENT INTAKES

In this chapter the diets of the children are described in terms of nutritional recommendations, nutrient intake, and dietary patterns. The practices observed are briefly discussed in terms of the qualitative information gathered.

6.1 The Sample

The group was chosen purposively to encompass a variety of experiences, it was not intended to be statistically representative of a larger group. The dietary descriptions illustrate the range of practices, the accompanying numbers are for the purpose of describing this sample.

Seventy-six five day records were collected from 33 children. Eleven of those records (from four different children) were not analysed because they contained incomplete information or were from a child who was sick and therefore eating very little. This left 65 diet records which were used in the calculations in this chapter.

6.2 Starting Solids

The term solids is used here to refer to foods other than beverages. None of the mothers reported giving their child cereal or biscuits mixed in a bottle[1].

The women described when they first gave their child "solids". While all the women discussed the issue some had trouble remembering exactly when their child started. One woman said while she looked for the information in her child's Plunket book,

> Isn't it funny how you forget? You agonize over it and think you'll remember that poignant day. Here it is. Well, it was between four and a half and six months, probably closer to six months I'd say.

1 One woman had tried to give her child a bottle with milk and biscuits dissolved in it, but the child refused it. I did not ask most women directly about this practice.

Eleven (28%) children had first been given solids before they were four months of age, and five (13%) started solids after 6 months of age. Being given solids did not always mean they were a regular part of the diet. Two children given them around 3 months of age were "not interested" and so did not "really" start till four months of age. In addition, two children who were first given solids between five and six months of age later refused them for several months, and began to eat them again at ten or eleven months of age.

Table 6.1 shows the relationship between method of milk feed and the age at which solids were first given. Information is presented for 40 children, one of the remaining two had not been given solids and the information was contradictory for the otehr. Twenty-six of the children (67%) were exclusively (or near exclusively) breastfed when they started solids[2]. Three children (9%) were receiving mixed bottle and breast, and ten (25%) were bottle fed at the time.

Four of the six bottle fed children who received solids before four months of age had been given infant formula because they were unsettled[3]. When the unsettled behaviour persisted solids were introduced for the same reason. This manner of responding to the child's behaviour may explain why bottle fed infants have been found to be given solids earlier than breastfed infants (Adair, 1983). Although it does not explain why some women respond to unsettled behaviour by giving a bottle formula whereas others do not.

Three of the women who started feeding solids to their three month old child did so because it was the "right" age; two learned that from their Plunket nurse. One of these women subsequently quit offering solids for a month after deciding the child "wasn't interested".

2 Two of the children who were exclusively breastfed at this time had received bottles for a period of time when they were younger.

3 This was by the women's definition. This definition could change, for example several women whose child woke frequently at night came to accept night waking and quit looking for "solutions" to it as a problem, but rather looked for ways to cope with the lack of sleep. This is similar to Wright's (1987) view that mothers of bottle fed babies are more likely to see renewed night waking as a problem than will mothers of breastfed babies who have continually been waking at night.

TABLE 6.1

AGE OF FIRST INTRODUCTION OF SOLIDS
AND THE MAIN TYPE OF MILK DRINK GIVEN AT THE TIME

Age at first solids	Type of Milk					
	Formula		Breast & Formula		Breast	
< 4 mos of age	**6**	15%	**1**	2.5%	**4**	10%
4 - 6 mos of age	**2**	5%	**1**	2.5%	**21**	52.5%
> 6 mos of age	**2**	5%	**1**	2.5%	**2**	5%

This table presents information for 40 children on the age at which solids were first given and the main source(s) of milk at the time.

Women who started feeding their children solids between four and six months did so based on the child's behaviour, the child's age, or both. To a large extent the child's behaviour, for example starting to wake at night, was understood in light of their existing knowledge that after four months was the right time to start solids. Several women mentioned that one should start giving solids before the child is six months of age.

Women whose children started on solids after six months of age also made their decision based on the child's behaviour and age. But the majority of these women considered six months, as opposed to four to six, to be the appropriate time to start solids. Several of the women offered solids from five or six months on (although the child refused them), while others in this group were waiting for the child to show an interest in solids.

6.3 Solids as a Source of Iron

Solids are recommended as a source of iron, particularly for breastfed babies (Birkbeck, 1992). The amount of iron supplied by solids to children 5-10 months old ranged from 7.3 to 0.7 mg/1000 kJ[4]. This compares with 1.9 to 0.9 mg iron/ 1000 kj for children in their second year. The child with the highest iron intake consumed relatively large amounts of fortified infant cereal mixed with infant formula.

Iron fortified cereal was not generally chosen because of its iron, but because it was recommended, was convenient, and had an appropriate taste and texture for babies, e.g. "milky". The need to introduce solids to give the child iron was a message a number of the women had heard, but there seemed to be less information about which solids provided iron. For example, feeding a child custard or yoghurt and a mix of vegetables was considered a "good" diet, particularly if the vegetables were cooked at home, but such a diet might provide less absorbable iron than did breastmilk.

4 Breastmilk provides 0.24 mg iron/1000 kJ, which if adjusted for the higher rate of absorption approximates the 1.2 mg/1000 kJ of iron supplied by infant formula.

Some women had been advised to give their child liver, but few intended to follow that advice. The women knew that liver was a source of iron, therefore some intended to substitute silver beet for it in the child's diet. Silver beet was added to many of the homemade vegetable mixes, although often in a relatively small amount. A number of the women had heard that the iron in silver beet is not "used" very well. Meat was usually introduced some time after the child was six months old. The frequency of giving meat in the first year and the amount given was very variable, although all children had meat at least once during the five day record period.

As iron fortified cereals were replaced with family foods and homogenised milk was used for cereal and to mix foods there was a drop in the iron density of the diet for children who had consumed infant formula or iron fortified foods. The children with higher iron intakes in the second year tended to have both a relatively high energy intake *and* a diet of higher iron density. The latter aspect was often related to the use of some fortified food in the diet, such as milo, fortified breakfast cereals, and marmite. For children not receiving fortified infant formula or baby cereals most of the iron in the diet was supplied by cereal and bakery products, similar to McMahon's (1990) report on the diet of preschoolers.

6.4 Avoidance of Foods in the First Year

Compared to Birkbeck's (1992) recommendations (see section 2.1.1) potentially allergenic foods were introduced "too early" into the diets of a number of children. Wheat was the most common offender with almost all children being given some wheat before they were eight months old. (The exceptions were the children who did not start eating solids until that age or later.)

Cow's milk was included in some children's diet before they were eight months old, either as a drink or on cereal. More children had it in a modified form, either made into custards or puddings at home, or in the form of custard, cheese or yoghurt. Peanut butter, oats, citrus fruit and chocolate had all been introduced into the diets of some

children before they were nine months old (contrary to the Committee on Nutrition's recommendation, [Birkbeck, 1992]).

None of the mothers reported introducing whole egg in the first year, and fish was also seldom included "early". Neither fish nor eggs were particularly common foods after the child's first birthday either.

The early inclusion of potentially allergenic foods in the children's diets was related to a number of issues. Firstly, many women did not know that these foods could cause a problem. Even women who said they used the Karitane information sheet (and had it on the front of their refrigerator) were not aware of some of these recommendations. For example Betsy was explaining to me how she was following the chart by reading to me some of the recommendations, she saw "leave cheese until after 8 months" and said, "oh, but I've given her these, the Plunket nurse suggested I might want to try them".

Betsy's experience of having these foods recommended was not uncommon. Most of the women were looking for ideas of what to feed their child, either from other people or from their own diet. The women evaluated the recommended foods in terms of their understanding of what a child could handle and what is healthy. Foods such as bread and custard would seem to be an appropriate texture and taste for babies.

Women who had read or heard that these foods should be avoided might still try giving them to their child. This is understandable from the "trial and error" perspective which is based on the women's recognition that each child is different. Other researchers have also found that women do not think that all recommendations apply to their child (DAB, 1995; McLorg & Bryant, 1989). Lastly, as discussed earlier (in section 5.4.3.2), some of the women believed that a sensitivity to a food either exists or it does not exist and that their action will not affect the situation in the long run. From that point of view the risk of introducing a food before the recommended age is quite small and is easily out weighed by the belief that the child might enjoy eating a particular food.

The common practice of introducing foods before the recommended age raises the issue of whether or not the recommendation is appropriate. If it is then perhaps it needs to be more clearly and consistently stated. The general lack of knowledge about this recommendation resulted in women who had a family history of allergy not being aware of recommended food avoidances until after the food(s) had been given to the child. This may be a case where awareness needs to raised. Although pregnancy is generally considered an ineffective time to discuss the introduction of solids, it may be effective to briefly discuss family health history at that time and the concept of avoiding foods for that reason, perhaps in conjunction with a discussion about the woman's diet and breastfeeding.

6.5 Beverages

Figure 6.1 shows the milk consumed by the children at various ages. In most cases the pattern as the child got older was to replace breastmilk with infant formula or to give cow's milk in addition to breastmilk. But there were exceptions, including the three women who gave formula for a while during the first weeks (one exclusively) and then returned to full breastfeeding.

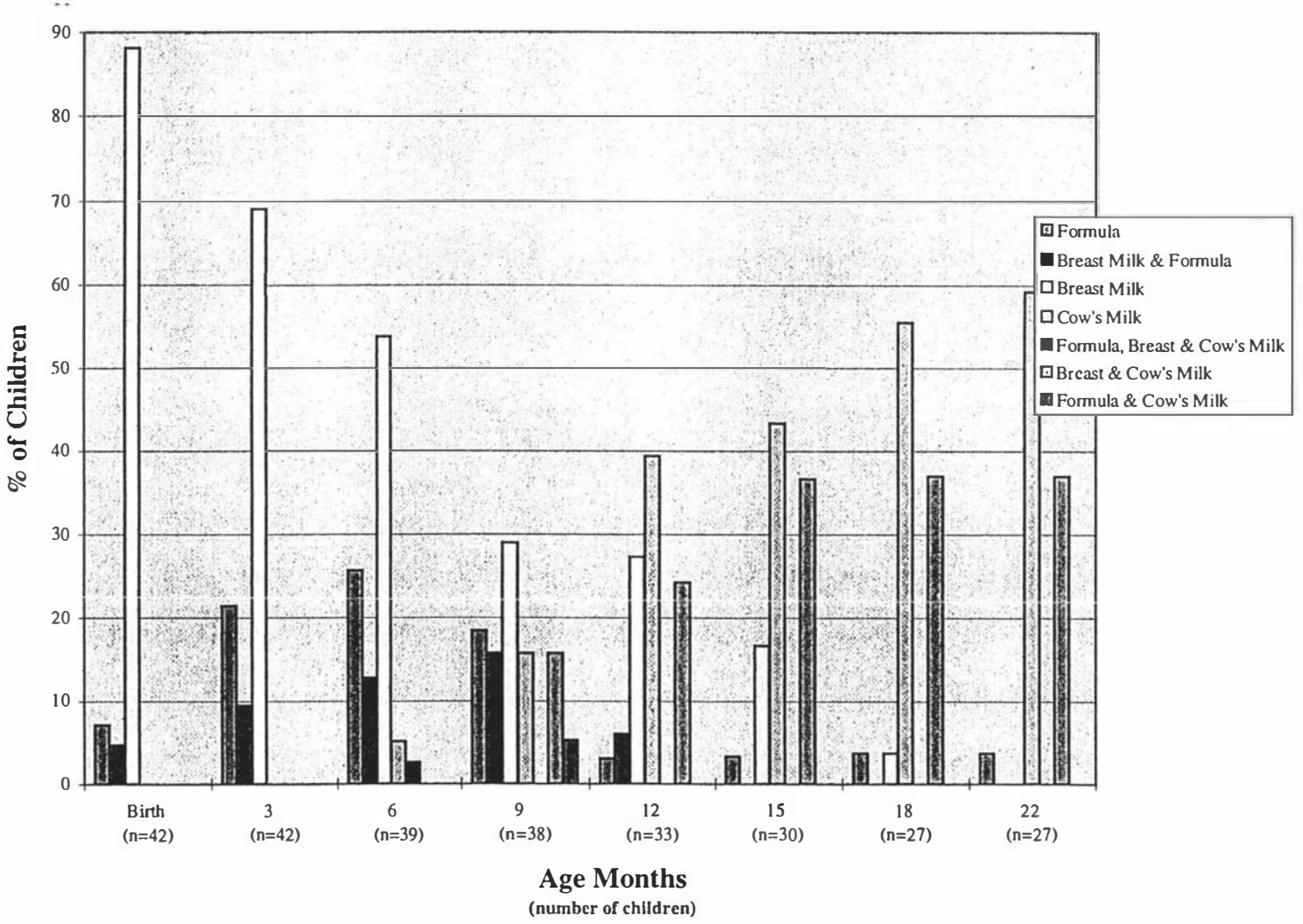
Six of the children were receiving cows milk as the only milk drink by nine months, eight were drinking exclusively cow's milk before their first birthday[5]. The remaining formula fed infants were switched to cow's milk at twelve months of age, when the formula tin became empty. (The exception was a child with a dairy allergy who continued receiving soy based formula until her second birthday.) In all cases cow's milk was substituted for formula in the child's bottle. One woman diluted the milk approximately 50:50 with water and another used low fat milk until a Plunket nurse suggested it was "not a good idea".

Five of the breastfed children received some cow's milk by nine months of age, either as a supplemental drink or mixed with cereal, and seven were consuming it by one year.

5 Figure 6.1 shows the main milk drink at discreet ages, but changes in feeding took place in the intervening months. For example two children were weaned from formula to cow's milk between 9 and 12 months.

Figure 6.1

Type of Milks Consumed



Dietary records were collected for three children under 12 months of age who were drinking cow's milk as their primary drink. Table 6.2 displays the nutrient intakes of these three children along side of the nutrient intake of formula fed children of a similar age. The average daily iron intakes of the children who consumed cow's milk were 2.2; 2.2; and 6.5 mg/day. The two children with daily intake of 2.2 mg/day were 10 months old and had one of the typical diet patterns for their age; most of the daily energy was consumed at three meals, one meal was yoghurt or milk and one meal was generally vegetables, they consumed relatively little fruit.

The third child consumed more energy, but her diet also contained more iron per kJ (1.3 mg iron/1000 kj as compared to .5 and .63 mg/1000 kj). Her diet pattern consisted of more eating events and more different foods consumed daily than the diet of the other two. Approximately 30% of her iron came from iron fortified foods (marmite, baby cereal, Special K). While she was older than the other two (11.5 months vs 10 months) the different diet pattern was not due to her age since she had a similar pattern at 8 months of age, and one of the other two maintained his pattern in the following months. These three children represent two different dietary patterns with associated nutrient intakes.

In addition to a lower iron intake, the diets of the children consuming cow's milk contain significantly less vitamin E and vitamin A, along with more calcium, phosphorus, potassium and sodium. These differences in nutrient intake associated with the milk drink are similar to those found in United States (Ernst et al., 1990).

Penrod et al. (1990) reported that the difference in nutrient intake between formula and cow's milk fed infants was not solely attributed to their milk drink. The groups in this study are too small for a meaningful comparison. The two children with the lowest iron intakes were not atypical, although it is possible that in a bigger study this pattern of feeding children would be more common amoungst those who give cow's milk[6].

6 The mother of the older child had been unable to breastfeed, in some ways her pattern of feeding her child was more similar to that of women breastfeeding in the second year, i.e. frequent meal events.

TABLE 6.2

NUTRIENT INTAKE OF 3 CHILDREN DRINKING COWS MILK AS THEIR MAIN DRINK AND OF A GROUP OF CHILDREN THE SAME AGE CONSUMING INFANT FORMULA

Nutrient	Paul 10mo of age n=1	John 10mo of age n=1	Jane 11mo of age n=1	Infant formula 5-12 mo of age n=6	Australian RNI for 7-12mo of age
Energy (kJ)	**3485**	**4300**	**4795**	**3508** (683) *2836 -4698*	
Protein (mg)	**34**	**41**	**42**	**24** (10) *15 -44*	**1.6/kg**
Fat (mg)	**32**	**39**	**43**	**32** (8) *23 -46*	
Fibre (g)	**4.0**	**8.1**	**12.4**	**6.8** (3.7) *1.2 -12.7*	
Vitamin A (RE)	**506**	**636**	**392**	**1112** (716) *649 -2542*	**300**
Vitamin C (mg)	**48**	**30**	**149**	**105** (51) *56 -193*	**30**
Thiamin (mg)	**0.93**	**0.95**	**1.58**	**0.74** (0.31) *0.41 -1.19*	**0.35**
Riboflavin (mg)	**2.07**	**2.04**	**2.25**	**0.95** (0.15) *0.79 -1.17*	**0.6**
Niacin (mg)	**3.1**	**2.3**	**10.2**	**6.8** (2.9) *2.7 -10.5*	**7**
Sodium (mg)	**679**	**599**	**1402**	**500** (352) *181 -1177*	**140-280**
Potassium (mg)	**1607**	**2506**	**2207**	**1305** (329) *690 -1669*	**390-580**
Calcium (mg)	**881**	**1183**	**908**	**516** (121) *412 -755*	**550**
Phosphorous (mg)	**783**	**991**	**934**	**470** (183) *250 -797*	**300**
Manganese (ug)	**869**	**510**	**1722**	**921** (426) *149 -1304*	
Iron (mg)	**2.2**	**2.2**	**6.4**	**9.5** (3.1) *6.4 -13.5*	**9**
Zinc (mg)	**3.4**	**4.1**	**5.3**	**4.4** (0.8) *3.1 -5.3*	**3-6**
Selenium (ug)	**7.9**	**7.5**	**21.6**	**12.8** (14.9) *0.4 -41.8*	**15**
Vitamin B6 (mg)	**0.51**	**0.98**	**1.16**	**0.77** (0.25) *0.39 -1.08*	**0.45**
Biotin (ug)	**22.4**	**31.1**	**38.0**	**16.1** (5.1) *10.2 -25.1*	
Folate (ug)	**68.0**	**91.6**	**223.3**	**89.2** (25.7) *48.6 -122.3*	**75**
Vitamin E (mg)	**1.78**	**1.21**	**5.91**	**8.54** (2.28) *5.17 -11.93*	**4**

Mean (Std Dev)
Minimum - Maximum

This table shows the nutrient average intake for 3 children who consumed cows milk as their main drink, compared with a group of children consuming infant formula.

The women who used cow's milk as the main drink for their child under one year of age included those who did not know that the practice was no longer recommended and those who knew the practice was not recommended but decided to try it for a variety of reasons. Not surprisingly the women who knew the current recommendation interpretted it in light of the child's ability to handle cow's milk, not in relation to the nutritional properties of breastmilk or infant formula[7]. Thus it made sense to see if their child had a reaction to the milk.

Another factor which contributed to women not following the cow's milk recommendation was that they knew others who had successfully offered cow's milk to their child at a similar age. This was common partly because the recommendation regarding the timing of introducing cows milk had only recently changed. The fact that the recomendation had changed and the reason for it was not routinely addressed by health professionals.

Early introduction of cow's milk was one of the practices associated with not challenging health professionals. Beasley (1993) described the non-challenging behavior in breastfeeding women who appeared to agree with the nurse but once the nurse left disregarded what they had been told to do. Thus rather than discuss a difficult situation the woman might conceal the difficulty. For example, one child refused to drink formula on weaning from the breast, but did accept cow's milk. The mother said that giving him cow's milk was "naughty", but she thought he was doing fine. In the case of this child, had the mother been able to discuss the situation it could have lead to suggestions of how to meet the child's nutrient needs in other ways.

Infant formula was not consumed past the first birthday, except by a dairy allergic child who drank a soy based protein through the second year[8]. Drinking large quantities of cow's milk in the second year has been suggested as a cause of iron deficiency

7 In fact a number of women had been told that their breastmilk was not "much good" at some time after six months. This information came from health professionals as well as relatives. In some cases the information was linked to a discussion about the child's need for iron.

8 Follow-on formula were relatively new at the time of the study. It will be interesting to see if their use changes the pattern of introducing cow's milk.

(Davidson, van Rij, & Grey, 1977). This may have been the case for a few children who consumed more than 500 ml of milk a day and had low iron intakes. But some children consumed less than 500 ml of milk a day, but consumed also relatively small amounts of solid foods. The iron intakes of these children also appeared to be low. The adequacy of these children's diets needs to be investigated in terms of haematological indicators in order to evaluate the appropriateness of present recommendations. At present the decision to introduce cow's milk is based on the child's age or his or her ability to handle it. A concept of dietary readiness has not been promoted.

At one year of age seven breastfed infants were receiving no supplemental milk. Milk (cow's or soy) was added to the diet of all breastfed children during their second year. But milk did not become a regular drink for some children during this time, for example, one 24 months old child received 50 ml one day and none for the following three days. These mothers believed that the breastmilk provided a sufficient quantity of milk for the child's needs. They generally gave water as a complementary drink.

Only some of the children in the study drank water. Several women commented that their child would not drink water, hence a small amount of juice was always added to the drink. Other women did not drink water themselves and did not offer it to their child.

The majority of the children were given diluted juice or cordial to drink. The amount of dilution ranged from approximately 1:20 to 50:50. As the children got older the drink was generally diluted to a lesser degree. Colour-free cordial was used by some women, mainly so it would not stain the carpet if spilt.

Children were either offered fluids at intervals during the day or they had a cup of water, juice or milk available continuously through out the day which their mother "topped up". Some children drank large amounts of juice, up to one litre a day, but because of the level of dilution the juice supplied relatively little vitamin C and energy in their diets. The exception being a child who was given juice (diluted 50:50)

frequently during the day because she was constipated. In this case the juice supplied 9% of the child's dietary energy.

Three of the children regularly drank tea; one from her own cup and two from their mother's cup. Two other children regularly had herbal teas from their mother's cup.

6.6 Nutrient Intake

Total nutrient intake could only be estimated from dietary records of children who did not breastfeed. Estimated intakes are presented in Table 6.3. The average intake for the group is above the RNI for all nutrients except iron, vitamin E and selenium[9].

Not surprisingly, the nutrient intakes of some individuals fell below the RNI even when the group's intake was in excess of the RNI. The distribution of intakes for individual nutrients is shown in Table 6.4. The average daily intake over five days was less than the RNI for iron, selenium, vitamin E, calcium and zinc for 30% of the diet records. Nutrient intake below the RNI does not indicate an inadequate intake, but it does indicate a risk of inadequacy (NRC, 1986). In particular, the relatively low intake of calcium for two children indicates an unusual diet pattern which is less than optimal.

The diversity of diets and associated nutrient intakes illustrates how there is more than one way to meet one's nutrient requirements. Changes in the diet for reasons other than nutrition had nutritional consequences. For example at 10 months John drank cow's milk as his primary drink and 60-70% of his total dietary energy was from dairy products. His intake for was 40% of RNI for vitamin E, 20% for iron and his vitamin C intake was also marginally low (90% RNI), while his calcium intake was well over the RNI. At 15 months his intake of vitamin E was 150-200% of the RNI, largely due to his eating canned peaches every day. His iron intake had also increased to the level of the RNI, a change which could also be attributed to the peaches. By 24 months of age his calcium intake was 60% of RNI because milk had been eliminated from the diet

9 Both vitamin E and selenium intakes have been slightly underestimated because information was not available on the levels present in some foods. The foods with missing information were mostly commercial baby foods, and not consumed in great quantity.

TABLE 6.3

NUTRIENT INTAKE OF CHILDREN NOT RECEIVING BREAST MILK

Nutrient	5-26 mo of age n=32	5-12 mo of age n=9	13-26 mos of age n=23	Australian RNI (Truswell, 1990)	
				7-12mo of age	1-3yrs of age
KJ	**4503** (1097) *2839 -8708*	**3744** (728) *2837 -4830*	**4801** (1085) *3576 -8708*		
Protein (mg)	**40** (13) *15 -73*	**29** (11) *15 -44*	**45** (11) *28 -73*	**1.6/kg body wt**	**14-18**
Fat (mg)	**40** (9) *23 -59*	**34** (8) *23 -46*	**43** (8) *28 -59*		
Fibre (g)	**8.9** (3) *1.2 -13.4*	**7.2** (3.7) *1.2 -12.7*	**9.6** (2.5) *4.5 -13.4*		
Vitamin A (RE)	**718** (499) *222 -2542*	**913** (643) *399 -2542*	**644** (423) *222 -1795*	**300**	**300**
Vitamin C (mg)	**74** (41) *19 -193*	**95** (53) *30 -193*	**66** (32) *19 -124*	**30**	**30**
Thiamin (mg)	**0.92** (0.26) *0.41 -1.59*	**0.88** (0.37) *0.41 -1.59*	**0.94** (0.2) *0.65 -1.43*	**0.35**	**0.5**
Riboflavin (mg)	**1.15** (0.51) *0.7 -2.8*	**1.34** (0.6) *0.79 -2.26*	**1.63** (0.46) *0.7 -2.8*	**0.6**	**0.8**
Niacin (mg)	**7.1** (3.1) *2.3 -15.4*	**6.29** (3.29) *2.27 -10.53*	**7.4** (3.1) *4.4 -15.4*	**7**	**9-10**
Sodium (mg)	**1189** (579) *181 -2521*	**632** (409) *181 -1414*	**1407** (485) *741 -2521*	**140-280**	**320-1150**
Potassium (mg)	**1920** (527) *690 -3582*	**1574** (534) *690 -2514*	**2055** (469) *1255 -3582*	**390-580**	**980-2530**
Calcium (mg)	**798** (289) *362 -1608*	**676** (272) *412 -1192*	**846** (287) *362 -1608*	**550**	**700**
Phosphorous (mg)	**834** (270) *250 -1423*	**616** (268) *250 -997*	**920** (223) *494 -1423*	**300**	**500**
Manganese (ug)	**1522** (658) *149 -3273*	**959** (463) *149 -1726*	**1742** (594) *784 -3273*		
Iron (mg)	**6** (2.9) *1.7 -13.5*	**7.44** (4.11) *1.7 -13.5*	**5.5** (2.2) *3.2 -12.5*	**9**	**6-8**
Zinc (mg)	**5.4** (1.3) *3.1 -8.9*	**4.34** (0.83) *3.11 -5.39*	**5.8** (1.3) *3.81 -8.93*	**3-6**	**4.5**
Selenium (ug)	**18.2** (9) *0.4 -41.8*	**12.7** (12.4) *0.4 -41.8*	**20.3** (6.4) *12.5 -32.9*	**15**	**25**
Vitamin B6 (mg)	**0.88** (0.25) *0.39 -1.42*	**0.81** (0.27) *0.39 -1.16*	**0.89** (0.25) *0.43 -1.42*	**0.45**	**0.6-.9**
Biotin (ug)	**25.3** (7.5) *10.2 -38.2*	**20.9** (9.2) *10.2 -38.1*	**27** (6.1) *18.2 -38.2*		
Folate (ug)	**133** (45) *49 -226*	**102** (51) *49 -224*	**145** (37) *96 -226*	**75**	**100**
Vitamin E (mg)	**4.78** (2.82) *1.22 -11.93*	**6.68** (3.55) *1.22 -11.93*	**4.03** (2.14) *1.81 -9.96*	**4**	**5**

Mean (Standard Deviation)
Minimum - Maximum

This table shows the mean, standard deviation and minimum and maximum values of nutrient intake for children not receiving any breastmilk.

TABLE 6.4

DISTRIBUTION OF NUTRIENT INTEKS COMPARED WITH THE AUSTRALIAN RNI

n=32

Nutrient	% of RNI					
	<100%	<90%	<80%	<70%	<60%	<50%
Vitamin A	1 3%	1 3%	1 3%	0 0%	0 0%	0 0%
Vitamin C	6 19%	3 9%	3 9%	2 6%	0 0%	0 0%
Riboflavin	2 6%	1 3%	0 0%	0 0%	0 0%	0 0%
Calcium	10 31%	7 22%	4 13%	2 6%	2 6%	1 3%
Iron *	25 78%	23 72%	20 63%	12 38%	9 28%	6 19%
Zinc*	11 34%	4 13%	3 9%	1 3%	0 0%	0 0%
Selenium	14 44%	11 34%	11 34%	9 28%	5 0%	0 0%
Vitamin B6	4 13%	2 6%	2 6%	0 0%	0 0%	0 0%
Folate	2 6%	0 0%	0 0%	0 0%	0 0%	0 0%
Vitamin E	19 59%	17 53%	16 50%	13 41%	8 25%	6 19%

* The midpoint of RNI ranges were used, i.e. 7mg iron/day for infants 1-2 years of age, and 4.5 mg zinc/day for infants aged 6-12 months of age.

This table shows the number and percent of children with average dietary intake below a given level of the RNI. The results are for 32 diet records which measure total intake, in other words, for children who received no breastmilk.

in an attempt to control his eczema, but the intake of all other nutrients remained above the RNI.

Similarly a child who had "loved" fruit refused to eat much fruit and generally, in his mother's view, became "picky". His intake of vitamin C and vitamin A remained just under the RNI from 18 months of age to close to his second birthday. Although he drank cordial it was diluted with about 10 parts water, thus not supplying significant amounts of vitamin C.

Nutrient supplements were not regularly consumed by children in this study, although several were given vitamin C for colds. General observation suggests that supplements are given when the children are older, although it is possible that second children may be more often given supplements earlier.

6.7 Nutrient Intake of Breastfed Children

It is more difficult to make statements about dietary risk for those who are breastfed, because they will be getting nutrients from breastmilk, whose intake was not measured in this study. Table 6.5 shows the nutrient intake of breastfed children from all sources other than breastmilk, the majority from solid foods (three children were receiving bottles as well as breastmilk). The breastfed children received less energy from solids than did those who were bottle feeding, particularly in the group of children one to two years of age. This is contrary to a report of breastfed children in the U.S. consuming more energy from solid foods than did bottle fed children of the same age (Heinig, Nommsen, Peerson, Lonnerdal & Dewey, 1993).

It is probable that there is more than one pattern in which solids are added to the diet of a breastfed child. Several studies which have quantified breastmilk intake, have found children's energy intake to remain constant with the addition of solids (Cohen, Brown, Canahuiti, Rivera & Dewey, 1994; Stuff & Nicholas, 1989). Quandt (1984) identified two patterns, one she named the "addition pattern" and the other the "replacement pattern". She associated it with the age the child started solids. The

TABLE 6.5

NUTRIENT INTAKE OF BREASTFED CHILDREN FROM SOURCES OTHER THAN BREASTMILK

Nutrient	5-12mo of age n=10	13-26mo of age n=23
KJ	**2014** (1090) *752 -4559*	**2557** (1596) *509 -5745*
Protein (mg)	**15** (12) *4 -44*	**22** (13) *5 -55*
Fat (mg)	**15** (13) *3 -48*	**20** (14) *3 -58*
Fibre (g)	**5.6** (2.4) *1.9 -9.6*	**10.6** (7.6) *1.3 -34.8*
Vitamin A (RE)	**437** (329) *113 -1154*	**399** (412) *73 -1948*
Vitamin C (mg)	**45** (45) *78 -150*	**50** (43) *5 -146*
Thiamin (mg)	**0.42** (0.16) *0.20 -0.71*	**0.52** (0.35) *0.15 -1.22*
Riboflavin (mg)	**0.49** (0.28) *0.17 -1.14*	**0.65** (0.35) *0.27 -1.31*
Niacin (mg)	**4.1** (1.8) *1.6 -7.1*	**11.9** (23.6) *0.8 -105.3*
Sodium (mg)	**506** (510) *54 -1425*	**830** (471) *45 -1720*
Calcium (mg)	**289** (268) *86 -765*	**339** (253) *20 -1168*
Phosphorous (mg)	**286** (195) *117 -765*	**442** (255) *41 -1070*
Manganese (ug)	**695** (341) *212 -1196*	**1567** (905) *0.1 -3353*
Iron (mg)	**4.9** (2.6) *1.6 -9.3*	**3.8** (2.3) *1 -8.3*
Zinc (mg)	**2.3** (2.1) *0.7 -7.5*	**3.1** (1.9) *0.7 -1*
Selenium (ug)	**6.9** (4.8) *0.9 -16.6*	**11.6** (8.3) *1.8 -29.1*
Vitamin B6 (mg)	**2.5** (6.5) *0.1 -20.8*	**0.8** (0.5) *0.1 -2.1*
Biotin (ug)	**9.2** (5.3) *2.4 -17.7*	**15.6** (8.2) *2.5 -29.3*
Folate (ug)	**69** (39) *27 -143*	**98** (66) *11 -222*
Vitamin E (mg)	**3.2** (3.5) *0.7 -12.4*	**2.8** (1.6) *0.2 -5.7*

Mean (Standard Deviation)
Minimum - Maximum

This table shows the mean nutrient intake and standard deviation, along with the minimum and maximum nutrient of breastfed children from sources other than breastmilk.

addition pattern being found in children who were over six months old when starting solids.

The level of displacement of breastmilk by solids may depend on the pattern of breastfeeding, as well as on the child's individual feeding preferences. Some women said that they noticed a decline in the amount of breastmilk their child took when solids were started. Two women cut back on solids for that reason. But others did not notice a change in breastfeeding patterns, and although the frequency of breastfeeding did decline, it did so slowly and not noticeably in relation to the consumption of solids.

Presumably the change in breastfeeding pattern is a result of the interaction between the woman and the child, either of which may exert influence to decrease the amount of breastmilk intake. Some women were consciously offering food instead of a breastfeed, and some children seemed to "lose interest" in breastfeeding with the introduction of solid foods. This raises an interesting issue, whether the increase in the consumption of solids comes before or after the decrease in breastmilk consumption. One woman was being urged to wean her child from the breast so that the child would eat more and grow bigger, but the woman thought the child might "starve" if she was not being breastfed.

When nutrient intake is examined in terms of energy intake the diets (excluding beverages) of the breastfed children are similar to non-breastfed children for most nutrients (see Table 6.6). The small sample size precludes any discussion of the differences that do exist.

TABLE 6.6

NUTRIENT DENSITY OF SOLID FOODS IN THE DIET BY AGE and MAIN MILK DRINK

Nutrient	5-12mo of age formula n=6	5-12mo of age breast n=10	13-26mo of age cows milk n=23	13-26mo of age breast n=22
Protein (mg/1000kJ)	**7.8** (2.5) *5.3 -1.1*	**6.9** (2.4) *3.5 -11.6*	**8.5** (1.9) *5 -14*	**8.9** (2) *4.7 -1.1*
Fat (mg/1000kJ)	**4.9** (2.4) *0.9 -8.1*	**5.8** (2.7) *1.1 -9.4*	**7.6** (0.4) *4.1 -11.6*	**8.6** (1.8) *5 -12.1*
Fibre (g/1000kJ)	**4.6** (2.3) *1.6 -7.5*	**3.6** (1.5) *1.6 -7.1*	**3.3** (2.4) *1.8 -5.7*	**2.6** (0.66) *1.7 -4.2*
Vitamin A (RE/1000kJ)	**437** (380) *105 -1169*	**325** (418) *55 -1434*	**213** (62) *52 -1475*	**129** (79) *36 -367*
Vitamin C (mg/1000kJ)	**34** (9.1) *21 -45*	**26** (24) *3.1 -71*	**22** (3.4) *1.2 -71*	**11** (6.6) *1.6 -23*
Thiamin (mg/1000kJ)	**0.26** (0.13) *0.12 -0.46*	**0.26** (0.14) *0.14 -0.59*	**0.19** (0.11) *0.12 -0.29*	**0.17** (0.037) *0.1 -0.23*
Riboflavin (mg/1000kJ)	**0.27** (0.07) *0.18 -0.39*	**0.25** (0.01) *0.13 -0.45*	**0.26** (0.001) *0.16 -0.36*	**0.21** (0.067) *0.13 -0.39*
Niacin (mg/1000kJ)	**2.2** (0.9) *1 -3.5*	**2.4** (0.82) *1.2 -4.1*	**1.9** (0.1) *1.1 -3.2*	**1.8** (0.51) *0.99 -3.2*
Sodium (mg/1000kJ)	**192** (7.5) *131 -329*	**218** (166) *24 -430*	**310** (23) *48 -606*	**379** (141) *154 -713*
Calcium (mg/1000kJ)	**131** (33) *86 -168*	**135** (69) *66 -275*	**131** (8.5) *51 -223*	**103** (37) *52 -191*
Phosphorous (mg/1000kJ)	**155** (42) *94 -20*	**141** (36) *93 -199*	**167** (6) *113 -225*	**154** (32) *85 -227*
Manganese (ug/1000kJ)	**521** (100) *377 -654*	**423** (145) *196 -6443*	**612** (67) *210 -1692*	**489** (159) *276 -777*
Iron (mg/1000kJ)	**2.6** (1.5) *0.98 -4.7*	**3** (2.2) *1 -7.4*	**1.7** (0.17) *0.75 -4.8*	**1.3** (0.21) *0.92 -1.7*
Zinc (mg/1000kJ)	**1** (0.41) *0.69 -1.6*	**0.94** (0.36) *0.64 -2.7*	**1.2** (0.05) *0.83 -1.9*	**1.2** (0.26) *0.65 -1.7*
Selenium (ug/1000kJ)	**3.9** (3.4) *1.3 -10.6*	**3.4** (1.5) *0.96 -6*	**4.2** (0.42) *0.49 -11*	**4.5** (1.8) *1.8 -9*
Vitamin B6 (mg/1000kJ)	**0.34** (0.18) *0.17 -0.64*	**0.7** (1.5) *0.11 -5.1*	**0.47** (0.19) *0.08 -5*	**0.19** (0.07) *0.08 -0.28*
Biotin (ug/1000kJ)	**5.2** (1.4) *2.8 -6.9*	**4.4** (2) *2 -8.1*	**4.2** (1.4) *2 -7*	**4.2** (1.2) *2.6 -6.3*
Folate (ug/1000kJ)	**39** (15) *26 -69*	**38** (11) *18 -51*	**39** (16) *16 -69*	**33** (7.9) *18 -52*
Vitamin E (mg/1000kJ)	**1** (0.9) *-2.7*	**0.81** (0.67) *0.15 -2.4*	**1.3** (0.14) *0.38 -2.7*	**0.92** (0.31) *0.18 -0.45*

Mean (Standard Deviation)
Minimum - Maximum

This table shows the intake of nutrient per 1000kJ for children as identified by age and main milk drink.

6.8 Meals and Eating Events

The average number of times a child was fed each day ranged from 4 to 14.5. The child fed four times in a day received drinks and solid foods at those times. The child who had an average of 14.5 eating events/day was given an average of 8.5 drinks of either breastmilk or water in a day and offered other foods six times[10]. Some children had continual access to some food and/or drink through out the day in addition to meals which were offered. Those children with less than three solid food events/day were under seven months of age. (Although older children would occasionally have a day with two or fewer solid food events, particularly when sick.)

The overall number of eating events tended to be larger for breastfed as opposed to non-breastfed children, with an average of 11.9 compared to 6.6 eating events per day. This difference was due to an increased number of both liquid (including breastmilk) and solid eating events. Breastfed children ate solid foods an average of 5.7 times/day compared with 4 times/day for non-breastfed children (or 6.4 vs 5.6 if we compare only children over 12 months of age). The relationship between frequent meals and frequent breastfeeding may be a result of a woman's parenting style. It is also probable that the child is influential in the evolution of this pattern, with some women commenting that their child never got into a "routine" in the early months of breastfeeding.

In all cases the frequency of eating on a given day was the result of an interaction between the child and the mother. For example one woman had planned to feed her child only at main meal times, but as he got older she found that he was hungry and needed snacks. Another woman offered her child snacks but they were not eaten. Using food to control the child's behaviour was one cause of frequent meals. For example one woman wrote on the diet record sheet "gave to shut her up".

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10 The women were asked to record each time they fed the child. This could mean that a child was fed a piece of cheese at 5:00, just before dinner was served at 5:15. There were differences in how women would record what happened. Meal events were counted as recorded, which is the woman's view of how often she did, or should, feed the child.

Some children had continual access to food or drink and the mother would note the amount of food that had been consumed over a day, for example "drank one litre of juice today". Over a period of a day this was counted as two "events", probably an underestimate. Breastfeeding could present a similar dilemma, with a child nursing on and off for an hour or more in the evening. This was counted as the woman recorded it.

6.9 Variety

The average number of foods[11] a child ate in a day ranged from 10.6 to 31.4. The former was a five month old child, and the count includes bottles of milk. A larger number of foods was eaten, not surprisingly, by children with more eating events. A day's food record from children at opposite ends of the spectrum in terms of numbers of foods eaten in a day is included in Appendix 4.

The number of different foods eaten in a day ranged from 6.6 to 21.4[12]. There was not a clear relationship between the number of foods, either total number or the number of different foods, and the children's nutrient intake. This is partly because some children were given small amounts of a large number of foods. In addition, with the small sample size idiosyncratic choices of a single food (such as John's tinned peaches mentioned above) exert a large influence.

6.10 Summary

The children's diets were heterogenous in terms of eating patterns and nutrient intakes. Not all women followed the weaning recommendations set out by the New Zealand Paediatric Society (Birkbeck, 1992). The response to the recommendation on the use of cow's milk has direct implications for the nutrient content of the diet.

As was expected the children's diets do not indicate a high risk of nutrient deficiencies. The low intake of iron has been discussed elsewhere (c.f. Wham, 1994). But the low intake of vitamin E combined with the low selenium intake may be a concern.

These children were eating frequently and consuming a large variety of foods in terms of the number of different foods. There were two general patterns, frequent meals or grazing, and a more structured approach. The frequent meals pattern was more common amoung children who were breastfed into their second year.

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11 For this calculation the number of foods is equivalent to the number of separate foods given. Combination foods are therefore counted as "one".

12 For this calculation each food which was prepared differently was a different food, for example bread and a scone are different, but two slices of bread are not.

CHAPTER SEVEN
CASE STUDIES

Two perspectives on the children's diets have been presented in the preceding two chapters. This chapter contains three case studies in which women's decisions can be viewed holistically. The input of health professionals is examined and other potential avenues of influence are discussed.

7.1 Case studies

7.1.1 Karen- starting solids

The decision to start solids often received more thought than subsequent feeding decisions. Karen's situation illustrates how factors interact to result in a decision. Her 19 week old son Ben was fully breastfed. Originally she had thought to start him on baby cereal at four months because

> Plunket said I could, and you see on the charts, and I sort of thought, oh, he's intelligent so [laugh], and also when he was going through the three month growth spurt.

But at four months he was not "watching you eat" or "continuously sucking", signs Karen considered to indicate a readiness for solids. When Ben got sick at around 17 weeks she decided to put off starting solids for awhile.

But Karen was feeling pressure from several sources to start Ben on solids. A friend had weaned her baby from the breast at four weeks. Karen explained,

> As soon as she stopped breastfeeding she felt better .. [her child] is on solids, and she's sort of gone along, "Oh, you should stop breastfeeding, you'll feel better". But I think I'm tired from getting up at night, I don't think it will make any difference if I stop breastfeeding... But I realize we're different, like she had the room ready before the baby was born and I hadn't even cleared out the study.

Karen also felt pressured by her mother-in-law to start solids. Ben was the first grandchild and she had brought out Karen's husband's Plunket book to show Karen.

Karen had shown her mother-in-law the information she received from the Karitane centre, but she was not sure it made much difference.

> She started her children on solids at three to six weeks [laugh]... maybe it's the breastfeeding, maybe she feels uncomfortable... she didn't breastfeed.

Other people also made comments which made Karen wonder about her decision.

> Am I doing the wrong thing? Yet he's growing (is that your main sort of way) of gauging him, yea. When he went through the six week and three month growth spurt he was sucking a lot.

Seeing that Ben was gaining weight was reassuring. She said, "He's a big baby, he's above the line and growing steadily above it". At 19 weeks Karen took him to the Karitane centre to check his weight. This was not a scheduled visit, her previous Plunket check had been when he was four months old and she would not have a scheduled appointment with the Plunket nurse again until he was six months old. While there she talked with the nurse.

> His bowel motions are green and smelly without even being on solids, so they say it might be a good idea to leave it another month. He doesn't demand me, he isn't hungry, he's putting on weight rapidly and he usually spits me out after five minutes, so why worry about it.... Karitane said, breastmilk is [plenty], he's not starving, it doesn't make any difference to the baby if it's food or breastmilk.

After talking with the nurse Karen felt more comfortable about not starting solids. Karen had also started going to two mother's groups. She found the Mother's Support Group good because "you're not allowed to criticize, that's one of the rules". At the PIN (Plunket in Neighborhood) group she met other women with babies of a similar age. Hearing other women's experiences led her to see that "they're all different". She also met a woman with a child the same age as Ben who also was not on solids yet.

Karen described how they supported each other,

> She called up today, "Do you think we should start today?" We decided to wait...

In spite of the support she was receiving Karen still had some doubts.

> I was just speaking to a girl today, and she said, "My baby's on solids and now she sleeps through the night."

One other factor influenced Karen's decision to wait until Ben was older. She had taken Ben to the doctor for eczema when he was three months old, others in the family have eczema. The doctor said it was best to exclusively breastfeed as long as she could.

Karen's case illustrates a number of factors which were commonly discussed by women in relation to starting solids. The child provided evidence of readiness, or need, for solids. The fact that Ben was not nursing a great deal and was gaining weight were indicators that he did not "need" solids. In situations where the child did not meet these criteria it was common, but not universal, to introduce solids.

The importance of the conceptual framework in which observations were interpreted can be seen. Signs of the child's digestion, including the consistency of bowel motions, can be interpreted in more than one way. Karen and the nurse decided that Ben's smelly bowel motions indicated that he was not ready to handle solids. Another mother came to a similar conclusion about her child; "to start her [constipated child] on any kind of solids was just not the answer". But other children were given solids because of what appeared to be digestive troubles. Interestingly, both Karen and the women who started solids because of digestive troubles said that they did so after talking with a nurse. It may be that the nurse was supporting what ever the mother decided, or it may be that nurses were giving different information for similar situations.

When considering the decision to start solids Karen's focus of concern was ultimately Ben's physical health, but there were indications that concern about the child's sleeping, the mother's well-being, and the child "keeping up" with age mates entered into the balance. Maintaining relationships, with family members, other mothers, and health professionals was also important.

Karen did not consider her mother-in-law a suitable advisor on the age to start solids, but Karen found that doing what she thought was correct in terms of introducing solids did not meet her need to maintain a good relationship with her mother-in-law. A similar situation was described by several other women. Others have suggested that grandparents could be included in counseling sessions (McLorg & Bryant, 1989). This may not always be practical or desirable. But perhaps pamphlets, or even talks could be given explaining changes in recommendations over the past years, along with a brief description of why today's practices are thought to be better for the children's health.

Interestingly the desire to decrease eczema problems did not appear to be a prime motivator for Karen, in spite of the doctor's advice. Unfortunately the topic was not explored in more detail, for instance I do not know if the doctor explained to her why waiting might be appropriate. She may not have considered the delay as having an influence on a long term eczema problem, a distinction discussed in section 5.4.2.3. For some women a concern about allergies was a strong part of their motivation to delay starting solids until the child was at least six months old.

Support for her decision, both from the nurse at the Karitane centre and from another mother, was also an important theme. For instance, had the nurse been concerned about Ben's weight gain Karen may have decided to try solids. Or she may have, as some women did, found another source of support.

Lastly, it is also interesting to see how Karen was coming to see that "all children are different". She had initially intended to start solids at the recommended time. As a result of a number of circumstances she had subsequently begun to rely on Ben as an indicator. The outcome, in terms of what she observed Ben's state to be, became more important than following instructions to the letter. This is similar to the concept of compliance Brooks (1986) found among people with hypertension, and supports Usinger-Lesquereux's (1994) call for emphasis on outcome as opposed to content.

7.1.2 Lynn- Starting Cow's Milk

The use of cow's milk as the main milk drink in the first year was associated with a relatively low intake of several nutrients. The decision of when to include cow's milk in a child's diet can be understood with reference to the concept of being able to "handle" a food along with the process of trial and error. Some New Zealanders consider cow's milk to be mucous forming as well as being a potential allergen (Birkbeck, 1996). Even if women do not believe this to be the case they may have been exposed to the idea. Therefore the advice to not give cow's milk until a child is one year old is easily understood in this light.

With this understanding it is easy to see why Fran decided to "try" cow's milk when she ran out of formula:

> I tried and he was fine, I thought he would be.

This is similar to Lynn's experience with "trying" solids, described in section 5.4.2. In the case of cow's milk, as with the age at which to start solids, the recommendation has recently been changed so the women knew of people who had given a child cow's milk before his or her first birthday and they had been "fine".

Lynn started her child on solids when he was three months old, contrary to the advice she had received from the Plunket nurse. I asked her why she continued to give her child infant formula after six months. Lynn said:

> When I went at six months and she [Plunket nurse] said to wait there'd been new research, that it could cause them to slightly shed their stomach lining, that's what sticks in my mind, shedding their stomach. And there was the follow-on formula which is specially designed for them and I read the label and it has bulk iron, bulk calcium, bulk vitamins. So if I can give him something with all that goodness why bother with [milk] which could do him harm.

She explained why she had offered her child some of the other foods which recommendations suggest be avoided in the first year:

> They didn't give a valid reason, just that baby's digestion can't handle it, and if he couldn't I would know [laugh] ... it would come out as it went in.

The difference, as Lynn saw it, between giving solids or cow's milk too early was that she would be able to observe symptoms if the solids caused a problem (for her child), but the problem caused by cow's milk was not visible (e.g. the effect on the stomach lining). In addition she considered the difference in nutrients between cow's milk and infant formula. This concept is not mentioned in the literature for parents[1].

In Lynn's case contextual factors did not exert a major influence on her decision. It is possible that other women in similar situations would have responded as Lynn did had they been given the same information. But in a situation where the child refused to drink infant formula, more information may not have resulted in the recommended practice being followed. Because of the constraints on women's actions, at times information resulted in conflict without an acceptable resolution.

7.1.3 Mary- Breastfeeding and Solids

A conflict without clear resolution was seen in the experiences of women whose children were exclusively milk fed after six months of age. Mary described the situation of trying to feed her ten month old daughter solids after a doctor said she needed solids because she was over weight and could be iron deficient:

> And there I was offering something and she just shut her mouth, and [husband] was trying to get something in and she blew it out again. [laugh] I still keep thinking of this doctor saying, you should encourage solids, how do you get something into a baby that doesn't want to eat, it's absolutely impossible!

In Mary's case nutrition information about the need for solids would not change her daughter's acceptance of food. Mary was trying a number of strategies to get the child to eat but she was against some of her husband's tactics which she referred to as "force

1 In fact a number of women had been told that their breastmilk was not much good at some time after the child reached six months of age. This information came from health professionals as well as relatives.

to eat but she was against some of her husband's tactics which she referred to as "force feeding". When I asked what she meant by force feeding she said:

> I feel it's cheating to put a spoon into a laugh, she's laughing, she's not asking for food, to me that's force feeding, especially when you see the surprised look on her face and the laugh sort of stops, "Wait a minute, how did this get here?" She'll be a very sombre baby, she won't dare laugh.

So while Mary was concerned with the child's physical, nutritional health it was not her only concern.

She dealt with the conflict by searching for more information. She talked to a La Leche League leader who gave her a research article by McMillan (1976). In this study only 2 out of 14 children who were exclusively breastfed for up to 18 months were iron deficient. This statistic reassured Mary that she was doing the right thing by not "forcing" food[2]. Given that she could not optimally meet all her concerns this small amount of risk was acceptable.

Mary had also checked the inside of the child's eye lid and found it to be pink, an indicator to her that the child was not anaemic. I asked Mary if she had considered a blood test and she said:

> I actually wish I could do it, but um, I can't afford it. It would set my mind at ease.

Mary had made the feeding decision which best met her multiple concerns, but she knew that she had incomplete information about the effect of her decision on her daughter's health. She knew that there was a risk involved (she had received that information from health professionals), but she had not received help in assessing the actual risk in the case of her individual child. While she received warnings about her present practices from the paediatrician and the Plunket nurse neither offered her any concrete help in resolving the conflict present in her situation.

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2 She later said that she probably would have given solids had it not been for the support of la Leche League, but the she paused and said, "if I could [do it]". Solids were sometimes "forced" by the mother holding both the child's hands and putting the spoon into the mouth.

This is a case were information regarding recommendations was not enough. Mary needed help identifying alternative strategies to reduce nutritional risk. This could have been provided by a dietician. A blood test to determine her child's actual nutritional actual nutritional status at the time would have also helped Mary in deciding the best action to take. Unfortunately, by only telling Mary what she should do the health professionals caused Mary to worry and led her to decide that they were not a useful source of information about feeding her child.

CHAPTER EIGHT
DISCUSSION

In this chapter the practical implications of the inquiry's findings are discussed. This is followed by a discussion of the study's limitations and suggestions for future research.

8.1 Summary and Practical Implications

The study children's diets were heterogenous in terms of the timing and patterning of weaning, the foods consumed and meal patterns. Dietary recommendations were not always followed, in particular the recommendations regarding the age to first introduce solid foods and the avoidance of various foods in the first year.

In terms of nutrient intake there were varying degrees of nutritional risk, as assessed by comparing actual practice to current recommendations. Iron, vitamin E and selenium were the nutrients for which intake was most often below the RNI. Use of cow's milk as the main milk drink in the first year of life was the dietary practice most clearly associated with nutritional risk.

Diets were not static. Examples of major changes to the children's diets include: no longer consuming commercial baby foods, avoiding a food due to sensitivity/allergy, and ommitting a food group because of the child's refusal to eat. In some cases the changes resulted in obvious changes in nutrient intake.

The women's decisions regarding their child's diet could be understood from their point of view (as described in Chapter 6). In all cases the diets were the result of decisions which best met the multiple concerns of the woman at the time, given her existing knowledge and resources. Recommendations were not always followed. In some cases they had not been heard, but more often they had been heard but were not followed for a variety of reasons.

8.1.1 Nutrition information

Two issues were raised in relation to nutrition information. The first is that some women had not heard the current recommendations, the second is that knowing what is recommended does not always lead to action.

Most women could repeat current recommendations regarding when to start solids and when to introduce cow's milk. In the cases where the new information had not been received the women had usually been given old recommendations. Thus this basic information is reaching most mothers, but the method by which new information is disseminated to health professionals needs to be reviewed.

Women did not appear to have heard complete and consistent information regarding some aspects of their children's diets. They were not all informed about foods to avoid or include at various ages, nor had the similarities and differences to adult diets been discussed.

There were a variety of reasons why women did not always follow recommendations which they had heard from health professionals. One of the reasons was a misunderstanding of the reasons behind the recommendations, as was the case with recommendations about the use of cow's milk. The experiences of the women interviewed suggest that the use of a therapeutic alliance model for nutrition intervention, as suggested by Achterberg and Trenkner (1990), could result in improved diets, both from the nutritionists' and the parents' point of view.

From the mother's view feeding her child required many decisions and actions everyday. These decisions were framed by her focus of concern at the time. While care for the health and nutrition of the child was part of the women's general concern, it was not their only concern. Therefore, at times the implicit assumption accompanying nutrition information that a good diet is the (only) important goal in terms of child feeding was not met. At times recommendations on child feeding could even be in direct conflict with another concern.

The mother's concern about other aspects of child raising was a common cause of conflict. For example the conflict between the recommendation to not start solids before the child is four months of age and and the mother's desire to try giving the child solids at three months to see if they will help the child to sleep better. The child's eating behaviour was another common source of conflict. For example the conflict between a mother who believed that fruit in the diet was very important and a child who refused to eat fruit.

When the mother has concerns which are not answered by recommendations of health professionals there is a clear need for a therapeutic alliance. The health professional and the mother need to work together to identify the problems and seek solutions which satsify the mother's needs[1]. Advice and information are not enough, the exchange has to go two ways.

There was evidence of health professionals listening to mothers' concerns. The danger appeared to be that at times current nutrition knowledge was discounted. For example, stating that a child should first be given solids between the ages of four and six months does not allow for the mother's view of the situation. On the other hand, stating that solids should be given "when the baby shows signs of needing them" fails to communicate current biomedical knowledge about the topic. This is a difficult balance.

A person in the role of the health professional in a therapeutic alliance requires more than procedural knowledge about child feeding, indicating the need for good understanding of nutrition concepts amongst health professionals and a readiness to refer to dieticians and nutritionists. The health professional also needs to accept the premises that there is more than one way to obtain optimal nutrition; that there is more than one definition of health; and that the mother may choose to follow none of the suggestions offered by the health professional (Achterberg & Trenkner, 1990).

1 Taking into account the women's concerns would also be done in a social marketing approach. But that approach does not give the women an active part in identifying and choosing solutions (Wallack, 1990).

As part of the therapeutic alliance health professionals may help mobilize resources in addition to information. This did occur in some cases, for example a referral to a Karitane Centre for a stressed and tired mother.

The perspective of the therapeutic alliance model is more difficult to communicate in written materials. All options can not be written in every pamphlet, but it can be made clear that there is more than one way to obtain optimal nutrition. This recognition along with an acceptance of different values and contexts may help create an openness so that women expect a partnership with health professionals and are not tempted to lie about what is happening.

In some cases the women did not follow recommendations because they did not see them as the best way to meet concerns about the child's health and nutrition. In these cases the women were acting on alternative information. Alternative information came from a variety of sources, one of the most common was from observation of the child. This was most noticeable during the introduction of new foods when the mothers followed a trial and error process when they learned what foods their child could "handle".

Providing information in a paternalistic, "do as I say" manner does not help the women integrate their new knowledge. This could lead to discounting the advice or following it in spite of feeling it was not right, thus causing stress. Given the complexities of the current nutrition information and the changing food supply it can be argued that nutrition education must prepare people to integrate knowledge from many sources (Haughton, Gussow & Dodds, 1987).

Whether conflict arose because of conflicting concerns or because of conflicting knowledge (either between two sources or between source and their existing knowledge) the women tried to make sense of the recommendations in order to make their decision. At times the women misunderstood the rationale behind the recommendations. One of the factors contributing to misunderstandings was the multiple issues that the women

considered when making feeding decisions. Another factor was the application of ideal adult nutritional practices to children's diets (an area where those in the nutrition profession are also somewhat confused).

Misunderstandings occured in the other direction as well; in communication from women to health professionals. Again this is partly due to the women's multiple foci of concern in contrast to the health professionals tendency to focus more on biomedical health. At other times different values lead to misunderstandings. A partnership between the health professional and the mother, i.e. a therapeutic alliance, should decrease the number of misunderstandings by providing a forum for discussing concerns and values.

A difficulty with the concept of a therapeutic alliance is the probability that it would require more resources than other means of sharing nutrition information (Usinger-Lesquereux, 1994). For example sharing ideas and concerns would take longer than telling a mother what to do. Such an interchange would also require that the health professional have a good understanding of the biomedical rationale behind the recommendations and sufficient understanding to evaluate alternatives from a biomedical point of view, or have ready access to nutritionists or dieticians for referrals.

Additional resources may be well spent influencing the diet of young children if it is accepted that good nutrition is a valuable aspect of preventative medicine. Feeding a young child is a time when women actively think about nutrition issues. Thus it is a good opportunity to start an effective communication and education process which may in the long run benefit the health of the entire family. In addition there is the possibility of empowerment in the area of nutrition contributing to general empowerment (Rody, 1988).

While one to one interchanges could require more resources there need not be any additional expense associated with written material. In addition to presenting an openess, as discussed above, authors of written material should make a conscious effort

not to fall into the paternalistic or moralistic mode of conveying information. As observed in the "expert non-expert" approach this is a difficult balance to obtain.

8.1.2 Contextual factors

Providing nutrition information is the main method of nutrition intervention in New Zealand, but the women's experiences highlighted other factors which influenced child feeding practices and should be considered by nutritionists.

An adequate income enhances the opportunity for a healthy diet, not only in terms of its affect on food availability, but also in terms of the influence on a woman's focus of concern, and her ability to create knowledge about her child through the trial and error process.

The availability and composition of food is also an issue. It is important that commercially available infant and toddler foods be monitored in terms of composition and use in the diet, and that research continue into the physiological consequences of the fortification of these foods with nutrients. The heterogenous nature of dietary practices leads to misleading results when group averages are examined, this problem being partly due to fortified foods. This may be more of an issue in the future with the introduction of more fortified foods into the New Zealand market.

In the home the family food preferences and eating habits are an important influence on food availability and dietary practices. Feeding young children can not be considered outside of that context. The children generally ate from the foods chosen for the family, particularly after their first birthday. Given the evidence that some people do make changes to their family diet in response to the child it would seem that this is an opportune time to publicize nutrition guidelines, and make clear that their application will aid the health of their children as well.

Concern has been expressed that nutrition guidelines for adults are not applicable to children under two years of age, but at present the differences in dietary requirements

between children and adults have not been clearly communicated. The majority of the fat in the study children's diets came from their milk, thus supporting the recommendation not to use reduced fat milk in the first years of life. Women who had received information about this were willing to keep two kinds of milk in the house, one for them and one for the child.

8.2 Limitations of the Study

The experiences of the women in this study, and the diets of their children are not generalizable to any other population. The range of dietary practices described and the variety of women's experiences suggests that the purposive approach to sampling was effective. The experiences of women belonging to different ethnic groups, women working outside the home, and those living on limited income were not adequately addressed.

The use of volunteers as participants may have resulted in recruiting women who were more aware of, and interested in, food and nutrition issues than are the average. I heard many stories of women who feed their children ice cream and lollies all day, but none of the women interviewed fell into this category. Perhaps these reports of lollies and ice cream are partly a case of the difference between what children are seen by others to be eating and "what they actually eat here [at home]" as Alice, one of the participants, said.

The inclusion of women who were experiencing problems was part of the purposive sampling strategy, but there is a risk that the problem situations overpower other experiences. Several of the participants were articulate women with unusual experiences, but these, I believe, are useful to illustrate the range of realities in which people live. While these women's words may come through clearly in the results, the issues raised have been examined in relation to each of the other women participant's experiences. Along a similar line, the majority of the women were first time mothers which may have resulted in undue emphasis on some aspects of their decisions.

This study provides a broad view of a number of issues, many of which could be examined in more depth. A smaller number of women may have resulted in a more in depth analysis.

My limitations as a researcher, both in data collection and analysis, need to be considered. As I was newly a mother at the time of data collection I was more consciously aware of some of the issues the women were discussing than had I been either an experienced mother or not a mother. But this awareness did not lessen the continual battle to recognize my assumptions as both a mother and a nutritionist so that I could clearly hear what the women were saying.

Lastly, in addition to the usual problems with diet records there was the difficulty of recording, and subsequently analysing, the small amounts eaten by children many times during the day; the bits fed to the dog; the chippies taken from the bowl; and the exact content of homemade weaning foods.

8.3 Areas for Future Research

The participants in this study were mainly middle class, Caucasian New Zealanders. It would be interesting to extend the research to children living in different social contexts, including those living on low incomes and those from different cultural backgrounds. The basic methodology from this study could be used since it allows for the influence of context to emerge in each situation. The collection of five day diet records might require additional input, particularly for families under stress. Repeated twenty-four hour recalls might be an option.

The influence the child has on his or her diet deserves further attention. This feedback to the mother is contrary to the linear model of infant feeding portrayed in most nutrition research (Piwoz et al. 1994). If many of the mother's decisions are seen to be in response to the child this needs to be taken into account in nutrition information.

In addition the influence of the child on the family diet needs to be further explored asking the questions: Is the child a motive for postive change or do parents make sacrifices in their own health for their child? (as Devine & Olson, 1991 found to be the case). Is information relative to child feeding more likely to be applied to the family diet, as opposed to being considered a rule to be used for a limited time, if an approach similar to a therapeutic alliance is used?

"Misconceptions" have been identified elsewhere as an area which needs to be addressed in order to increase the effectiveness of nutrition education (Auld, Achterberg, Getty & Durrwachter, 1994). There were examples in this study of women's misconceptions about nutrition information. But perhaps more importantly, some of the examples of miscommunication were due to differences in what people were trying to achieve. A fruitful area of research may be to clarify health workers' view of concepts for which people share a "common sense" understanding.

Lastly, the use of fortified food made a large impact on the iron content of some children's diets, in many cases without their caretaker's conscious decision to use a fortified food. This aspect of nutrient intake will become more common with the introduction of more fortified foods into the New Zealand market. It would be worth while to examine their effect on the diets of young children and on women's view of of these foods. In particular the use of follow-on formula should be examined in order to determine how it is used in children's diets in relation to other milks and how women perceive it.

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APPENDICES

Appendix 1: Pamphlets on Infant Feeding

Karitane®

Feeding Guide for Babies

UP UNTIL 4-6 MONTHS

Breast milk or formula is all that baby needs.

AFTER 4-6 MONTHS - Baby is ready to start solids

WHEN? Baby's appetite is clearly no longer satisfied by the milk feeds alone.

HOW? After the milk feed

Smooth and creamy - Free of lumps

Luke warm

Slowly - one food at a time

Wait 3-4 days between new foods

WHAT? Baby rice; or

Apple, pear, ripe banana, apricot, peach; or

Potato, kumara, pumpkin, carrot, swede, marrow, avocado

THEN AROUND 7 MONTHS TRY -

- Chicken, lamb, liver, kidney
- Egg yolk
- Seasonal vegetables and fruit such as: parsnip, yam, courgettes, green beans, taro, puha, cauliflower, broccoli, melon, nectarines, nashi pears, plums (Remove skins and seeds)

LEAVE UNTIL AFTER 8-9 MONTHS

- Beef, fish, soya foods
- Silverbeet, spinach, peas, beans, tomatoes, cabbage, creamed corn
- Orange, kiwifruit, pineapple, berries
- Bread, pasta, wheat cereals, oatmeal, semolina, rusks, crackers
- Yoghurt, cottage cheese, grated cheese

LEAVE UNTIL AFTER 12 MONTHS

Cows milk as a primary drink, muesli, honey, egg white, peanut butter, shellfish, pork

FOR TEETHING, OFFER

Peeled apple wrapped in muslin

Then later (after 8 months) rusks, dry toast, or crusts

DELAY UNTIL 12 MONTHS IF ALLERGIES RUN IN THE FAMILY

Cows milk, cheese, yoghurt, soya foods, wheat, rye, oats, egg white, fish, citrus fruit, strawberries, tomato, chocolate

DRINKS

Keep to breast milk or formula, diluted fruit juice, water

No tea or coffee

LEAVE OUT

BAD HABIT FORMERS

Added sugar or salt

Sweets

Salty snack foods

SMALL HARD FOODS

e.g. peanuts, pretzels

For further Advice

Speak to one of our qualified nutritionists by calling

Toll Free on: 0800 654 342

For More Information Contact:

The doctor or nurse who sees your baby:

- family doctor and practice nurse
- Plunket nurse
- midwife
- child health nurse at community clinic or Tipu Ora
- paediatrician
- lactation consultant

Other groups in the community:

- La Leche League
- marae-based health services, Tipu Ora, ngā ūkaipō
- Plunket-Karitane Family Centres
- Kohanga Reo
- Parents Centres NZ Inc
- Multiple Birth Association

Community health workers

- Community health services or public health units in your local Crown health enterprise
- Dietitian in community or private practice
- Maori or Pacific Island health workers.

You can also get telephone help from:

- Plunket Line freephone 0800 10 10 67

I love to breathe in smokefree air

MINISTRY OF HEALTH
MANATU HAUORA

New Zealand, October 1996. Code 6004.

NGĀ KAI TŌTIKA MŌ TE HUNGA KŌHUNGAHUNGA

Healthy Eating for Babies and Toddlers

FROM BIRTH TO 2 YEARS OLD

A baby needs enough food to grow, develop, sleep, and be happy.

Caring for a baby is very rewarding, although there is always a lot to do. Your baby depends on you for a healthy start in life.

These guidelines will help you choose healthy food for your baby and toddler.

- Breast milk is best.
- If you cannot breastfeed, use an infant formula until baby is 12 months old.
- Give babies and toddlers plenty to drink.
- Start solids with one new food at a time.
- Change variety, texture and quantity as your baby grows.
- Healthy eating habits start early.

Breast Milk is Best

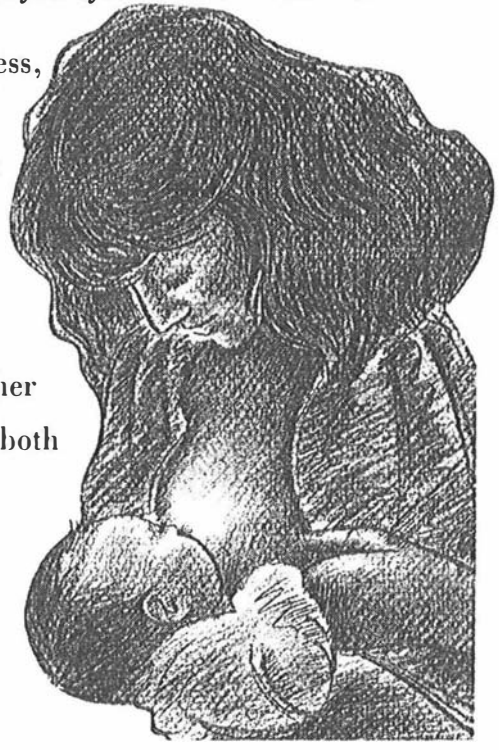
Successful breastfeeding is best for babies.

Breast milk is specially made for your baby:

- it's the perfect food for baby
- it changes with your baby's needs
- it helps protect your baby against infection
- it lowers the risk of allergies
- and it's cheap, safe, environmentally friendly and ready to use!

Young babies need to be fed often and on demand.

Baby's appetite, happiness, weight gain and lots of wet nappies tell you how much milk baby needs. If baby is still hungry after feeding from one breast, then offer the other breast. After feeding on both breasts, begin the next feed on the breast used last.



FINGER FOOD

At about five months, whether baby has teeth or not, he will enjoy chewing on finger foods.

Bread rusks, made by slowly baking bread fingers, pieces of cooked kumara and taro, and banana and apple are useful to start with.

Talk to baby's nurse and other parents for ideas about other food to give.

This breastfeeding factsheet goes with the book *Breastfeeding: Giving Your Baby the Best You've Got.*

Other factsheets in this series are *Inverted Nipples, Time for Toddlers, Sore Breasts, Answers to Breastfeeding Questions, Expressing Milk,* and *Sore Nipples.*

Department of Health, Te Tari Ora, New Zealand, 1990. Code 4896.

Weaning baby from the breast is something you and baby work out together. There is no set age or weight for baby that is right.

Weaning baby gradually, as other foods are slowly introduced, is easier for you and baby. Talk to your nurse or La Leche League about this.

As baby starts to eat more solids he may want to cut out a breastfeed. This may be the afternoon or lunch time feed when he is busy with other activities.

Give baby something else to drink, such as water, from a cup. Don't force baby to drink as this is a new experience for him.

After a week or so, baby and you may want to cut out another feed. Continue to do this as long as baby drinks plenty from his cup.

Often the last feed to be cut out is the first one in the morning, or the last one at night which helps to settle baby down.

Starting Solids

Every baby will start to eat solids at a different age. It could be as early as four to six months, or not until baby is much older.

Don't be pushed by other people into giving baby solids too early. Check with your nurse if you're not sure if baby is ready.

Start young babies with pureed or mashed fruit and vegetables. Older babies can go straight onto finger foods, but will need to be watched as they may choke.

Start solids slowly, try one food at a time every few days. This lets baby get used to new flavours and textures and you can see if the food agrees with baby.

Avoid giving mixed cereals, because if baby reacts it may be difficult to work out which cereal disagrees with him.

Some foods are not suitable for babies—talk to your nurse about this.

Give baby his food from meals prepared for the family. This is easy and gets baby used to family cooking.

By the time he is 12 months old he will be eating most things off the family menu. But, don't be surprised if he only eats a small variety of foods.

Natural foods are best for baby but cans or packets can be a useful standby. Check the salt and sugar content is not too high.

WHAT TO DO

Use a blender, sieve or mouli to get rid of any lumps. Give food at room temperature or slightly warmer.

Freeze any extra food in ice cube trays for use later.

Offer solids after breastfeeding. Hold young babies and give a small amount from a spoon. Gradually give more as baby gets older.

Older babies will hold food in their own hand while sitting in your lap or in a baby chair.

If baby is sick or not interested in solid food don't insist that he take it. Breast milk is still the best food for babies.

USING CANNED FOOD

In line with modern trends in infant nutrition, *canned baby food contains little or no added salt or sugar, and tastes very bland to adults who are used to stronger flavours. However, babies have many more taste buds than adults and will readily accept them. *Canned baby food contains no artificial colouring, flavourings or preservatives.

The lower levels of salt and sugar and the careful preparation of the food now make *canned baby food a suitable part of a healthy diet for baby. Canning is a method of food preservation which helps keep important vitamins in food.

To heat, place the opened can into boiling water for a few minutes, stir well, check the temperature and serve.

If you know you are not going to use the whole can, just place the amount baby needs into a cup. This can be placed in boiling water, or into the microwave and heated.

Always stir and check the temperature of food before giving to baby to avoid burns. This is especially important if you heat food in a microwave oven.

Desserts and fruits can be served without heating.

Never save heated food for a later meal. Unheated food should be removed from the can and placed in a covered container in the fridge or freezer.

Unopened cans of food can be stored in a cupboard.

**Refers to J Wattie Foods Products.*

This leaflet has been approved by members of the J Wattie Foods Infant Nutrition Advisory Group: Professor John Birkbeck, nutritionist; Jenny Carr, registered dietitian; Dr David Geddis, Chief Medical Director, Royal New Zealand Plunket Society.

For further information:

J Wattie Foods Information Service
PO Box 543
HASTINGS

Revised: June 1991

GETTING STARTED ON SOLIDS

When and how to introduce foods other than breastmilk to your baby can be confusing for new parents. This leaflet will give you the basic information you need to get started on feeding your baby in the best possible way. **The information in this leaflet is for healthy babies. If you are at all worried about the health of your child, ask your Plunket Nurse or doctor.**

0-4 months

For at least the first 4 months, baby needs only milk, preferably breastmilk, but if that is not possible, a suitable infant formula. Although babies experience growth spurts at about 6 weeks and 3 months and may seem to be very hungry, what they need is more milk. Feed more often to increase breast milk supply.

Don't be tempted to introduce solids early. Despite wishful thinking, early introduction of solids will not help a baby sleep through the night. Introducing solids too early may make your baby sick. **If you are not sure when to start your baby on solids check with your Plunket Nurse or Doctor.**

4-6 months

After the first 4-6 months, when your baby is interested in putting things into her mouth or still seems to be hungry after a milk feed, that's the time to think about giving solids.
Don't be in a rush to start.

GETTING STARTED

Feeding babies is a messy business, so be prepared!

Use a big bib and hold baby on your lap. Once baby can sit with support and hold their heads up you can use a high chair.

Using a small spoon, put luke warm liquid food up to the baby's lips. Let baby taste the food and suck it off the spoon. To start with more may be spilled out than swallowed, but this will soon change. Eating food is quite different from drinking milk, and your baby needs to learn how to do it.

At the start, remember that milk will be the main source of nourishment, so solids should be given at the end of the feed after breástmilk or formula. The amount will be small and of a liquid consistency at first, but it is important that baby becomes accustomed to new tastes and textures. Later this becomes less important, but if baby is frantic for a feed giving some breastmilk or formula first will make baby calmer to deal with solids.

Only when a wide range of solids are taken in considerable amounts will milk become less important, but it remains a valuable source of calcium and other minerals and vitamins.

WHAT FOOD?

Start with pureed fruits, vegetables, baby rice or other special baby cereal mixed to a smooth, thin consistency with breast or formula milk.

As baby learns to eat, (not before four months) gradually introduce more foods such as meats and gravies, and mixtures of foods.

Avoid introducing egg, dairy foods, wheat, fish and peanut butter before eight months, as these may cause allergies in some sensitive babies.

Gradually introduce more and more foods, with lumpier textures. Babies love to pick food up, so give them pieces of soft fruit, toast fingers or pieces of cheese as they are able to manage them. By about 9 months some babies can feed themselves using a spoon, although it will still be messy! By about 12 months your baby will be able to eat many of the foods you eat. If you have a healthy diet, then your baby probably will too.

GUIDELINES FOR HEALTHY EATING

Avoid using salt - babies don't need salt, and aren't used to the taste the way adults are.

Avoid using sugar - babies love sweet food, but sugar and foods containing it, such as honey, undiluted fruit juice and cordials, can damage their teeth, and provide more calories than your baby needs.

Avoid small hard foods - such as nuts and raisins because of the risk of choking. Once babies have teeth they can bite off small pieces of fruit and toast which could cause choking so never leave baby to eat alone.

Avoid tea, coffee, milk flavouring and artificial colours, flavours and preservatives - babies do not need any of these things, and it is best if they learn to enjoy natural foods as much as possible.

HINTS

- Towards 12 months of age, try to modify family foods for baby. Leave out salt and unnecessary sugar and mash or chop foods so baby can handle them. Baby is getting ready to eat with you.
- Although it is important for your baby to learn to eat a variety of foods, it is not important for you to create new and wonderful dishes every day. Babies are usually happy to eat almost the same thing day after day.
- Babies should be encouraged in their efforts to feed themselves. Provide finger foods, and give your baby a spoon to hold as soon as he or she is interested. You may need to load up the spoon, or help with steering it into the baby's mouth.
- If vegetable purees are a bit watery, add mashed potato to improve the texture.
- Canned tomato puree can be added to vegetable mixtures for a change in flavour.
- Use canned baby food as a sauce or base for mixed dishes.
- Pieces of raw fruit e.g., apple, pear and orange, can be put inside sterilised muslin, tightly tied, for baby to suck and chew on, even before teeth appear.

REMEMBER

- Never leave baby to eat alone in case he or she chokes.
- Always stir and check the temperature of food before feeding baby to avoid burns.
- Avoid too much salt, sugar, fat and fibre. Baby gets enough of these things from food and does not need extra.
- If you are concerned that your baby may be allergic to certain foods, or that your baby is not eating a healthy diet, consult your health advisor.
- Avoid introducing egg, dairy foods, wheat, fish and peanut butter before 8 months of age as these may cause allergies in some sensitive babies. Cow's milk may be introduced once baby is having a widely varied diet.
- Once solids are introduced, baby can be given drinks other than breast or formula milk. Use water or very dilute fruit juice. Undiluted fruit juice contains a lot of "natural" sugar which can affect baby's appetite and cause tooth decay.

This leaflet has been approved by members of the J Wattie Foods Infant Nutrition Advisory Group: Professor John Birkbeck, nutritionist; Jenny Carr, registered dietitian; Dr David Geddis, Chief Medical Director, Royal New Zealand Plunket Society.

For further information:

J Wattie Foods Information Service
PO Box 543
HASTINGS

Revised: June 1991

MEAL TIPS FOR BABIES

BREAKFAST

Younger babies (6 to 8 months)

Drink of milk (breast or formula).
Baby cereal made up with diluted juice, breast or formula milk (do not use formula for breastfed babies).
Pureed fruit/mashed banana (can be mixed with cereal).

Older babies (after about 8 months)

Baby cereal made up with breast milk, formula or diluted juice.
Towards 12 months, other cereals and cow's milk may be introduced gradually. Choose cereals with little or no added salt or sugar.
Piece of fruit mashed or pureed as necessary.
Rusk or crisp toast, with thin layers of butter/margarine and/or spreads.
Drink of milk (preferably breast or formula).

Fruit Ideas

- Mash bananas, kiwifruit (remove skin), melon, very ripe apricots (remove skin), berries.
- Puree or mash stewed fruit - peaches, nectarines, apples, pears, plums.
- Fruit canned in fruit juice - puree.
- Grate raw apple. Add juice if necessary to moisten.

Suitable Wattie's Foods

Fruit Salad, Peaches, Peach Apricot and Semolina, Pears, Apples, Cereal and Apple.

LUNCH

Younger babies

Drink of milk (breast or formula), pureed fruit or vegetables or baby cereal made up with diluted juice, breast or formula milk (only for formula-fed babies), if this was not given at breakfast.

Older babies

Fruit, vegetables, mashed or diced.
Yoghurt, custards.
Sandwiches - peanut butter (use smooth peanut butter),
yeast extract, jam, meat spreads.
Cheese pieces, cheese on toast (leave to cool).
Drink of milk (preferably breast or formula).

Ideas

- Bread can be white or wholemeal, but grainy varieties are best left until baby is older.
- Flavour unsweetened natural yoghurt, or mashed soft tofu with fruit puree.
- Serve vegetables raw, if baby is able to manage them, or cooked and cold, with yoghurt/cottage cheese dip.
- Cut sandwiches small, as this makes it easier for baby to manage.

Suitable Wattie's Foods

Baby Foods as listed for Breakfast, Pineapple & Rice Custard, Fruit Custard. Banana Custard, Vanilla Custard, Mixed Vegetables, Apricot & Rice Custard, Meat & Vegetable Dinners, e.g. Beef Dinner.

DINNER

Younger babies

Drink of milk (breast or formula).
Pureed vegetables - gradually introduce a variety to your baby one at a time.
Gravy or breast or formula milk can be used to moisten the mixture.
Pureed meat - chicken or lean red meat. Cook by casseroling, steaming or boiling in a little water.

Older babies

Meat, pureed or minced (moisten with gravy or vegetable cooking water).
Chicken or fish (steam or boil) with white sauce.
or Pate on toast or sandwiches.
or Gently casseroled lean meat or liver.
or Well cooked dried beans such as lentils and haricot beans.
and Pureed, mashed or diced cooked vegetables.
or Soft raw vegetables e.g., skinned cucumber, tomatoes, red peppers.
Pudding if necessary. Choose fruit and/or milk based types such as fruit and yoghurt or fruit and custard.
Drink of milk (preferable breast or formula).

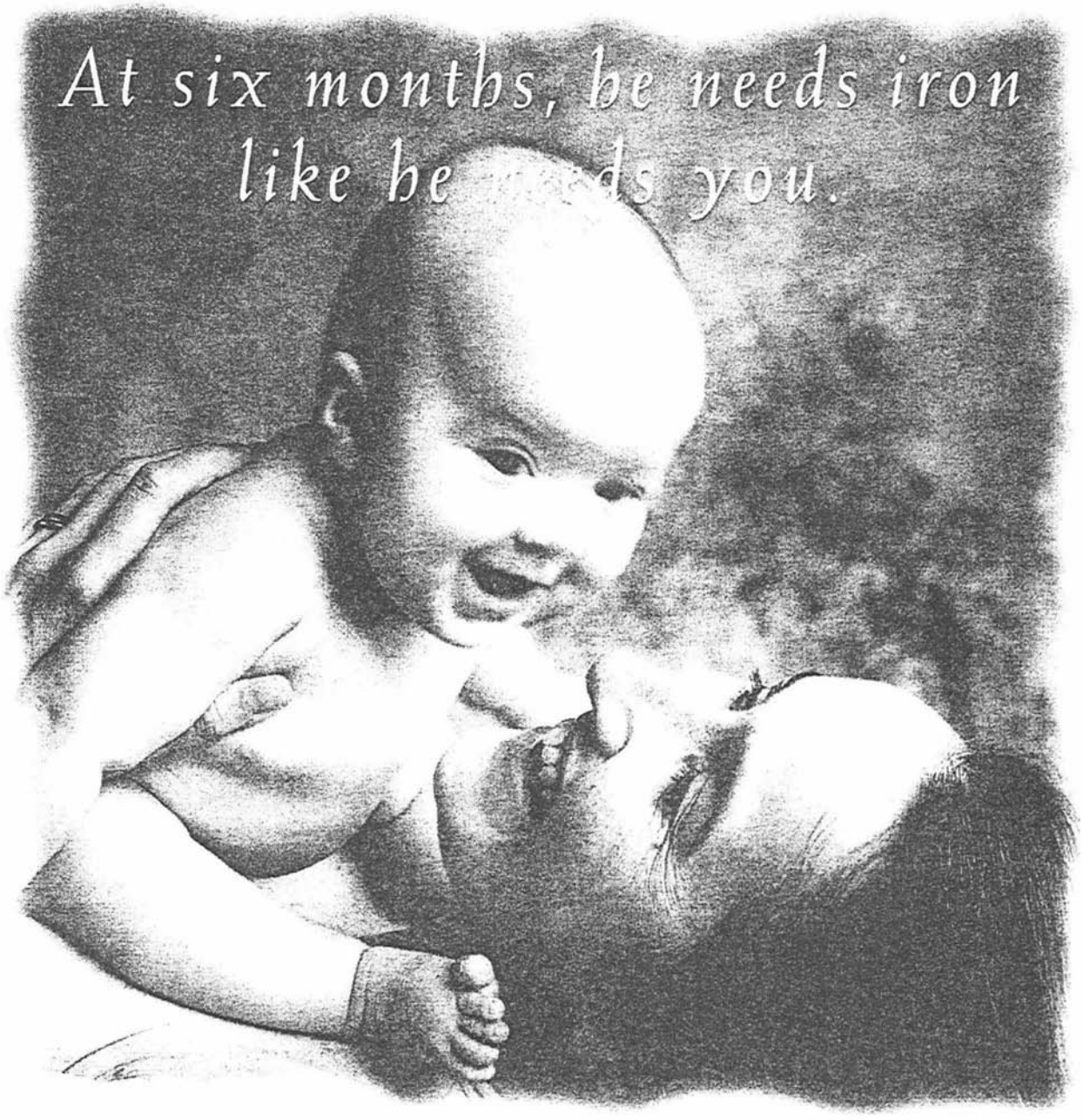
Ideas

- Make a soup with vegetables and finely chopped meat. Be sure not to serve too hot. Frozen peas or milk can be added to soup to cool it down. Canned baby foods can be used as a base.
- Serve cheese sauce, grated cheese, or cottage cheese with vegetables instead of meat for a change.
- Add a small amount of egg yolk or canned babyfood meat dinners to mashed vegetables in place of meat.
- Serve pasta shapes instead of potato sometimes. Serve with meat or cheese sauce. Canned baby food can also be used as a sauce - thin with milk if necessary.
- Homemade pizza with vegetables on top.

Suitable Wattie's Foods

Mixed Vegetables. Lambs Fry & Bacon, Chicken Dinner, Lamb Dinner, Beef Dinner, Garden Vegetables, Fruits and Custards Meals for pudding.

At six months, he needs iron like he needs you.



At six months of age, your baby will be hungry for iron.

No wonder.

It's essential for healthy physical and mental development and resistance to infection during the vital growing time from 6 months to 2 years.

That's why new Infasoy Progress is formulated with an appropriate amount of iron.

More than twice the iron of some adult soy drinks.

And because weaning infants are often fussy eaters, Infasoy Progress has the right nutritional balance of vitamins and minerals.

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❑ "Cooking without Milk" Cookbook

Name .....

Address.....

.....

.....

Baby's date of birth.....

Limited offer while stocks lasts.

Infasoy® Progress®. A real step forward.

Infasoy Progress is a high protein milk-free formula enriched with vitamins and minerals, including iron. It is designed to meet the nutritional needs of infants and children aged six months and over who are allergic to cow's milk proteins or intolerant of lactose. It is recommended to be used as the liquid part of an older baby's diet. It is not intended to replace breast milk. Professional advice should be followed. Wyeth (NZ) Limited. 5/96 WNZN969/CJB-LT

Appendix 2: Interview Guide and Diet Record Sheet

Interview Schedule

-I'd like to learn about [child's] diet.

-Diet history

milk -first milk? weaned?

-formula? weaned?

-cow's milk? when? kind?

first solids

-when?

-what?

-24 hour recall

-what kinds of things do you think about when choosing foods for [child]?

-What differences are there between your diet and child's diet? Do you buy any foods especially for him/her? why?

-Are there any foods that you won't give him/her? Why? Sources of information and advice.

-Are there any foods which you feel are particularly important in [child's] diet? Why? Source?

-Sources of information on child feeding.

-nurse

-doctor

-dietitian

-written materials- books/magazines/pamphlets- specify?

-radio/TV

-classes- which?

-Plans

Second Interview

Start with changes that have taken place since previous interview and reasons for the change.

Day of week..... Date.....

Record the amount of all food and drink (including water) which is consumed- not the amount offered. Please use a separate line for each item. List contents of mixed dishes when possible .

Time am/pm	Where eaten	Brand name (except fresh foods)	Full description of item include-fresh, frozen, etc. -how cooked -added salt, sugar	Amount eaten (number, weight or measure)	Comments

General comments about the child's day, e.g. health, activity

Appendix 3: Researchers' Perspective

RESEARCHER'S PERSPECTIVE

My origional interest in the topic of child feeding in New Zealand arose out of a concern about hunger and iron deficiency. At the time information about "usual" diets of children in New Zealand was lacking, as was information about factors which influence diets. As I believed that people on low incomes share the same dietary ideals as the rest of the population I decided to examine child feeding in a cross-section of population instead of focusing on people with low incomes.

I chose qualitative methods to gain the perspectives of the mother. I was also interested in examining the child's role in the process. At the time I was still influenced by more conventional nutrition research with its causal models, i.e. which factors *deterimine* diet. My underlying belief was in the public policy model of health promotion, as opposed to "Do you teach them to budget?" view.

As research progressed I found the information I was collecting was biased towards an evaluation of nutrition knowledge. For example I wrote a poster to the International Nutrition Congress in Adelaide, 1993, on the confusion about milk and milk products in the diets of children. There was a conflict between my belief in the importance of structural issues and my "finding" that people's misconceptions need to be addressed.

Victoria Grace (1989) helped me to articulate my confusion. She states that a focus on structural issues identifies factors which enable and constrain people's actions. But while such a focus does not blame people for their situation it also denies the existence of free will. The constructivist view offers an alternative approach, in which individuals are seen to interact with the environment and construct their own understanding of reality. Equity issues are important, but so is each individual- a message I was clearly receiving in the interviews.

The concept of a "theraputic alliance", described in an article by Achterberg and Trenkner (1992), provided a focus for the analysis by indicating what was missing in terms of the women's interactions with health professionals.

Appendix 4: Diet Records

Ml	Food/Recipe	Amount	Measure	Weight g	Ener kcal	Vit-C mg	Iron mg	Vit-E mg
TIME								
09	WEET-BIX	1.00	BISC	15	49	0	0.6	0
	MILK,FLUID,STANDARD,	30.00	ML	31	19	0	0.0	0
	RAISINS	14.10	G	14	35	0	0.2	0
11	MILK,STANDARD,BOTTLE	220.00	ML	227	140	3	0.0	0
13	CUSTARD FROM POWDER	0.25	C	68	52	1	0.1	0
14	MILK,STANDARD,BOTTLE	100.00	ML	103	64	1	0.0	0
17	APPLE,COX'S ORANGE,RAW	0.12	AVE	16	8	1	0.0	0
67	JUICE,APPLE	1.00	C	261	109	29	0.2	0
18	MACARONI CHEESE	2.00	TSP	10	18	0	0.0	0
21	MILK,STANDARD,BOTTLE	250.00	ML	258	159	3	0.1	0
			Total:	1003	653	39	1.3	1

Ml	Food/Recipe	Amount	Measure	Weight g	Ener kcal	Vit-C mg	Iron mg	Vit-E mg
TIME								
07	MILK,HUMAN,MATURE	0.00	G	0	0	0	0.0	0
08	BREAD,WHOLEMEAL,SL AND UNSL	0.75	SL	21	42	0	0.4	0
	MUESLI,TOASTED,SWEETENED	3.00	TSP	7	27	0	0.3	0
09	SOFTDRINK,LEMONADE,DIET	0.50	C	125	0	0	0.0	0
	CORNFLAKES	1.00	TBSP	2	7	0	0.1	0
	MILK,FLUID,WHOLE	1.00	TSP	5	3	0	0.0	0
	YOGHURT,FRUIT,FAT RED.,SWEETD	1.00	TSP	6	6	0	0.0	0
10	RICE WAFERS,HEALTHERIES	0.50	SERVE	7	30	0	0.1	0
30	CHEESE,MILD GRATED(COPY)	4.00	TBSP	28	119	0	0.1	0
11	CHOCO-CHIP BISCUIT [COPY]	2.00	BISC	28	131	0	0.5	0
12	FRUIT SALAD,WATTIES	0.33	SERVE	45	25	0	0.1	0
	YOGHURT,FRUIT,FAT RED.,SWEETD	6.00	TBSP	108	104	1	0.1	0
13	RAISIN SCONE,MINE	0.50	SERVE	30	102	0	0.4	0
	MARGARINE,POLY-UNSATURATED	1.00	TSP	5	37	0	0.0	1
	WATER,MUNICIPAL	1.00	C	250	0	0	0.0	0
16	MILK,HUMAN,MATURE	0.00	G	0	0	0	0.0	0
66	BISCUIT,SNAX,GRIFFINS	4.00	BISC	16	76	0	0.3	0
	BISCUIT,CREAM CRACKERS	1.00	BISC	6	24	0	0.1	0
	WATER,MUNICIPAL	0.50	C	125	0	0	0.0	0
18	CARROTS,RAW	1.00	SL	12	3	0	0.0	0
	INSTANT NOODLES(COPY-NOODLES	1.00	TSP	3	2	0	0.0	0
	WATER,MUNICIPAL	0.25	C	63	0	0	0.0	0
	SUNFLOWER SEEDS,OIL ROASTED	2.00	TSP	6	37	0	0.4	2
	APPLE,COX'S ORANGE,RAW	2.00	NIP	4	2	0	0.0	0
19	SOFTDRINK,LEMONADE,DIET	0.50	C	125	0	0	0.0	0
69	PIE,SHEPHERD'S	0.75	C	86	102	2	0.9	0
	RAISINS	14.00	G	14	35	0	0.2	0
20	MILK,HUMAN,MATURE	0.00	G	0	0	0	0.0	0
			Total:	1126	915	4	4.1	5