NUTRITIONAL ADEQUACY AND DIETARY COMPLIANCE IN CHILDREN AND ADULTS ON ELIMINATION DIETS

ANNA CHIU

Supervisors:
Dr. Anne R Swain, Dip Nutr Diet, PhD
Chief Dietitian
Dr. Robert H Loblay, MB, BS, FRACP, PhD
Director
Dr. Velencia L Soutter, MB, BS, FRACP
Paediatrician

Allergy Unit
Department of Clinical Immunology
Royal Prince Alfred Hospital

June, 1997

DECLARATION

1. I, ***Anna Chiu***, hereby declare that none of the work presented in this essay has been submitted to any other University or Institution for a higher degree and that to the best of my knowledge contains no materials written or published by another person, except where due reference is made in the text.

2. The studies described in this essay were approved by the Ethics Review Committee of the Central Sydney Area Health Service, and all subjects gave informed consent before participating.

Signature

_____

dated on 16th June, 1997.

ACKNOWLEDGEMENTS

I wish to express my deepest gratitude to Dr Anne Swain, Dr Robert Loblay, Dr Velencia Soutter and Dr Samir Samman for allowing me the privilege of working and learning with a dedicated group of people on this interesting and excited project.

I would like to thank Dr Robert Loblay for his supervision and precious suggestion; Dr Velencia Soutter for her expertise and words of wisdom, and; Dr Anne Swain for her guidance, endless motivation and support which has made me greatly enjoy my research.

I would also like to extend my appreciation to: the dietitians at the allergy consulting rooms, Alan, Dorothy, Kim and Jane for their assistance, encouragement and care throughout the study; all the clinic staff for their cooperation and friendliness; Suzanne Abraham for her knowledge and valuable advice; Johane Soutar for her help in the study, and; Ray for all his support during the ups and downs of my project.

To all the participants of the study, I am especially grateful, as without them the project would have been impossible.

TABLE OF CONTENTS

ABSTRACT

The degree of dietary restriction required when following an elimination diet has raised concerns that nutritional adequacy may be compromised, particularly in children who required the exclusion of staple foods such as milk and wheat. Maternal and adult eating behaviours and psychological status may also have an influence on compliance and nutritional adequacy. The nutritional intake of 15 children and 5 adults who attended the allergy clinic at RPAH was analysed before and during the Simplified Elimination Diet (SED) by using 5-day weighed food records. A series of validated questionnaires was used to assess the eating behaviours, psychological status and personality traits of 26 compliers and 7 non-compliers. The results in 15 children were then combined with those of Soutar in mainly adults. Dietary investigations revealed that the nutrient intake in children on the SED adequately met the RDI recommendations, except for calcium. In many cases, the intake of calcium was already poor prior to dietary intervention. In adults, calcium, iron and zinc intakes were improved on the SED, but a lower intake of vitamin A, in particular β-carotene was observed ($p<0.05$). Nutritional adequacy of children on the SED was maintained by the prescription of a milk substitute or calcium supplement and close dietary supervision. This was particularly so in those who needed milk free SED. The mothers and adults who complied with the SED, all had normal scores for the eating disorders and psychological questionnaires and were therefore assessed to be psychologically normal. Non-compliers had significantly higher scores, indicating they had higher levels of disordered eating, emotional distress, depressive illness, neurotic behaviour and anxious personality types.

INTRODUCTION

Elimination diets in conjunction with double blind placebo controlled food challenges are considered to be the "gold standard" in the diagnosis and treatment of food allergy and food intolerance. However, the strictness of the diet, predisposed eating disorders or other psychosocial factors may lead to nutritional inadequacy in some individuals.

FOOD ALLERGY

Food allergy is the most common immunological adverse reaction to food, producing IgE antibodies to specific food proteins. It occurs in 5% of the paediatric population with an atopic background and less than 1% of adults [26, 81]. Food allergy involves only a few protein foods (commonly egg, peanut and milk, and less often soy, fish and wheat) with a reaction occurring within 2 hours. Symptoms include itching, burning and swelling around the mouth and throat with oral contact. Nausea, vomiting, abdominal cramps, diarrhoea and urticaria after ingestion. In rare cases breathing difficulties and systemic anaphylactic shock. Clinical examination, along with Skin Prick Testing (SPT) or Radioallergosorbent Extract Testing (RAST) are used in the diagnosis of food allergy [3,54]. Management involves the complete avoidance of the relevant food proteins.

A number of studies [4, 13, 14, 30, 42, 67, 84] have shown that manipulation of the maternal diet during pregnancy and lactation, the delayed introduction of solids or the use of a low allergen diet may prevent or alter the development of allergies in some genetically predisposed children.

FOOD INTOLERANCE

In contrast, pharmacological food intolerance is a non-immunological reaction to food resulting in a range of symptoms which can occur at any age. The most common include recurrent hives, mouth ulcers, nausea, irritable bowel syndrome, headache and lethargy. In children, leg cramps, sleeping difficulties and behavioural disturbances [11, 17, 19, 33] may also occur. Many natural and artificial food chemicals can be involved and reactions times are variable, leading to a more difficult diagnosis. The true incidence of food intolerance remains uncertain [1, 83], largely because there are no generally accepted diagnostic criteria [34]. The SPT or RAST used for the diagnosis of food allergy are not relevant in the evaluation of food intolerance. To date, the only reliable method of confirming the diagnosis is to perform systematic dietary elimination followed by double-blind placebo-controlled challenge testing [44, 69].

CONTROVERSIES

Concerns have been raised that the degree of dietary restriction required when following an elimination diet compromises variety and hence nutrient intake and may place some individuals at risk of nutritional deficiencies [23]. Criticisms such as these have been particularly evident in relation to the nutritional adequacy of diets used in children who experience allergy or intolerance to staple foods such as milk and wheat [48].

A study conducted by Paganus et al [56] reported that 19 children with cow's milk allergy who were following a cow's milk free diet, showed a significant reduction in serum prealbumin values, low serum zinc and iron values, low energy but high protein intake. David et al [23] indicated that some children (13/23) with atopic eczema consumed significantly less calcium (<75% RDI) than their matched controls as the consequence of dietary elimination. Delvin et al [25] and McGowan and Gibney [50] also reported low

calcium intakes in children following a cow's milk free diet, whether or not they consumed a milk substitute or calcium supplement. A few cases of nutritional deficiency have been documented [48, 50] whereby long term adherence to an elimination diet (without milk, wheat or egg) resulted in an inadequate energy intake and failure to thrive.

The Simplified Elimination Diet (SED) used at Royal Prince Alfred Hospital (RPAH) was developed in the early 1980's. Although originally based on the elimination diets of Rowe [65], Shelley [72], Feingold [32] and Warin and Smith [78], the diet at RPAH is more restrictive as a result of extensive analysis of the salicylate content of common foods [76]. In a previous study, Soutar [74] has assessed the nutritional adequacy of 20 patients (15 adults and 5 children) on the SED for management of food allergy or intolerance at RPAH. A significant reduction of vitamin A intake, in particular β-carotene was reported. Intakes of calcium and iron were below the RDI for some individuals, although in many cases intakes were already poor prior to dietary elimination. Positive dietary changes included reduction of sodium, total and saturated fat intake.

In considering the dietary compliance of the patients undergoing an elimination diet, the question arises whether the psychological status or personality traits of the mothers or adults has an effect. Rix et al [62] found that the patients attending an allergy clinic had higher levels of psychiatric distress and were more likely to consult general practitioners, hospital specialists and try other types of treatment for their symptoms than the general population. In a study conducted by Karlin and Retzlaff [45], 30 caregivers of patients with chronic physical illness, including psychosomatic variables, scored higher on the clinical scales of anxiety, somatoform, dysthymia and major depression compared to the matched controls. In the study by Soutar [74], eating disorder psychopathology in conjunction with a higher incidence of emotional distress and psychological and depressive illness was

observed only in the patients who chose not to follow the SED. In paediatrics, current thought suggests that the mothers with psychopathology are those who are more likely to impose dietary restrictions on their children with suspected food allergy or intolerance. Concerns have been raised that the so-called Munchausen syndrome by proxy may be present in the allergy clinic population [15, 16, 51, 68, 79, 80].

AIMS

The aim of this research project was to investigate the nutritional adequacy and dietary compliance of children on the Simplified Elimination Diet (SED) and then to compare and combine these results with the previous study by Soutar in mainly adults. There were two major aims of the project:

1. The principal aim was to assess the nutritional adequacy of the SED in children at RPAH. *Specific* aims were to :
    - Estimate total energy intake on the SED and document weight changes.
    - Estimate and compare macro- and micro-nutrient intakes before and during the SED.
    - Compare estimated nutrient intakes with recommended dietary intake (RDI) values.
    - Assess the influence of previous nutrition advice on the nutritional adequacy prior to the SED.

2. The secondary aim was to determine whether maternal or adult patients psychological characteristics influence compliance on the SED and/or affect nutritional adequacy. *Specific* aims were to :
    - Characterise the spectrum of eating behaviours in the study population.
    - Assess maternal or adult patients current psychological status.
    - Document the occurrence of personality traits, particularly anxiety, and neuroticism in the mothers or adults.
    - Correlate these psychological characteristic with:
        - Compliance on the SED
        - Presenting symptom/s of children or adult patients
        - Children's behavioural problems

METHODS

ETHICAL APPROVAL

Ethical approval was obtained from the Ethics Review Committee of the Central Sydney Area Health Service. Written consent was obtained from the participants.

RECRUITMENT

101 new patients referred to the Allergy Consulting Rooms at RPAH were invited to participate in the study. New patients of both sexes (or mothers of children aged between 1 and 12 years) were contacted by telephone prior to their appointments, and invited to participate. The research dietitian determined whether patients were potentially eligible for the study by ascertaining the reason for their referral to the Allergy Clinic. Patients were asked about the symptoms they experienced and whether or not they believed diet provoked their symptoms.

Individuals who expressed an interest in taking part in the study were given a brief outline of the procedures over the telephone, and sent a study package including information sheets which provided further detailed instructions (Appendix A).

Of the 67 patients who agreed to participate, 26 cancelled their consultation. 14 patients later withdrew from the study because they:

1. did not require the SED (n=7)
2. decided not to go on the SED reported reasons including (n=7),
    - awaiting for second medical advice (n=4)
    - strictness of the diet (n=1)
    - subjects were sick during the study period (n=2)

27 patients completed the entire study protocol. Due to the time constraints of the study, data collection is not yet completed for 7 of these patients. The present report only includes data on the 20 patients who completed the dietary protocol.

SUBJECTS

To date, 15 children and 5 adults have been studied for the nutritional adequacy of the Simplified Elimination Diet. The sex, age and weight of the study population is shown in Table 1. (The details of the combined study population are shown in Appendix F.)

	Children n=15	**Adults n=5**
Sex		
Female	8	5
Male	7	0
Age (years)		
Mean (SD)	3.23(0.5)	26.45(7.17)
Range	1-7.67	13-50.67
Weight (kg)		
Mean (SD)	15.3(1.27)	52.3(2.27)
BMI (kg/m^2)*	--	20.72(0.87)

* BMI is not relevant for children under 13 years of age

Table 1 : Sex, age and weight of study participants

THE SIMPLIFIED ELIMINATION DIET

At RPAH, the Simplified Elimination Diet (Appendix B) is followed initially for 2-6 weeks. The length of the time will depend on frequency and type of symptoms and degree of restriction of diet. When symptoms are relieved for 5 consecutive days, a series of food challenges are administered to determine the precise chemicals responsible for eliciting symptoms A final diet can then be prescribed for each individual based on the results of their challenges. Subsequently, gradual liberalisation of the diet to increase the intake of the relevant food chemicals may raise the individuals dose threshold such that a greater variety of foods may eventually be tolerated. The diet excludes all artificial food colours, preservatives, and monosodium glutamate as well as high levels of naturally occurring biogenic amines, salicylates, and free glutamate. Individuals with gastrointestinal symptoms may also be instructed to eliminate wheat and/or milk if a sensitivity is suspected.

PROCEDURES

A summary of the study protocol is depicted in Figure 1. Before attending for the appointment, patients were asked to complete a 5-day food and drink intake diary (Appendix C) and questionnaire on dietary habits (Appendix D) which had been sent in the mail. Prior to the consultation, height and weight was measured, a brief interview was conducted to clarify the missing or obviously erroneous information in the diary and questionnaire, and to obtain demographic and clinical data. Whilst waiting to see the physician, mothers or adult patients were asked to complete the following questionnaires (Appendix E):

1. Computerised version of the Eating Disorders Examination (EDE)
2. Eating Disorders Inventory (EDI)
3. Appearance Rating

4. Body Shape Questionnaire (BSQ)
5. General Health Questionnaire (GHQ)
6. Edinburgh Postnatal Depression Questionnaire (EPDQ)
7. Beck Depression Inventory (BDI)
8. Eysenck Personality Questionnaire (EPQ)
9. State-Trait Anxiety Inventory (STAI)
10. Symptom Questionnaire
11. Conners' Parents Questionnaire

After receiving specialist dietetic instructions on the elimination diet, patients were issued a new food diary to be completed 2 weeks after commencing the dietary protocol. They were telephoned when they began their records and then contacted frequently to ensure compliance and continued participation in the study.

Patients were invited to have a follow-up consultation at the allergy clinic, when the second weight measurement, food diary and questionnaires could be obtained and completed. However, mothers were not required to repeat the questionnaires as the outcome was not expected to change. Alternatively, patients who preferred telephone follow-up consultation were asked to return the completed food diary and questionnaires by mail in prepaid envelopes provided, and to obtain weight measurements from a pharmacy. Reimbursement was available if necessary. These patients were unable to repeat the computerised version of the EDE.

At the completion of the research study, participants received a printed summary of their nutrient analyses and EDE results. If necessary, appropriate recommendations were made by the specialist dietitian for improving their nutritional intake.

TELEPHONE CONTACT

Invitation to participate in study

↓

PACKAGE SENT
containing:

Information Sheet
5-day Food and Drink Intake Diary
Questionnaire on Dietary Habits

↓

INITIAL CONSULTATION

Written consent
Food and Drink Intake Diary checked
Height and Weight measurement
Interview with research dietitian
Complete written questionnaires (30 minutes)
Physician
Complete computerised questionnaire (20-40 minutes)
Specialist dietitian
Collect second Food and Drink Intake Diary

↓

THE SIMPLIFIED ELIMINATION DIET
(duration of 2 weeks)

Reminder telephone call to commence
second Food and Drink Intake Diary and questionnaire/s

↓

FOLLOW-UP BY TELEPHONE / MAIL
OR
FOLLOW-UP CONSULTATION

Food and Drink Intake Diary checked
Weight measurement
Complete written & computerised questionnaires (20-40 minutes)
If desired, see specialist dietitian (10 minutes)

↓

ANALYSIS

Figure 1: Flow diagram of study protocol

STUDY DESIGN

FOOD AND DRINK INTAKE DIARY

The weighed dietary intake method was used to measure the patients daily nutrient intakes before and during dietary intervention. Each patient thereby acted as his/her own control, by providing a baseline nutrient profile with which comparisons could be made.

Mothers and adult patients were required to document the type and amount of food and beverage items consumed over 5 consecutive days by using kitchen scales. If weighing of foods was not possible, intake was quantified using standard household cup and spoon measures. This was performed during the patients usual diet and again whilst following the elimination diet. Careful verbal and written instructions were given on how to record food items, brand names, cooking methods and recipes (Appendix C). Graph paper was also supplied to encourage the participants to illustrate or describe the amount of food eaten with scaled drawings if measurements of food intake were impossible (eg, dining at restaurants). A contact telephone number was given if further assistance was necessary.

The food diaries were used to analyse 25 macro- and micro-nutrient intakes by SERVE nutrition software. This program utilises the NUTTAB, the Australian nutrient composition database [24], which also contains data from the British McCance and Widdowson's food tables. Mixed food items which were not included in the database were added separately according to individually recorded recipes, nutrient panels on product labels and nutrient information obtained from manufactures. If the quantity of food consumed was omitted, average serve sizes (according to the NUTTAB database) were substituted. Dietary supplements were not incorporated into the analysis.

The nutritional adequacy of the diet before and during dietary elimination was assessed by comparison of selected nutrients with the Recommended Dietary Intake (RDI) values for all Australians [77]. By convention, an inadequate dietary intake was considered to be less than two thirds the RDI for sex, weight and age. For those RDI values which consist of a range of nutrient intakes, the upper limit was used to ensure "adequacy" for all persons.

According to the patients age and the degree of dietary elimination required, 4 major groups were divided for the analysis of nutrient intakes. These include,

1. Children on the SED (n=5)
2. Children on the milk free SED (n=5)
3. Children on the milk free, wheat free SED (n=5)
4. Adults on the SED (n=5)

NUTRITIONAL STATUS

The nutritional status of patients was assessed and compared before and during dietary elimination. Measurement of body weight and height was performed by the research dietitian, if impossible, patients were requested to obtain the second weight measurements from a local pharmacy. Although the accuracy of pharmacy scales was unknown, the magnitude of changes in body weight was considered to be most relevant and it was felt that would probably be accurate, provided that the same scale was used for both measurements. The Body Mass Index (weight (kg) / height (m^2)) was also calculated. Skin fold thicknesses were not expected to change significantly in the limited time frame of the study and were therefore not measured.

QUESTIONNAIRE ON DIETARY HABITS

The questionnaire on dietary habits designed by Soutar [74] asked patients about their symptoms, the relevant dietary change/s they had made, source/s of previous nutrition knowledge, the use of nutrition supplements, cooking skills and the frequency of "eating-out" (Appendix D). The information gave an insight into how the nutrition beliefs and dietary habits affect dietary compliance. The questionnaire was also used to compare the nutrition adequacy of people who had or had not obtained nutrition advice prior to the consultation at the Allergy Clinic. In addition, the influence of presenting symptoms on mothers and adult patients psychological status and personality traits was assessed.

EATING DISORDERS AND PSYCHOLOGICAL STATUS

A series of validated questionnaires (Appendix E) were used to address the current disordered eating behaviours and attitudes of the mothers or adult patients. Their psychological status and the presence of particular personality traits were also assessed, to determine the influence these characteristics had on their children's or their nutrient intake.

The Eating Disorders Inventory [38, 39] was a 64-items self-report questionnaire used to identify the preoccupation of body weight or exhibition of other eating disorder psychology. The Eating Disorders Examination measures the frequency and severity of overeating and weight control practices, and to obtain an overall assessment of specific eating disorder psychopathology, based on the DSM IV classification [21, 63]. The Body Shape Questionnaire [20] focuses primarily on concern with body shape. The Edinburgh Postnatal Depression Questionnaire [12, 22, 55] was a validated tool in detecting *distress* in the general population, and was used to assess things such as self-blame, anxiety, reactivity, panic, coping ability, insomnia and unhappiness in the participants. The Beck Depression

Inventory [6] in contrast analyses 21 behavioural manifestations of *clinical depression*. The State-Trait Anxiety Inventory [2, 73] was used to investigate anxiety phenomena namely, 1) state-anxiety, the current tension, nervousness, worry and apprehension and 2) trait-anxiety, the disposition to respond to psychological stress or anxiety-proneness. The General Health Questionnaire [9, 40, 43] also assesses anxiety and somatic traits in conjunction with a broad range of other symptoms noted in psychiatric disorders (eg, insomnia, social dysfunction, depression). The Eysenck Personality Questionnaire [29], a valid indicator of predisposed psychosomatic personality, was used to measure neuroticism or emotionality in the study population. Conners' Parents Questionnaire [18] was a commonly used checklist for paediatricians to detect behaviour problems in children over 3 years of age.

All questionnaires were scored by computer or manually, according to the specific scoring system developed for individual questionnaire. The scores were assessed by comparison with normative sample means of eating disorder patients and the general population, with cut-off scores based on previous validation studies.

Subjects were categorised into the following groups for assessment of eating disorder psychopathology and psychological status. These include,

Compliers (n=26), which were further divided into 2 groups :

- Mothers of children who followed the SED (n=17)
- Adult patients who followed the SED (n=9)

Non-compliers (n=7)

- Patients who chose not to follow the SED and withdrew from the study

STATISTICAL METHODS

The descriptive statistics (mean and standard deviations) were calculated for age, demographic data, weight, nutrient intakes and questionnaire scores by using MINITAB statistical package. The significant changes in nutrient intakes after commencing the dietary elimination was compared by using the non-parametric two-tailed Mann-Whitney t-tests. The disparity of questionnaire scores between compliers and non-compliers, and different presenting symptoms were evaluated using comparative t-tests as well. A significance level of 5% was used, with $p<0.05$ indicating a significant difference in results. Correlation statistics were also performed between questionnaire scores.

RESULTS

DIETARY HABITS

Prior to attending the allergy clinic, the subjects were asked about their symptoms, source/s of previous nutrition knowledge and any dietary change/s they had made.

SYMPTOMS

All patients studied described multiple symptoms which they associated with food intolerance (Table 2). Skin problems were the commonest symptoms reported in children and adults. Behavioural disturbances and inability to concentrate were present in 6 of the children, including one case of Attention-Deficit Hyperactivity Disorder.

Symptoms	**Children** n=15	**Adults** n=5
Skin[1]	11	3
GIT[2]	6	1
Respiratory[3]	6	1
Neurological[4]	2	2
Behavioural[5]	6	-

1. ***Skin Problems*** - eczema, urticaria and rashes.
2. ***Gastrointestinal tract (GIT) symptoms*** - nausea, vomiting, mouth ulcers, flatulence, abdominal discomfort, bloating, diarrhoea and constipation.
3. ***Respiratory symptoms*** - sinus congestion, rhinitis, and asthma.
4. ***Neurological symptoms*** - lethargy, headache, mood swings/irritability and insomnia.
5. ***Behavioural problems*** - behavioural disturbances, inability to concentrate and Attention-Deficit Hyperactivity Disorder.

Table 2 : Symptoms associated of food intolerance/allergy.

PREVIOUS NUTRITION ADVICE

Most patients (n=16) had received previous dietary advice regarding their food intolerance/allergy from their general practitioners and eight had consulted a specialist. Nutrition advice was also sought from naturopaths (n=3) and eight patients had referred to

books and/or magazines. Two patients had consulted a dietitian before attending the allergy clinic. Multiple consultations were common among these subjects. Statistical analysis revealed that the nutritional intake of subjects who had obtained dietary advice from other sources were as adequate (namely in consumption of total energy, carbohydrate, calcium and iron) as those who had not obtained advice prior to the dietary intervention. Daily multivitamin and mineral supplements were not commonly taken in the present population (n=3). Garlic tablets and evening primrose oil were taken occasionally.

PREVIOUS DIETARY CHANGES

A total of fifteen patients (11 mothers and 4 adults) had made some form of dietary modification to alleviate their children's or their symptoms, prior to attending the allergy clinic. Only two patients were avoiding foods high in salicylates and artificial preservatives. However, most patients had removed *specific* foods or beverages from the diet which they believed had provoked symptoms. These included chocolate, lollies, peanut, vegemite, meat, eggs, seafood, coffee, alcohol, spices. Fruits and vegetables were commonly avoided, these included tomatoes, capsicum, broccoli, orange, banana and sultanas. Nine mothers stated they had removed milk or dairy products from their children's diet and only five had substituted soy products. Other foods which were avoided included wheat (n=2), yeast (n=2) and rye (n=1).

NUTRITIONAL ADEQUACY OF THE SIMPLIFIED ELIMINATION DIET

The average nutrient intake before and during dietary elimination was estimated and the nutritional adequacy of the diets was then assessed by comparison with RDI values calculated for sex, weight and age. After commencing the SED, the energy intake of all patients decreased by a mean of 6% (Table 3). The average weight loss of children was

0.5±0.11kg and of adults was 0.6±0.58kg. During the SED, patients had significantly lower intakes of β-carotene (76%), vitamin C (46%), total vitamin A (41%), sodium (37%), sugars (37%), saturated fat (24%), with smaller decreases (in descending order) of carbohydrate, total and monounsaturated fat, thiamin, riboflavin and calcium. In contrast, there were significantly higher intakes of polyunsaturated fat (29%), starch (22%), cholesterol (37%) and protein (15%), with smaller increases (in descending order) of niacin equivalents, zinc, alcohol, iron, phosphorus, potassium, fibre and magnesium. The overall mean nutritional intake of each of the SED groups compared with RDI's are displayed in Figure 2-5.

CHILDREN ON THE SIMPLIFIED ELIMINATION DIET

Children following the SED lowered their energy intake by 5% (Figure 2) with an average weight loss of 0.24±0.3 kg, but adequately met their requirements for all analysed nutrients. Large decreases in vitamin C and vitamin A consumption were noted, however intakes continued to exceed the RDI recommendations (276% RDI and 112% RDI respectively). Protein, iron, zinc and calcium intakes were increased by 13%, 10%, 4% and 3% respectively. The children following the SED which included wheat and milk had the greatest increases in cholesterol (46%) and fibre (13%) and greatest decrease in carbohydrate (12%) consumption (Table 3). The present results were then combined with the Soutar study and showed a similar change in nutrients (Appendix G), except that the magnesium and calcium intakes were marginally less than the RDI requirements (78% RDI and 87% RDI respectively). A possible explanation is the previous smaller sample size of children (n=3).

Nutrient	Simplified Elimination Diet (SED)				
		Children			Adults
	Group mean	SED	SED without Milk	SED without Milk & Wheat	SED
		n=5	n=5	n=5	n=5
Energy	**-6**	-5	-11	-1	4
Protein	**15**	13	3	4	43
Carbohydrate	**-7**	-12	-12	-7	2
Fibre	**4**	13	-6	3	-2
Starch *	**22**	15	28	14	26
Sugars *	**-37**	-39	-49	-27	-25
Total Fat	**-11**	-4	-23	5	-14
Saturated Fat *	**-24**	-5	-49	-19	-14
Monounsaturated Fat	**-11**	-9	-23	17	-13
Polyunsaturated Fat *	**29**	6	86	5	-10
Cholesterol	**37**	46	-6	23	78
Calcium	**-4**	3	-19	-22	23
Iron	**6**	10	3	-12	34
Zinc	**11**	4	-1	11	34
Sodium *	**-37**	-27	-51	-29	-30
Potassium	**4**	4	-8	-3	23
Magnesium	**3**	5	-13	3	30
Phosphorus	**6**	7	5	-14	36
Vitamin A (Total Retinol) *****	**-41**	-40	-46	-49	-24
β-Carotene *****	**-76**	-78	-75	-77	-71
Vitamin B1 (Thiamin)	**-2**	-18	-10	-23	50
Vitamin B2 (Riboflavin)	**-5**	-11	-13	-27	44
Vitamin B3 (Niacin Equivalents)	**11**	-	2	3	43
Vitamin C *	**-46**	-48	-56	-64	11
Alcohol	**-**	-	-	-	7

* Statistically significant change after dietary intervention for group mean, $p<0.05$

Table3 : Percentage change in nutrient intake for the diet groups.

CHILDREN ON THE SIMPLIFIED ELIMINATION DIET WITHOUT MILK

Children on the milk free SED had decreased energy intake by 11% with a mean weight loss of 0.9±0.61 kg. Although the total energy level was lowered, these children adequately met their requirements for energy and all analysed nutrients, except calcium, which was consumed at 75% RDI (Figure 3). Prior to the SED these children had a mean calcium intake (91% RDI) which was less than the recommended. Compared with the group on the SED containing milk and wheat (Table 3), the children on the milk free SED showed marked decreases in vitamin C (56%), sugars (49%), total fat (23%), saturated fat (49%), total vitamin A (46%) and increases in starch (28%) and polyunsaturated fat (86%) consumption. The nutrient changes in this diet group were in line with the Soutar study. However, when the results of both studies were combined, calcium intake almost met the recommendations (consumed at 95% RDI) (Appendix H).

CHILDREN ON THE SIMPLIFIED ELIMINATION DIET WITHOUT MILK AND WHEAT

Children on the milk free, wheat free SED maintained their energy consumption (83% RDI) with a mean weight loss of 0.3±0.13kg (Figure 4). The RDI profiles between the three SED groups showed significant decreases in vitamin A, particularly in β-carotene and vitamin C consumption (49%, 77% and 64% respectively), along with decreases in thiamin, riboflavin and iron (23%, 27% and 12% respectively). Calcium intake was found to be less than two thirds the RDI (64% RDI), suggesting that these individuals may have increased risk of calcium deficiency, but in most cases, intake was already poor prior to the dietary intervention (81% RDI). Intakes of all other nutrients met the RDI requirements.

ADULTS ON THE SIMPLIFIED ELIMINATION DIET

Adults following the SED (Figure 5) consumed an additional 4% of energy with a mean weight loss of 0.6±0.6 kg. In contrast to the children, the adult RDI profiles showed an increased intake of all the nutrients, except vitamin A, where the consumption fell from 82% to 62% RDI. Although calcium, iron, zinc, magnesium intakes were marginally below recommendations (76% RDI, 79% RDI, 71% RDI and 95% RDI respectively), the dietary intervention had actually improved the RDI status of these nutrients by 23%, 34%, 34% and 30% respectively. Larger increases in protein (43%), thiamin (50%), riboflavin (44%), niacin equivalents (43%), phosphorus (36%) and potassium (23%) were also evident on the diet. Cholesterol intake increased significantly by 78% to 395mg per day, which exceeded the recommended intake (300mg), although saturated fat consumption was decreased by 14%. The unexpected increase of alcohol consumption was due to the increased intake of gin/vodka/whisky in one adult. When these results were combined with the Soutar study, a similar RDI profile was found (Appendix I). However, most nutrients increased less dramatically except for a significant increase in zinc (43%) and a significant decrease in vitamin A (71%).

EATING DISORDERS AND PSYCHOLOGICAL STATUS

The demographic characteristics of the study population are given in Table 4. There were no significant differences in the characteristics of the study groups. Similar characteristics were found in the combined study population (Appendix J).

	Compliers		Non-compliers
	Mothers n = 17	Adults n = 9	 n = 7
Age (years)*	34.7(3.90)	30.0(17.46)	33.1(4.49)
Current Body Mass Index (kg/m^2)*	25.3(4.68)	21.0(1.95)	27.7(6.88)
Years of Education (HSC =12)*	13.0(2.76)	11.7(3.35)	13.1(2.56)
Country of Birth			
Australia	13	6	7
Other English speaking	3	3	0
Non English speaking	1	0	0
Marital Status			
Been Married	15	3	4
Never Married	2	6	3
Number of Children*	2(0.94)	0.2(0.67)	2.1(1.68)
Smokers	2	0	0

* Means(SD)

Table 4: Characteristics of participants for the assessment of eating disorders and psychological status.

Clinical data obtained during the interview found that 1 mother and 2 non-compliers were currently suffering from psychiatric problem, including one case of neurosis, with the mother having attempted suicide. Two mothers, 4 adults and 2 non-compliers had previously suffered from depression. Post-natal depression was experienced by 4 mothers and 2 non-compliers. Anxiety or panic attacks were reported by 2 mothers, 3 adults and 1 non-complier. Alcohol and/or drug abuse was reported by one mother and physical and/or sexual abuse by another mother.

ASSESSING EATING BEHAVIOURS AND ATTITUDES

EATING DISORDERS EXAMINATION(EDE)

The Eating Disorders Examination (EDE) diagnosed bulimia nervosa in one non-complier, and another complier reported that she had previously suffered from anorexia nervosa. Epidemiological studies performed in Australia [7] and the United States [49] suggest that the incidence of bulimia nervosa in the general population is less than 2-3%, which is in line with the finding in the present population. However the self reported incidence of 3% for anorexia nervosa is considerably higher than the 1% for the general population. The EDE also identified subclinical eating disorder behaviours in some individuals. Objective bingeing was detected in 1 mother and 2 non-compliers; subjective bingeing in another mother and non-purging for bulimia nervosa in 4 non-compliers.

Comparison of the mean scores for the EDE subscales among the study groups, with the normal population, "dieters" and anorexia nervosa patients is presented in Figure 6. Among the study groups, the non-compliers scored highest for all subscales, namely, restraint, eating, weight and shape concerns. Their scores were similar to "dieters", except the eating concern subscale was scored in the range between the "dieters" and the

anorexia nervosa population. The restraint and weight concern in mothers and adults was similar and comparable to the normal population. The shape concern in mothers however was slightly higher than that of normal women and the eating concern in adults was same as "dieters".

EATING DISORDER INVENTORY(EDI)

The mean scores of the compliers for all the EDI subscales were representative of the normal population (see Figure 7). Among the compliers, the mean score of body dissatisfaction subscale of the mothers was higher than that of the adult patients, suggesting the mothers were more preoccupied with body shape and weight. The adults' mean score of drive for thinness was higher than the mothers, however one adult who had previously suffered from anorexia nervosa had a high score (score=21, compared to a cut-off score of 14 [38]), which generated a higher mean score. The non-compliers revealed substantially higher scores for all EDI subscales when compared to the normal population and the compliers. The score for the body dissatisfaction subscale was close to that of the eating disorder population, implying more eating disorder psychopathology and behaviour was present in the non-compliers.

APPEARANCE RATING

The mean score of the compliers was representative of the normal population (a score of 6-7 out of 10). However, the mothers (6.41±0.29) generally rated their appearance slightly lower than the adult patients (7±0.24). A significant difference was found between the rating of the compliers and non-compliers. The non-compliers tended to give lower scores with a mean of 4.93±1.34.

BODY SHAPE QUESTIONNAIRE (BSQ)

The mean score of BSQ for the non-compliers (84.4±36.9) was much higher than that of the compliers (63.65±27.3). Statistical analysis revealed that the BSQ score in adults was highly correlated with drive for thinness(r=0.952), restraint(r=0.962) and shape concern(r=0.972). High correlations were also found between BSQ score and shape concern in mothers(r=0.816). A similar trend was also found in the non-compliers (r=0.789).

These results were in line with the findings of the Soutar study. When results of both studies combined, the non-compliers revealed substantially higher scores on EDE (Appendix K), EDI (Appendix L), BSQ and lower rating on Appearance (Appendix M). The mean scores of compliers were also found to be representative of the normal population, except for the eating concern score of EDE which was similar to the "dieters".

ASSESSING PSYCHOLOGICAL STATUS

The mean scores of questionnaires assessing psychological status and personality traits are shown in Table 5 for all the subjects.

QUESTIONNAIRE	Compliers			Non-Compliers	p-values *
	Total n=26	**Mothers n=17**	**Adults n =9**	**n=7**	
GHQ >12, Psychiatric Problem	**3.65 (3.97)**	3.71(4.57)	3.5(2.6)	**12.14(5.4)**	0.005
EPDQ >12, Emotional Distress	**6.15(5.01)**	5.71(5.13)	7(4.95)	**14.71(4.92)**	0.002
Beck >16, Clinical Depression	**4.46(4.14)**	4.06(4.18)	5.2(4.2)	**16.86(8.4)**	0.0065
EPQ >18, Neurotic Behaviour	**8.65(4.85)**	8.06(4.39)	9.7(5.72)	**15.86(5.05)**	0.0061
STAI-State >49, State Anxiety	**32.04(7.7)**	32.76(7.6)	30.7(8.1)	**56.00(9.92)**	0.0002
STAI-Trait >48, Trait Anxiety	**33.73(7.82)**	33.41(6.8)	34.33(9.9)	**56.86(8.59)**	0.0001
Symptom	**9.54(8.08)**	7.82(7.08)	12.78(9.3)	**18.86(11.9)**	NS
BSQ(Body Shape)	**63.65(27.3)**	67.6(22.2)	56.2(35.3)	**84.4(36.9)**	NS
Appearance	**6.62(1.06)**	6.41(1.18)	7(0.71)	**4.93(1.43)**	0.0079
EDI	**23.73(11.7)**	22(11.06)	27(12.77)	**51.86(20.7)**	0.0087

* Significant difference between Compliers (Total) and Non-compliers, $p<0.05$.

Table 5 : Mean scores (SD) of questionnaires assessing psychological status and personality traits for the participants.

The compliers scored significantly lower than the non-compliers on the GHQ (p=0.005), EPDQ (p=0.002), BDI (p=0.0065), EPQ (p=0.0061), STAI (p=0.0002, 0.0001) and were all representative of the normal population. The mothers and adult patients had similar mean scores for all the questionnaires, except that a higher rating for symptoms was seen in adult patients compared to mothers.

In comparison, the non-compliers displayed substantially higher mean scores on all the questionnaires. The mean scores on GHQ, EPDQ, BDI, STAI revealed by the non-compliers were all above the cut-off scores for the associated psychopathology. The results were in line with the findings of the combined population (Appendix M), indicating that the non-compliers had more psychiatric problems, emotional distress and depression. In addition, they not only experienced current anxiety, apprehension and tension (state anxiety) but were also more prone to anxiety phenomena in response to stressful situations (trait anxiety). Although the mean score on EPQ in the present and combined study (Appendix M) was lower than the cut-off point, the marginally higher score implied a greater tendency towards neurotic behaviour and a psychosomatic personality in the non-compliers.

ASSESSING PSYCHOLOGICAL STATUS WITH PRESENTING SYMPTOMS

Statistical analysis was performed to determine whether any significant differences existed between psychological status, personality traits and presenting symptoms. The adults with skin symptoms (Appendix N) revealed significantly higher scores for EPDQ ($p=0.049$) and EPQ ($p=0.034$) than the mothers of children with skin problems. The results implied that the adults with skin problems experienced more emotional distress and were more prone to neurotic behaviour compared to the mothers of children with skin complaints.

Thirteen mothers filled out the Conners' Parents Questionnaire and five of the children had T-scores greater than 67 on the Hyperactivity Index factor, indicating the presence of behaviour problems [18]. Comparative testing carried out to determine whether mothers with or without hyperactive children revealed different scores on various questionnaires, failed to detect any significant association.

DISCUSSION

NUTRITIONAL ADEQUACY

Elimination diets involve the extensive restriction of a variety of foods which contain natural or artificial chemicals that may provoke symptoms in sensitive individuals.

In the 1950s a number of infants were reported to develop vitamin A deficiency as a result of elimination diets [5, 82]. Protein-calorie malnutrition has also been reported [66]. Other studies [8, 23, 25, 48, 50, 56] have shown that children on elimination diets may have an inadequate intake of energy and nutrients, particularly calcium. However, in the present study group of children undergoing dietary investigation, nutritional adequacy was maintained on the Simplified Elimination Diet (SED), with the exception of calcium. In many cases calcium intake was already poor prior to dietary intervention.

On the SED, the energy intake was maintained in all children, except those excluding milk. An 11% decrease in energy intake with a mean weight loss of 0.9±0.6kg was observed in these children. All nutrient intakes and lowered energy intakes still adequately met the RDI recommendations. The subsequent weight loss was probably due to the lower intakes of sugars, saturated and total fat. It should be noted that there was a degree of uncertainty about the accuracy of weight scales used for assessing changes in body weight, since many patients were unable to return to the allergy clinic for follow-up measurement. To minimise the possibility of measurement error, such patients recorded their weight changes at a local pharmacy (see methods). Clinical experience at the allergy clinic at RPAH also suggests that the children usually regain the weight loss within 3-4 weeks once they have adjusted to the SED food choices.

The most significant nutritional changes which occurred in children following the SED were decreases in intake of vitamin A, in particular β-carotene and vitamin C, but these lowered intakes were still sufficient to meet their RDI requirements. Inadequate calcium intakes were found in children on the SED who also excluded milk and/or wheat. Four out of nine mothers who suspected their children had a milk intolerance/allergy reported that they already avoided milk but had not replaced the milk with a substitute prior to the consultation at the allergy clinic. On the SED, these children continued to have lower calcium intakes compared to the children who had an adequate intake prior to the SED. These children often substituted fruit, fruit juice and vegetables for milk and dairy products. These observations were also made by McGowan & Gibney [50] in a study of 38 adults who followed a milk free diet for self-diagnosed milk allergy. They had significantly higher intakes of β-carotene, vitamin C, iron, folic acid and fibre and significantly lower intakes of calcium. The nutritional profile of the children on the SED who also excluded milk and wheat was found similar to the children who excluded milk only. The intake of B vitamins and iron was decreased but still met the RDI. These observations contrast with those of Lloyd-Still [48], who reported on the nutritional deficiencies of a milk and wheat free elimination diet.

On the SED (including wheat and milk), children showed increases in intakes of iron, zinc and decreases in sodium, total and saturated fats. This was due to an increased consumption of fresh meats, eggs and a decrease in commercial snack foods, processed meats, deep-fried foods and yeast extracts. Protein intake was increased on the SED even though most children already ate more than 200% RDI prior to the SED. Hence protein inadequacy was not observed as reported by Roy [66]. A small

change in fibre intake occurred in this group of children which was not observed in the adult group studied by Soutar [74]. These children regularly consumed a low fibre diet prior to the SED.

In contrast, the intakes of calcium, iron, zinc, magnesium and riboflavin in adults were poor prior to dietary intervention, these all improved on the SED. However, a significantly lower intakes of vitamin A, in particular β-carotene was detected, suggesting that a supplement was required to ensure nutritional adequacy in those with a previously poor intake.

Self-imposed dietary restriction of foods suspected to give adverse reactions and unsupervised dietary elimination from other professionals were common in the present population and contribute to poor dietary habits prior to consultation. Dietetic counselling at the commencement of the SED addresses patients beliefs, thereby enabling individuals at greater risk to be identified and appropriate advice given. In the children requiring milk restriction on the SED, milk substitutes (eg. calcium enriched soy drinks) and/or a calcium supplement were prescribed to ensure an adequate intake of calcium.

When interpreting these results it should be noted that the association of dietary change and nutritional status may be subject to bias due to a number of factors. These include the time constraints of the study as assessment was undertaken after 2-3 weeks of dietary intervention. The intra-individual variation in food intake may be so large that five-day dietary recording is too short a time to reveal correlations in a small group of patients [47, 75]. The use of weighed food records may generate

inaccuracies in dietary assessment in the children [60]. The mothers may have prepared a more monotonous for their children during the recording period. The measured portions of food may have been inadvertently discarded or extra foods consumed by some toddlers in the study group.

DIETARY COMPLIANCE

The second aim of this study was to determine whether the maternal or adult eating behaviours, current psychological status and personality traits influence compliance and nutritional adequacy of patients prescribed the SED. Based on the results obtained it appears that the incidence of current eating disorders in all compliers is the same as that of the normal population, except that the "concern of eating" in adult patients was similar to the "dieters". The eating behaviours, psychological status and personality traits of all compliers (mothers and adults), was found to be consistent with those of the adults in the Soutar study. This observation is in contrast to the popular perception that people with disordered eating or psychological disturbances may present for assessment of food intolerance and undergo dietary elimination in order to perpetuate their disorder.

In comparison, the non-compliers appeared to exhibit some eating disorder psychopathology in conjunction with a higher incidence of emotional distress and depressive illness. The mothers and adults who chose to withdraw from the SED also displayed a greater tendency to neurotic behaviour and may be described as having anxious personality types. Five out of the seven non-compliers in the present study were mothers. One of them, suffering from psychiatric problems, reported that multiple health professionals had been involved in the management of food allergy

and intolerance in her 19-month-old son. Another mother, who was a nurse planned to diagnose the food problems of her 11-year-old child by charting the symptoms, daily activities and food intake for a month prior to starting the SED. Two mothers wanted to seek a second opinion from other health professionals before commencing.

The degree of dietary restriction imposed on the children by some of the non-compliant mothers, in addition to the above observations have raised health concerns, about the possible presence of the so-called Munchausen syndrome by proxy. In paediatrics, Munchausen syndrome by proxy is an increasingly reported insidious disorder in which symptoms and signs in a child are fabricated and/or induced by the caretaker, mostly mothers [10, 49, 52, 64]. The deception often results in illness, danger, a persistent seeking of medical care, unnecessary investigations and treatments for the child. This syndrome was first described in 1977 by Meadow [53]. Mothers seemed to derive a sense of purpose and fulfilment from the medical attention given to the factitious illness created in her child. "Food allergy" has been reported as an associated feature of Munchausen syndrome by proxy since Warner & Hathaway [80] found factitious allergy affecting 17 children. In most cases, these mothers believed that their children had severe disease due to food allergies, such as nausea, abdominal pain, diarrhoea, recurrent cough, rhinitis, fever and hyperactivity. According to Bools' literature review [10] of Munchausen syndrome by proxy, most verbal fabrications have been about food allergies, and the maternal obsession with allergen avoidance resulted in unbalanced diets. Fisher et al [37] reported that a mother fed her child a strict vegetarian diet for four years, insisting that he was psychotic with a history of bizarre behaviours and allergies.

The maternal history of previous physical/sexual abuse, miscarriage and dysfunctional marriages [28] in the fabricating mothers was also found in some of our non-compliant mothers. Refusal to take dietary advice, failure to attend clinic follow-ups and frequent consultation [49, 80] also occurred in this group. Some characteristics of the psychopathology of the fabricating mothers was also observed in our non-compliant mothers. Samuels et al [68] and Scourfield [70] noted that some fabricating mothers suffered from eating disorder, psychiatric problems and depression with personality disorders. Although food allergy is rarely the life-threatening presentation of Munchausen syndrome by proxy, the nutritional adequacy of the affected children is a serious health concern.

The exhibition of psychological and personality disorders in the two adult non-compliers in the present study reinforces the findings of the Soutar study that this group of people were less likely to undergo dietary elimination. Similar consulting behaviour was also found in the non-compliant mothers. Higher levels of psychological morbidity, frequent consultation and overvalued ideas of diet were common among the non-compliant group of patients. Rix et al [62] found that these patients were more likely to attend an allergy clinic seeking advice about food allergy or intolerance than the general population. However, this study shows that although they may seek assistance, they are less likely to follow the dietary advice given.

A number of studies [27, 31, 35, 57, 58, 59, 62, 71] have reported that patients who want to investigate the role of food when suffering from the so-called "psychosomatic" complaints, such as irritable bowel, chronic fatigue syndrome and migraine, may display some form of psychiatric disorders. Assessment of psychological variables

and symptoms of food intolerance in the present group revealed some interesting results. The adult patients with skin manifestations experienced more emotional distress and were more prone to neurotic behaviour compared to mothers of children with skin problems. No significant difference was seen in mothers or adults with other symptoms. A follow-up measurement of psychological profile in the previous adult group [74] showed a significant reduction of emotional distress and proneness to neurotic behaviour following dietary elimination. Further assessment of mothers is important to determine whether there is improvement in psychological profile after dietary intervention in children.

Behavioural problems in children were popular complaints associated with food intolerance at the allergy clinic at RPAH. Harvey et al [41] found that the presence of maternal depression and anxiety were associated with increased behavioural problems in 65 children. In the present study, this association was not detected, suggesting that behavioural symptoms in children are not a result of maternal depression or anxiety. This result may be due to the small sample size of the population under study. Further research is needed in order to determine whether mothers with behavioural problems in their children exhibited disordered psychological status and/or personality traits would influence the dietary compliance and hence nutrient intake of the children on the elimination diet.

CONCLUSIONS

This study in primarily children, like that of Soutar primarily in adults, shows that nutritional adequacy is not necessarily linked to the level of dietary restriction. The nutrient intake of children on the SED adequately met the RDI requirements, with the exception of calcium. In most cases calcium intakes were already poor prior to the dietary intervention. In adults, the intake of total vitamin A, in particular β-carotene was more likely to be inadequate and was also poor prior to the SED. Prescription of food substitutes and/or a supplement is essential to ensure nutritional adequacy on the SED, especially in those with prior poor intakes. The nutritional profile may eventually improve in patients if appropriate dietary advice is given and the patients are made more aware of the importance of ensuring nutritional adequacy. Based on the assessment of eating behaviours, psychological status and personality traits, the individuals who undergo dietary elimination were considered to be psychologically normal. Whereas, non-compliant mothers were more likely to exhibit psychological and personality disorders and were therefore unable to undergo dietary elimination.

REFERENCES

1. Aberer W. Food allergies and intolerance-epidemiological studies. *Wiener Klinische Wochenschrift* 1996; 108(6): 159-62.
2. Aylard PR, Gooding JH, McKenna PJ and Snaith RP. A validation study of three anxiety and depression self-assessment scales. *Journal of Psychiatric Research* 1987; 31(2): 261-268.
3. Bahna SL. Critique of various dietary regimens in the management of food allergy. *Annals of Allergy* 1986; 57: 48-51.
4. Bardare M, Vaccari A, Allievi E, Brunelli L, Coco F, De Gaspari GC and Flauto U. Influence of dietary manipulation on incidence of atopic disease in infants at risk. *Annals of Allergy* 1993; 71: 366-371.
5. Bass MH and Caplan J. Vitamin A deficiency in infancy. *Journal of Paediatric* 1955; 47: 690.
6. Beck A, Ward C, Mendelson M, Mock J and Erbaugh J. An Inventory for Measuring Depression. *Archives of General Psychiatry* 1961; 4: 61-71.
7. Ben-Tovim DI and Morton J. The epidemiology of anorexia nervosa in South Australia. *Australian and New Zealand Journal of Psychiatry* 1990; 24: 182-186.
8. Bierman CW, Shapiro GG, Christie DL, VanArsdel PP & Ward BH. Allergy grand rounds. Eczema, rickets and food allergy. *Journal of Allergy and Clinical Immunology* 1978; 61: 119-127.
9. Boardman AP. The General Health Questionnaire and the Detection of Emotional Disorder by General Practitioners. *British Journal of Psychiatry* 1987; 151: 373-381.
10. Bools C. Factitious illness by proxy. *British Journal of Psychiatry* 1996; 169: 268-275.
11. Boris M, Mandel FS. Foods and additives are common causes of the attention deficit hyperactive disorder in children. *Annals of Allergy* 1994; 72: 462-468.
12. Boyce P, Stubbs J and Todd A. The Edinburgh Postnatal Depression scale: Validation for an Australian sample. *Australian and New Zealand Journal of Psychiatry* 1993; 27: 472-476.
13. Businco L and Cantani A. Prevention of childhood allergy by dietary manipulation. *Clinical and Experimental Allergy* 1990; 20: Supplement 2: 9-14.
14. Cant AJ, Bailes JA, Marsden RA and Hewitt D. Effect of maternal dietary exclusion on breast fed infants with eczema: Two controlled studies. *British Medical Journal* 1986; 293: 231-233.

15. Carlson J, Fernlund P, Ivarsson SA, Jakobsson I, Neiderud J, Nilsson KO, Svensson M and Swanstein U. Munchausen syndrome by proxy: an unexpected cause of severe chronic diarrhoea in a child. *Acta Paediatric* 1994; 83: 199-21.
16. Carter C. Dietary treatment of food allergy and intolerance. *Clinical and Experimental Allergy* 1995; 25 Suppl.1: 34-42.
17. Carter CM, Urbanowicz M, Hemsley R et al. Effects of a few food diet in attention deficit disorder. *Archives of Disease in Childhood* 1993; 69: 564-568.
18. Conners CK. A teacher rating scale for use in drug studies with children. *American Journal of Psychology* 1969; 126: 884-8.
19. Conners CK, Goyette CH, Southwick DA, et al: Food additives and hyperkinesis: A controlled double-blind experiment. *Paediatrics* 1976; 58: 145.
20. Cooper PJ, Taylor MJ, Cooper Z, & Fairburn CG. The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders* 1987; 6: 485-94.
21. Cooper Z, Cooper P and Fairburn C. The Validity of the Eating Disorder Examination and its Subscales. *British Journal of Psychiatry* 1989; 154: 809-12.
22. Cox JL. Holden JM. and Sagovsiky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 1987; 150: 782-786.
23. David TJ, Waddington E, and Stanton RHJ. Nutritional hazards of elimination diets in children with atopic eczema. *Archives of Disease in Childhood* 1984; 59: 323-325.
24. Department of community services and health. *Composition of Foods Australia.* Canberra: Australian Government Publishing Service, 1992.
25. Devlin J, Stanton RHJ and David TJ. Calcium intake and cow's milk free diets. *Archives of Disease in Childhood* 1989; 64: 1183-4.
26. Dietitians Association of Australia review paper. The dietary management of food allergy and food intolerance in children and adults. *Australian Journal of Nutrition and Dietetics* 1996; 52: 89-98.
27. Drossman DA, McKee DC, Sandler RS, Mitchell CM and Cramer EM. Psychosocical factors in the irritable bowel syndrome. A multivariate study of patients and non patients with irritable bowel syndrome. *Gastroenterology* 1988; 95: 701-8.
28. Eminson DM, Postlethwaite RJ. Factitious illness: recognition and management. *Archives of Disease in Childhood* 1992; 67: 1510-1516.
29. Eysenck H and Eysenck S. *Eysenck Personality Questionnaire.* Hodder & Soughton: Sevenoaks, Kent, 1975.

30. Falth-Magnusson & Kand Kjellman NIM. Allergy prevention by maternal elimination diet during late pregnancy - A 5 year follow-up of a randomised study. *The Journal of Allergy and Clinical Immunology* 1992; 89(3): 709-713.
31. Farthing MJG. Irritable bowel, irritable body, or irritable brain? *British Medical Journal* 1995; 310: 171-5.
32. Feingold BF. Recognition of food additives as a cause of symptoms of allergy. *Annals of Allergy* 1968; 26: 309-13.
33. Feingold BF. Hperkinesis and learning difficulties linked to artificial food flavours and colours. *American Journal of Nursing* 1976; 75: 797-803.
34. Ferguson A. Definitions and diagnosis of food intolerance and food allergy: Consensus and controversy. *The Journal of Paediatrics* 1992; S7-S11.
35. Ferguson A. Food sensitivity or self deception? *The New England Journal* 1990; 323: 476-478.
36. Fergusson DM, Horwood LJ, Beautrais AL, Shannon FT and Taylor B. Eczema and infant diet. *Clinical Allergy* 1981; 11: 325-331.
37. Fisher GC and Mitchell I. Is Munchausen syndrome by proxy really a syndrome? *Archives of Disease in Childhood* 1995; 72: 530-534.
38. Garner D and Garfinkel P. Development and validation of a Multidimensional Eating Disorder Inventory. *International Journal of Eating Disorders* 1983; 2: 15-34.
39. Garner DM and Olmsted MP. *Manual for the Eating Disorder Inventory (EDI)* 1984; Toronto: Psychological Assessment Resources.
40. Goldberg DP. The General Health Questionnaire. *Psychological Medicine;* 9: 139-45.
41. Harvey JM, O'Callaghan MJ and Vines B. Prevalence of maternal depression and its relationship to ADL skills in children with developmental delay. *Journal of Paediatrics & Child Health* 1997; 33: 42-46.
42. Hattevig G, Kjellman B, Sigurs N, Grodzinsky E, Hed J, and Bjorksten B. The effect of maternal avoidance of eggs, cow's milk, and fish during lactation on the development of IgE, IgG, and IgA antibodies in infants. *The Journal of Allergy and Clinical Immunology* 1990; 85: Vol.1: Part 1: 108-115.
43. Hobbs P, Ballinger CB and Smith A H W. Factor Analysis and validation of the General Health Questionnaire in Women: A General Practice Survey. *British Journal of Psychiatry* 1983; 142: 257-264.
44. Hodge L, Yan KY, Loblay RL. Assessment of food chemical intolerance in adult asthmatic subjects. *Thorax* 1996; 51: 805-9.

45. Karlin NJ, Retzlaff PD. Psychopathology in caregivers of the chronically ill: personality and clinical syndromes. *Hospital Journal* 1995; 10(3): 55-61.
46. Lacey SR, Cooper C, Runyan DK and Azizkhan RG. Munchausen Syndrome by Proxy: Patterns of Presentation to Paediatric Surgeons. *Journal of Paediatric Surgery* 1993; 28: 827-832.
47. Livingstone MBE, Prentice AM, Strain JJ, Coward WA, Black AE, Barker ME, McKenna PG. and Whitehead RG. Accuracy of weighed dietary records in studies of diet and health. *British Medical Journal* 1990; 300: 708-712.
48. Lloyd-Still JD. Chronic diarrhoea of childhood and the misuse of elimination diets. *The Journal of Paediatrics* 1979; 95(1): 10-13.
49. Lucas AR, Beard CM, O'Fallon WM and Kurland LT. Fifty year trends in the incidence of anorexia nervosa on Rochester, Minn: A population-bases study. *American Journal of Psychiatry* 1991; 148: 917-22.
50. McGowan M, Gibney MJ. Calcium intakes in individuals on diets for the management of cows' milk allergy: a case control study. *European Journal of Clinical Nutrition* 1993; 47(9): 609-16.
51. Meadow R. Management of Munchausen syndrome by proxy. *Archives of Disease in Childhood* 1985; 60: 385-393.
52. Meadow R. Munchausen syndrome by proxy. *Archives of Disease in Childhood* 1982; 52: 92-98.
53. Meadow R. Munchausen syndrome by proxy: the hinterland of child abuse. *The Lancet* 1977; 2: 343-345.
54. Metcalfe DD. Diagnostic Procedures for Immunologically Medicated Food Sensitivity. *Nutrition Reviews* 1984; 42: No. 3: 92-97.
55. Murray L and Carothers AD. The validation of the Edinburgh Postnatal Depression Scale on a community sample. *British Journal of Psychiatry* 1989; 157: 288-290.
56. Paganus A, Juntunen Backman K, Savilahti E. Follow-up of nutritional status and dietary survey in children with cow's milk allergy. *Acta Paediatric* 1992; 81(6-7): 518-21.
57. Parker SL, Leznoff A, Sussman GL, Tarlo SM, and Krondl M. Characteristics of patients with food-related complaints. *Journal of Allergy and Clinical Immunology* 1990; Vol 86: No.4: Part 1: 503-511.
58. Pearson DJ. Food Allergy, hypersensitivity, and intolerance. *Journal of Registered College Physicians London* 1985; 10: 154-162.

59. Pearson DJ, Rix KJB and Bentley SJ. Food Allergy: How much in the mind? *The Lancet* June 4 1983; 1259.
60. Persson LA and Carlgren G. Measuring children's diets: evaluation of dietary assessment techniques in infancy and childhood. *International Journal of Epidemiology* 1984; 13: 506-517.
61. Peveler R, Mayou R, Young E and Stoneham M. Psychiatric aspects of food-related physical symptoms: a community study. *Journal of Psychosomatic Research* 1996; 41: 149-159.
62. Rix KJB, Pearson DJ, and Bentley SJ. A psychiatric study of patients with supposed food allergy. *British Journal of Psychiatry* 1984; 145: 121-126.
63. Rosen JC, Vara L, Wendt S and Leitenberg H. Validity Studies of the Eating Disorder Examination. *International Journal of Eating Disorders* 1990; 9: No. 5: 519-528.
64. Rosenberg D. Web of deceit: A literature review of Munchausen syndrome by proxy. *Child Abuse and Neglect* 1987; 11: 547-61.
65. Rowe AH. Elimination diets and the patient's allergies. Philadelphia: Lea & Febiger, 1944.
66. Roy CC, Silverman A and Cozzetto FJ. Diarrhoeal disorders, *in* Paediatric clinical gastroenterology, St. Louis, 1975, The CV Mosby Company, p 194.
67. Saarinen UM and Kalosaari M. Does dietary elimination in infancy prevent or only postpone a food allergy? *The Lancet* January 26 1980; 166-167.
68. Samuels MP, McClaughlin W, Jacobson RR. Poets CF and Southhall DP. Fourteen cases of imposed upper airway obstruction. *Archives of Disease in Childhood* 1992; 67: 162-170.
69. Schwartz RH. Allergy, intolerance, and other adverse reactions to foods. *Paediatric Annals* 1992; 21(10): 654-5, 660-2, 665-7.
70. Scourfield J. Anorexia by Proxy: Are the children of anorexic mothers an at-risk group? *International Journal of Eating Disorders* 1995; 5: 371-4.
71. Seggev JS. Psychopathology masquerading as food allergy. *Journal of Family Practice* 1988; 26: 161-164.
72. Shelley WB. Birch pollen and aspirin psoriasis. A study in salicylate hypersensitivity. *Journal of American Medical Association* 1964; 189: 985-8.
73. Spielberger C, Gorsuch R & Lushene R. *Manual for the State-Trait Anxiety Inventory* 1970; Palo Alto, CA: Consulting Psychologists Press.
74. Soutar J. *Nutritional assessment of elimination diets in patients with food allergy and food intolerance* [MND research project]. Sydney: University of Sydney, 1996.

75. Stuff JE, Garza C, O'Brian SE, Nicholas BL and Montandon CM. A comparison of dietary methods in nutritional studies. *American Journal of Clinical Nutrition* 1983; 37: 300-306.
76. Swain A, Dutton S and Truswell AS. Salicylates in food. *Journal of American Dietetics Association* 1985; 85: 950-960.
77. Truswell AS, Dreosti IE, English RM, Rutishauser IHE and Palmer N. Recommended Nutrient Intakes Australian Papers 1990. Australian Professional Publications. Mosman.
78. Warin RP, Smith RJ. Challenge test battery in chronic urticaria. *British Journal of Dermatology* 1976; 94: 401-6.
79. Warner JO. Food and behaviour. *Clinical and Experimental Allergy* 1995; 15 Suppl: 23-26.
80. Warner JO and Hathaway MJ. Allergic form of Meadow's syndrome (Munchausen by proxy). *Archives of Disease in Childhood* 1984; 59: 151-156.
81. Weeke ER. Epidemiology of allergic diseases in children. *Rhinol Suppl.* 1992; 13: 5-12.
82. Wolf IJ and Paterson NJ. Vitamin A deficiency in an infant. *Journal of American Medical Association* 1958; 166: 1859.
83. Young E. Stoneham M D. Petruckevitch. Barton J. and Rona R. A population study of food intolerance. *The Lancet* 1984; 343: 1127-9.
84. Zeiger RS, Heller S, Mellon MH, Forsythe AB, O'Connor RD, Hamburger RN, and Schatz M. Effect of combined material and infant food-allergen avoidance on development of atopy in early infancy: A randomised study. *Journal of Allergy and Clinical Immunology* 1989; Vol. 84: No.1: 72-89.

SUMMARY OF INSTRUCTIONS

Thankyou for taking the time to participate in this Research Study. Below you will find a summary of the steps involved. Should you have any problems or questions throughout the study, please feel free to contact Anna Chiu at the allergy consulting rooms on (02) 9515 8244.

RECEIVE YOUR CHILD'S PACKAGE FROM THE ALLERGY UNIT

Complete the enclosed questionnaire on dietary habits (10 minutes).

↓

Start your child's 5 day food and drink diary as soon as possible (refer to instructions).

↓

ATTEND THE ALLERGY UNIT FOR YOUR CHILD'S APPOINTMENT

Please arrive 30 minutes earlier than your child's scheduled appointment.

↓

Bring your child's completed forms with you (food diary, questionnaire on dietary habits).

↓

Discuss any questions you may have with the research dietitian - sign consent form.

↓

Have your child's height and weight measured.

↓

Your interview with the research dietitian (10 minutes).

↓

Complete the written questionnaires (30 minutes).

↓

See your child's physician.

↓

Complete the computerised questionnaire (20-40 minutes).

↓

See your child's specialist dietitian.

↓

Collect your child's second food diary

↓

START YOUR CHILD'S ELIMINATION DIET

↓

REMINDER CALL TO START YOUR CHILD'S SECOND DAIRY

Please start your child's second diary when instructed.

↓

YOUR CHILD'S FOLLOW-UP CONSULTATION AT THE ALLERGY UNIT

Bring your child's food diary with you.

↓

Have your child's weight measured.

↓

Your interview with the research dietitian (5-10 minutes).

↓

Complete the computerised questionnaire (20-40 minutes).

↓

Complete the written questionnaires (10 minutes).

↓

If desired see your child's specialist dietitian.

↓

YOU HAVE FINISHED

Receive in the mail a printed summary of your child's nutrient analysis and eating attitudes before and after the elimination diet. If desired, you may discuss the results of this analysis with your child's dietitian.

NUTRITIONAL ASSESSMENT OF ELIMINATION DIETS IN PATIENTS WITH FOOD INTOLERANCES

INFORMATION SHEET

You are invited to participate in a study of the nutritional adequacy of elimination diets used for the investigation of food intolerance. This research is being conducted by Dr R. Loblay, Dr V. Soutter, Dr A. Swain, and Ms Anna Chiu (student dietitian) at the Royal Prince Alfred Hospital Allergy Unit.

Food intolerance can cause a variety of symptoms in sensitive individuals. Investigation usually involves following a specially designed *elimination diet* which eliminates all possible suspect foods from the diet for a period of time, to see whether symptoms can be relieved. This usually takes between 2 and 6 weeks. A series of *challenge tests* are then administered by mouth (either as foods or in capsules) in order to identify the offending food compounds. The testing phase may last another 6-8 weeks (longer in some cases), after which an individually tailored diet can be recommended, according to the results. Gradual liberalisation may then be possible, depending on the person's degree of sensitivity.

The elimination diets used at RPAH have been carefully designed so as to provide a proper balance of nutrients and are supervised by a specialist dietitian in the Allergy Unit. However, since the variety of foods which can be selected is limited, we are concerned that in some patients there may be an inadequate intake of particular nutrients. The purpose of this research study is therefore to assess in detail the nutritional intake of patients going onto an elimination diet for investigation of possible food intolerance. We are also interested to find out whether attitudes to food may influence nutritional adequacy.

How this study would involve you

If you agree to participate, you will be asked to complete a preliminary food and drink intake diary 1-2 weeks before your clinic appointment. This involves recording the types and amounts of food and drink you consume over 5 days, as outlined in the enclosed diary and instructions. If, after assessment your physician considers it appropriate, you will then be given instructions by one of the specialist dietitians for following an elimination diet. You will be asked to complete another food diary, 2 weeks after you commence this diet. A telephone number will be available should you require help at any time. In addition to the food diary, you will also be asked to complete a questionnaire on dietary habits, which will take about 10-15 minutes.

On the day of your visit to the clinic, we will ask you to arrive half an hour before your scheduled appointment. At this time you will have the opportunity to discuss any additional questions you may have about the research study with the research dietitian (Anna Chiu).

If you agree to continue with the study you will be asked to sign a consent form in the presence of a witness. Your food diary and questionnaire will then be collected and your height and weight measured. Before you see the doctor, you will be interviewed briefly by the research dietitian before completing a series of questionnaires relating to your general health and attitudes to food. This will take about 30 minutes.

After your medical consultation, arrangements will be made for you to see one of the specialist dietitians at the clinic, to obtain detailed instructions on the elimination diet and challenge tests. Normally, you may need to wait up to 30 or 40 minutes to see the dietitian, depending how busy the clinic is at the time. Whilst waiting, we will ask you to do another questionnaire, this time using a computer to prompt you for your answers.

Before you leave the allergy unit, you will be given a second food and drink diary to take home. We will ask you to complete this two weeks after starting the elimination diet. You will receive a telephone call to remind you when to begin recording in your diary.

Although not essential for your routine management, we will ask you whether you can return to the clinic for a follow-up visit 3 weeks later. At this time, your weight will be recorded, you will have a short (5-10 minute) interview with the research student, and you will be asked to repeat the written questionnaires and the computer questionnaire. You will also be able to see the specialist dietitian to review your progress and answer any questions you may have about your diet. There will be no charge for this consultation and you will be reimbursed for any travel expenses incurred.

If you are unable to return to the allergy unit for a follow-up consultation, you can send to us your completed food diary by mail in the prepaid envelope. You will also be asked to weigh yourself on an accurate set of scales, preferably at a local pharmacy (you can be reimbursed for this if necessary).

Any information obtained during this study will be treated confidentially. If you decide to participate and then change your mind, you may freely withdraw at any time without being disadvantaged in any way. Whatever you decide, your treatment or your relationship with medical or dietetic staff at the clinic will not be affected.

At the completion of the research study we will send you a printed summary of your nutrient analysis and eating attitudes before and after you started the elimination diet. You may call and discuss the results of this analysis with your specialist dietitian and/or physician.

Thank you for taking the time to participate in this study. If you should run into any unexpected problems at any stage of the study please contact Anna Chiu on 9515 8244 or Dr R Loblay on 9515 6111 (pager no. 1845).

This study has been approved by the Ethics Review Committee of the Central Sydney Area Health Service (RPAH Zone). If at any time it becomes necessary to

make a complaint about the conduct of the project you can contact the Secretary of the Committee via the Research Development Office on 9515-6766.

FOOD & DRINK INTAKE DIARY

Name: _____

Please record in this booklet the type and amount of food and drink you (or your child) consume over 5 days. Make sure you include one weekend day.

Write down what you eat and drink regularly so that you don't forget anything (eg. snacks etc.).

Bring this booklet with you when you come for your appointment at the allergy consulting rooms.

If you require any assistance, please feel free to contact Jo Soutar at the allergy consulting rooms on 5158244.

FOOD & DRINK INTAKE DIARY

Name: _____

Please record in this booklet the type and amount of food and drink you (or your child) consume over 5 days. Make sure you include one weekend day.

Write down what you eat and drink regularly so that you don't forget anything (eg. snacks etc.).

Bring this booklet with you when you come for your appointment at the allergy consulting rooms.

Please classify the severity of the symptoms you experience as:

0	**=**	**None**.
1	**=**	**Mild:** You are aware of the symptom, but it is easily tolerated.
2	**=**	**Moderate:** This symptom is enough to cause interference with daily life or usual activity**.**
3	**=**	**Severe:** This is incapacitating with inability to work or to take part in your usual activities**.**

If you require any assistance, please feel free to contact Jo Soutar at the allergy consulting rooms on 5158244.

INSTRUCTIONS

1. Please record the **type** of food & drink with as much description as you can. Include brand names if possible. For example:

- *No Frills White bread with natural ingredients (not just bread)*
- *Meadow Lea polyunsaturated table margarine (not just margarine)*
- *Arnott's milk arrowroot biscuits (not just biscuits)*
- *Dairy Farmers Lite White milk - reduced fat (not just milk)*

2. Don't forget to include the following:

- Drinks: *eg decaffeinated coffee (include milk and/or sugar you may add), lemonade or tonic water etc.*
- Spreads: *eg margarine, butter, jam, golden syrup etc.*
- Accompaniments: *eg sauces, chutney, relish, salad dressings etc.*

3. Measure the **amount** of food prior to eating it. Use weighing scales (in grams) to calculate the exact weight, or use standard household measures such as cups or spoons. For example:

- *Rice, Pasta or Breakfast Cereals etc - 1 cup*
- *Margarine or Butter etc - 1 teaspoon*

Serving sizes are often listed on packets with exact weights. For example:

- *Kettle chips, plain - 1 medium packet = 75 grams.*
- *Bread - 1 slice = 28 grams.*

4. Remember to record the weight of any **leftovers** in the "amount left (g)" column, as well as the original weight. For example, *core, seed and skin of fruit, chicken bones, fat on meat or uneaten portions of food etc* (see example menu).

5. If it is not possible to weigh or measure the amount of food eaten, estimate by describing the dimensions or drawing the food to scale on paper. For example, *piece of cake 7cm x 8cm x 5cm, OR fresh fillet of fish 15cm x 5 cm x 0.5cm* (see drawings).

6. If meals are prepared at home, include your **recipes** on the sheets provided (see example recipe). Remember to record how much of the recipe you actually ate. For example, a recipe may make 18 muffins, but you only ate one. The muffin you ate weighed 70 grams. Don't forget to describe the **cooking methods** in the designated column *eg boil, roast, grill, microwave, fry (which oil did you use?).* Specify which **cut of meat** you ate (*eg breast and wing of chicken).*

7. If dining at **Restaurants** or fast food outlets, describe as best you can the ingredients in the food and estimate the amount you have eaten in household measures (cups and spoons). It may be easier to draw a picture of some food items to indicate the quantity you ate (see example). Don't forget any leftovers.

INSTRUCTIONS

1. Please record the **type** of food and drink with as much description as you can. Include brand names if possible. For example:

- *Tip Top multigrain bread (not just bread)*
- *Golden Canola - salt reduced - mono-unsaturated margarine (not just margarine)*
- *Kellogg's Sustain breakfast cereal (not just cereal)*
- *Dairy Farmers Lite White milk - reduced fat (not just milk)*
- *Salad - lettuce, tomato, cucumber, beetroot, onion etc (not just salad)*

2. Don't forget to include the following:

- Drink: *eg coffee and tea (include milk and/or sugar you may add), soft drink, alcohol etc.*
- Spreads: *eg margarine, butter, jam, honey etc.*
- Accompaniments: *eg sauces, chutney, relish, salad dressings etc.*
- Snacks: *eg lollies, nuts, chips, crackers, biscuits etc.*

3. Measure the **amount** of food prior to eating it. Use weighing scales (in grams) to calculate the exact weight, or use standard household measures such as cups or spoons. For example:

- *Rice, Pasta or Breakfast cereals etc - 1 cup*
- *Margarine or Butter etc - 1 teaspoon*

Serving sizes are often listed on packets with exact weights. For example

- *Potato Chips - 1 medium packet = 50 grams.*
- *Bread - 1 slice = 28 grams.*

4. Remember to record the weight of any **leftovers** in the "amount left (g)" column, as well as the original weight. For example, *core, seed and skin of fruit, chicken bones, fat on meat or uneaten portions of food etc* (see example menu).

5. If it is not possible to weigh or measure the amount of food eaten, estimate by describing the dimensions or drawing the food to scale on paper. For example, *piece of cake 7cm x 8cm x 5cm OR fillet of fish 15cm x 5 cm x 0.5cm* (see example).

6. If meals are prepared at home, include your **recipes** on the sheets provided (see example recipe). Remember to record how much of the recipe you actually ate. For example the beef and vegetable stir fry may have served 6 people, but you only ate 240g of the total amount made. Don't forget to describe the **cooking methods** in the designated column *eg boil, roast, grill, microwave, fry (which oil did you use?).* Specify which **cut of meat** you ate (*eg breast and wing of chicken).*

7. If dining at **Restaurants** or fast food outlets, describe as best you can the ingredients in the food, and estimate the amount you have eaten in household measures (cups and spoons). It may be easier to draw a picture of some food items on the paper provided to indicate the quantity you ate (see example). Don't forget any leftovers.

RECIPES AND DRAWINGS

Name: _____

RECIPE & INGREDIENTS	brand	cups/ spoons/ mls/ g/ cms	cooking method
Pear Muffins*: *recipe makes 18			*Baked*
Brown rice flour	*Orgran*	*1 cup*	
Buckwheat flour	*Orgran*	*1 cup*	
Baking powder		*2 tsps*	
Pear - ripe - peeled - chopped	*Golden circle*	*1*	
Pear juice		*1/3 cup*	
Eggs		*2*	
White sugar		*¼ cup*	
Sunflower oil	*Crisco*	*3 tbl*	
Poppy seeds		*1 tbl*	

RECIPE & INGREDIENTS	brand	cups/ spoons/ mls/ g/ cms	cooking method
Beef and Vegetable Stir Fry: *recipe serves 6*			Stir Fry
Rump Steak - trimmed of fat and thinly sliced		*478g*	
Polyunsaturated Vegetable Oil	*Crisco*	*2 tbl*	
Cornflour		*2 tsp*	
Soy sauce - salt reduced		*4 tbl*	
Oyster sauce		*2 tbl*	
Dry Sherry		*2 tsp*	
Beef stock cube		*1 cube*	
Water		*3 tbl = 60mls*	
Sugar		*2 tsp*	
Onion		*120g*	
Ginger		*15g*	
Green and Red Capsicums		*60g*	
Celery		*80g*	
Broccoli		*80g*	
Bok Choy Cabbage		*60g*	
Mushrooms		*40g*	
Baby corn		*40g*	
Carrots - peeled		*50g*	
Snow Peas		*20g*	

RECIPE & INGREDIENTS	brand	cups/ spoons/ mls/ g/ cms	cooking method

QUESTIONNAIRE ON DIETARY HABITS
FOR CHILDREN

PLEASE COMPLETE THE FOLLOWING QUESTIONNAIRE AND BRING IT WITH YOU WHEN YOU COME FOR YOUR APPOINTMENT AT THE ALLERGY CONSULTING ROOMS

Name _____

1. Briefly describe the symptoms your child has been experiencing that you think may be provoked by the kinds of food he/she eats.

_____
_____
_____
_____
_____

How long has your child been suffering from these symptoms?

_____

2. Have you made any recent changes to your child's diet in order to relieve these symptoms? Please tick the appropriate box.

YES	NO
☐	☐

Briefly describe the dietary changes you have made.

_____
_____
_____
_____
_____
_____
_____

3. Have you obtained any nutrition information to relieve your child's symptoms, from one or more of the following sources? Please tick the box/es below. If not, go to question 4.

G.P or Local Doctor	☐	
Specialist Doctor	☐	
Dietitian	☐	
Other health professional	☐	- please specify _____
Naturopath/Osteopath	☐	
Books	☐	
Magazines/Newspapers	☐	
TV/Radio	☐	
Other	☐	- please specify _____

What prompted you to seek advise from the above source/s? eg referral from doctor, recommended by friend or relative etc.

_____
_____
_____
_____

What nutrition advice did you receive from the above source/s? Indicate the source and beside it write the information you obtained.

SOURCE	**ADVICE GIVEN**

Have you followed the advice you were given? Please tick the appropriate box.

YES	NO
☐	☐

If so, when and for how long?

_____
_____
_____
_____

Did these dietary changes affect your child's symptoms? Please tick the appropriate box.

YES	NO
☐	☐

If so, how were your child's symptoms affected ?

_____
_____
_____
_____
_____

4. Does your child take any supplements? eg. vitamin, mineral etc. Please tick the appropriate box.

YES	NO
☐	☐

Please specify which one/s.

_____
_____
_____

_____

5. Do **you** take any supplements? eg. vitamin, mineral etc. Please tick the appropriate box.

YES	NO
☐	☐

Please specify which one/s.

_____
_____
_____
_____

6. Who does the *majority* of the shopping in your household? Please tick one or more of the boxes.

Self ☐

Spouse/Partner ☐

Someone else ☐ - please specify _____

7. Where is *most* of the shopping done? eg supermarket etc.

_____
_____

8. Who does the *majority* of the cooking in your household? Please tick one or more of the boxes.

Self ☐

Spouse/Partner ☐

Someone else ☐ - please specify

_____

9. How would you describe their cooking skills? Please tick the appropriate box.

Poor	☐
Basic skills	☐
Moderate	☐
Good	☐
Excellent	☐

10. How often does your child or family eat meals at restaurants or fast food outlets? Please tick one or more of the following times, and specify where you eat beside this time.
For example:

☐ Once a week *McDonald's*

☐ Once a day _____

☐ Once a week _____

☐ Once a fortnight _____

☐ Once a month _____

☐ More than the above - please specify - how often _____
- where _____

☐ Less than the above - please specify - how often _____
- where _____

QUESTIONNAIRE ON DIETARY HABITS

PLEASE COMPLETE THE FOLLOWING QUESTIONNAIRE AND BRING IT WITH YOU WHEN YOU COME FOR YOUR APPOINTMENT AT THE ALLERGY CONSULTING ROOMS

Name _____

1. Briefly describe the symptoms you experience that you think may be provoked by the kinds of food you eat.

_____
_____
_____
_____
_____
_____

How long have you been suffering from these symptoms?

_____

2. Have you made any recent changes to your diet in order to relieve these symptoms? Please tick the appropriate box.

YES	NO
☐	☐

Briefly describe the dietary changes you have made.

_____
_____
_____
_____
_____
_____
_____
_____

3. Have you obtained any nutrition information to relieve your symptoms, from one or more of the following sources? Please tick the box/es below. If not, go to question 4.

G.P or Local Doctor	☐	
Specialist Doctor	☐	
Dietitian	☐	
Other health professional	☐	- please specify _____
Naturopath/Osteopath	☐	
Books	☐	
Magazines/Newspapers	☐	
TV/Radio	☐	
Other	☐	- please specify _____

What prompted you to seek advise from the above source/s? eg referral from doctor, recommended by friend or relative etc.

_____
_____
_____
_____

What nutrition advice did you receive from the above source/s? Indicate the source and beside it write the information you obtained.

SOURCE	**ADVICE GIVEN**

Have you followed the advice you were given? Please tick the appropriate box.

YES	NO
☐	☐

If so, when and for how long?

_____
_____
_____
_____

Did these dietary changes affect your symptoms? Please tick the appropriate box.

YES	NO
☐	☐

If so, how were your symptoms affected ?

_____
_____
_____
_____
_____

4. Do you take any supplements? eg. vitamin, mineral etc. Please tick the appropriate box.

YES	NO
☐	☐

Please specify which one/s.

_____
_____
_____

_____

5. Who does the *majority* of the shopping in your household? Please tick one or more boxes.

Self	☐
Spouse/Partner	☐
Someone else	☐ - please specify _____

6. Where is *most* of the shopping done? eg supermarket etc.

_____
_____

7. Who does the *majority* of the cooking in your household? Please tick one or more of the boxes.

Self	☐
Spouse/Partner	☐
Someone else	☐ - please specify

_____

8. How would you describe their cooking skills? Please tick the appropriate box.

Poor	☐
Basic skills	☐
Moderate	☐
Good	☐
Excellent	☐

9. How often do you eat meals at restaurants or fast food outlets? Please tick one or more of the following times, and specify where you eat beside this time.
For example:

☐ Once a week *McDonald's*

☐ Once a day _____

☐ Once a week _____

☐ Once a fortnight _____

☐ Once a month _____

☐ More than the above - please specify - how often _____
- where _____

☐ Less than the above - please specify - how often _____
- where _____