Primary school Healthy Eating Surveys

Findings report –

August 2016

Lower Hume Primary Care Partnership Integrated Health Promotion Collaborative

Lower Hume Primary Care Partnership

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EXECUTIVE SUMMARY

This report outlines the process and key findings from the Primary School Healthy Eating surveys conducted in 2013-14 in the Murrindindi and Mitchell Shires. The survey methodology was chosen as an action from one of the strategies in the Lower Hume Primary Care Partnership Integrated Health Promotion Plan 2012-2017 (LHPCP IHP Plan).

The Healthy Eating Surveys were conducted to address the Healthy Eating Integrated Health Promotion Priority of the Hume Region, in line with the Lower Hume Healthy Eating objective and strategies targeting 0-12 year old children. Five Primary Schools were surveyed in Murrindindi and 1 in Mitchell Shire from June 2013 to October 2014. The Primary schools were: Alexandra, Eildon, Taggerty, Buxton, Highlands, and Upper Plenty.

Originally a parent Nutrition and Food Security (NFS) survey was developed and an ethics application was submitted, however, the ethics application recommendation was to conduct 'A day in the Life' (DILQ) survey for students as well, to compare and contrast the findings.

A total of 284 DILQ surveys and 94 NFS surveys were completed.

Results suggested that while children's fruit consumption was adequate, vegetable consumption was below recommended levels. Most of the vegetables were consumed at the evening meal, with the inclusion of vegetables in school lunch boxes minimal. Using healthy lunch box guidelines (Healthy Eating Advisory Service 2013), food variety in school lunch boxes was also poor.

In respect to parents' perceptions, findings suggested that parents are interested and willing for their families to eat well, but find food cost; time and fussy eaters make it difficult.

Cars were parents' most commonly reported mode of transport to access fruit and vegetables, with just under half driving 20km or more to do so. Only a third of parents reported they shopped at local supermarkets for their fruit and vegetables, while even less accessed local fruit and vegetable shops. Of the parents responding, 11% reported that getting to a location to purchase fruit and vegetables was difficult, with 2 of the 94 parents reporting they had run out of money to buy food in the previous 12 months.

Taking the above into account, future planning should focus on increasing children's vegetable consumption, particularly in the school setting. Increasing children's vegetable consumption could also be the emphasis of parent based education with regards to quick healthy and affordable recipes. Initiatives that encourage family involvement in vegetable gardening at home, school or community are also recommended. Fussy eating is a relatively common childhood problem that can start at toddler age. Based on this and current findings, it may be useful to target parents of children in the pre-school years with regards to support and education on behaviour management strategies.

The results also highlight the importance of the social determinants of health and potential impact on healthy eating, with the need to address these for improved outcomes (eg cost, transport, community). The report provides important data on shopping and healthy eating habits of the Murrindindi and Mitchell school families and we will endeavour to disseminate the data to feed back into the evidence base both at a local level and to the wider sector.

INTRODUCTION

Background

The Hume Region Health Promotion Strategy 2012-15 was introduced in 2011 and 'encourages agencies to work in partnership to plan, implement, and evaluate evidence informed catchment plans that address identified priority areas'[1]. As a result, the Lower Hume PCP Integrated Health Promotion Plan 2012-2017 (LH IHP Plan) was developed by the LHPCP and their member agencies (LHPCP Collaborative).

After a thorough review of evidence and data reflecting the health and wellbeing status of local communities 'Healthy Eating' was selected as the Hume Region health and wellbeing priority, and 'prevention of Alcohol Related Violence and Harm' as the Lower Hume sub-priority.

The Hume Region Healthy Eating Goal and the first Lower Hume Objective from the LHIHP Plan are:

'All people in the Hume Region are able to have access to food that is safe, nutritious and culturally valued'

Objective 1: By 2017 75% of primary schools and early childhood settings (inclusive of childcare and kindergartens) will be involved/engaged with one or more Victorian Healthy Eating Enterprise (VHEE) initiative'[2].

The target population selected for the Healthy Eating priority is Children 0-12 years, incorporating a broader focus on families (p21 IHP Plan).

The Victorian Prevention and Health Promotion Achievement Program (AP) were selected as one of the Victorian Healthy Eating Enterprise (VHEE) 'settings based' health promotion initiatives, to be implemented in primary schools and early childhood services to achieve the objective. The implementation of the healthy eating and oral health benchmark within the AP were targeted to address Healthy Eating objective 1.

Purpose

One of the strategies of Healthy Eating Objective 1 (above) was to 'collect baseline data from schools on current healthy eating practices and activities' (p27 LHIHP Plan), originally to inform the development and evaluation of strategies to promote and support healthy eating practices, but also to contribute to the LHIHP Plan's Objective 2, 'creating supportive environments that promote culturally valued healthy food'. This included a focus on improving food insecurity in the catchment.

This report aims to summarise the methodology and findings of the two surveys to provide key information on dietary patterns of primary school children in LHPCP catchment, and provide LH IHP Collaborative and partner agencies with some valuable local data around the social determinants of healthy eating. And ultimately generate local data to feed back into the evidence base for the broader community.

[1] Integrated Health Promotion Strategy: Developing a Hume Region approach to preventive health 2012-15, Department of Health Hume Region, 2011

[2] Lower Hume Primary Care Partnership Integrated Health Promotion Plan 2012-17, Lower Hume Primary Care Partnership, 2012

METHODS

Survey tools and data collected

The Nutrition and Food Security (NFS) Survey was developed for parents to collect the baseline data. An ethics application was submitted to the Department of Education and Early Childhood Development (DEECD) at the end of 2012. The key objectives as outlined in the ethics application were: to evaluate the implementation of the Achievement Program, assess serves of different food groups consumed by the targeted primary school aged population and learn more about local food security.

Originally only the NFS for parents was submitted for ethics approval. This proposal was approved with recommendation to introduce a second survey for students to complete, to allow for confirmation and comparison to the parent survey. With this purpose in mind, the Day in the Life Questionnaire was selected as an evidence-based tool for students to demonstrate dietary patterns over a set 24 hour period. The joint submission for ethics approval to DEECD for both surveys to be conducted within Murrindindi and Mitchell Shires was approved in February 2013.

The parent NFS survey was modified from a Children's Nutritional Questionnaire developed by Harvard School of Public Health in 1993 and adapted by the LHIHP Collaborative. It was reviewed by a local Accredited Practising Dietitian who was actively involved in the LH IHP Collaborative who ensured the serving sizes were up-to-date with current Australian dietary guidelines.

The parent NFS survey is a 4 page survey, comprising of 2 parts. Part 1 of the survey asks parents to estimate the number of serves of fruit, vegetable, snack foods (or discretionary foods), drinks and cereal foods that their child consumes on a daily basis. To assist with data validity, they are also asked to estimate the number of serves of these food groups over the last 7 days. Additional questions used a Likert scale, asking parental knowledge, perceived importance of nutrition and the perceived healthiness of their child's diet. To provide more information in relation to the determinants of healthy eating practices, Part 2 includes a range of multiple choice and open ended questions related to food shopping practices, food security, and suggestions for improving childhood nutrition at home, school and in the community.

The Day in the Life Questionnaire (DILQ) is designed for Grade 3-6 students to demonstrate their food intake over the previous 24 hours via writing and drawing. In addition to foods consumed at meal and snack times, students are also asked about their consumption on the way to and from school as well as their activity levels throughout the day. This data provides information regarding the frequency and location of the student's consumption of key foods such as fruit, vegetables, juice and discretionary foods, as well as how well their school lunches compare to general healthy lunch box guidelines.

Recruitment method and limitations

In June 2013 the first surveys were distributed in Murrindindi to 2 schools, the remaining schools data was collected over 12 months and the last school collected in October 2014. This should be taken into consideration when assessing data as seasonal variance may affect results.

The Primary schools surveyed were: Alexandra, Eildon, Taggerty, Buxton, Highlands, all within Murrindindi, and Upper Plenty from Mitchell Shire.

Initially, surveys were used by some agencies as a means of making contact with schools. In the case of 3 schools, copies of the surveys were sent to the school with the suggestion of meeting with the Achievement Program (AP) coordinator and discussing the program and baseline data collection. Of these 3 schools, one school responded and participated in the survey process. In the case of other schools, school principals were introduced to the surveys during their initial introductory meeting with their AP coordinator and the AP. Over the 2013/14 period 6 out of 26 schools participated in the survey process, 5 in Murrindindi and 1 in Mitchell Shire.

All schools elected to complete all the student surveys in one day, with AP staff coordinators (and in one case a nursing student) used to assist teachers. Generally with upper year levels, one or two staff members per class were adequate to assist students with the completion of the survey. When working with lower year levels however, significantly greater time and higher staff numbers was required to assist students with interpreting questions, recalling recent food intake and interpreting student's pictures and writing.

Prior to survey completion, consent forms were signed by both school principals and parents to indicate their understanding of the research process and consent for the school to take part. Student surveys were completed during class time, with parents given the choice of excluding their child from the survey process (no parents took up this option). Schools were advised that the tool was designed for students in years 3, 4, 5 and 6, however in most cases school principals decided to ask all student levels to complete the survey.

The student surveys were completed by all students present at school on the day of the survey, providing a high response rate. The process of completing the Parent NFS Survey was tailored for each school and commenced with information included in the school newsletter to advise parents about the survey and its purpose. Surveys were then sent home with students (including consent form, NFS survey and envelope), and parents were asked to return completed consent forms and surveys to school. The different survey designs made it difficult to compare results directly but provided differing perspective to fruit and vegetable intake from students and parents.

Data analysis

Data on the students self-reported food intake for the previous 24 hour period was collated on an excel spreadsheet for analysis. Clarification of students' pictures and hand writing was attempted during the survey process by AP coordinators and teachers asking students what they meant, however interpretation of responses remained challenging at times. Data provided information including frequency of intake of fruit, vegetables, water, soft drinks and discretionary foods during that period as classified by the 2013 Australian Dietary Guidelines. The tool provided qualitative information regarding the types of foods children consumed, where they consumed them and when. The quantity of food consumed could not be estimated using the DILQ. When collating the DILQ responses the following foods were classified as discretionary; chocolate, crisps, muesli bar, cake, muffins, fruit straps, fruit sticks, pizza, nuggets, hot chips, hash browns, hot dogs.

Data collation was a very time consuming process with 284 DILQ survey results collated using an excel spreadsheet. The parent NFS survey quantitative data was collated and analysed by a previous staff member using SPSS (Statistics Package for Social Sciences) software package. This staff member was the author of the initial ethics research application in a paid capacity and is no longer working for LHPCP agencies, but kindly gave her time on a volunteer basis.

Data collected from the NFS survey included the estimated number of serves of fruit, vegetables and soft drink consumed by children on both a daily and weekly basis. Data analysis provided an average daily intake of fruit, vegetable and soft drink serves as well as average servings a week.

Qualitative data collected regarding parental views on strategies for addressing healthy eating and food security in school, community and home settings was collected to inform future strategies and activities. This was collated using Thematic Analysis by the previous IHP Coordinator and detailed below.

Upon completion of this report all schools will be sent an appreciation letter, the report and any data analysis that is relative to their school.

RESULTS

Response rates

Six out of 26 schools in the Lower Hume region participated in the survey process, with five located in the Murrindindi Shire and one in Mitchell Shire. In respect to the DILQ surveys, 284 mixed gender students of a possible 483 students completed the surveys indicating a response rate of 59%. A smaller number of parents (94) completed the parent NFS surveys. As discussed in the Limitations section below, the voluntary nature of the parental survey may have influenced results.

Table 1: Number of surveys completed by students and parents according to primary school

Primary School Prep – grade 6	Student DILQ completed	Parent NFS survey completed	Matched
Alexandra	173	44	36
Buxton	30	17	15
Eildon	31	0	0
Highlands	9**	15**	8
Taggerty	7	1	1
Upper Plenty	34	19	15
Total	284	96	66

**All parents within the school completed NFS survey and only G4-6 completed DILQ

Thematic analysis of open-ended questions

The open- ended question responses of the NFS were thematically analysed by the LHPCP IHP Coordinator to determine common concepts which were then coded. The process utilised consisted of coding similar responses into themes and counting the number of comments for each theme.

The open-ended question that was thematically analysed was *'What changes do you think would help our children eat nutritiously?'*

- At Home
- At School
- At the Shops
- In the community

All of the identified themes in each category, including the number of responses for each category are in appendix 1. The following are the top 4-5 responses for each category, those with a total of 10 or more responses:

Table 2: Thematic Analysis of parents suggested changes to help children eat nutritiously

HOME (n=92 responses)

Limit Unhealthy foods in the house/only for special occasions	18
More time for food preparation and recipes for cooking interesting and tasty food/cook from scratch	17
Grow fruit and vegetables at home	14
Good supply of healthy food/drinks at home	12

SCHOOL (n=85 responses)

Restriction and policies on what foods and drinks children can bring/buy	13
Grow fruit and vegetables at school	12
Other	11
Parents pack healthy food for their children	10
Fruit/healthy snack break/reward program	10

SHOPS (n=75 responses)

Promotion of healthy options	13
Other	12
Less junk food/don't position where attractive to children	11
Healthy food at cheap/affordable price	10

COMMUNITY (n= 67 responses)

Promotion / advertising through newspaper, newsletter, radio, packaging etc.	15
Education programs/workshops cooking/recipes/nutrition	12
Other	12
Local food swaps/stores/markets	10

Nutrition and Food Security - Parent Survey

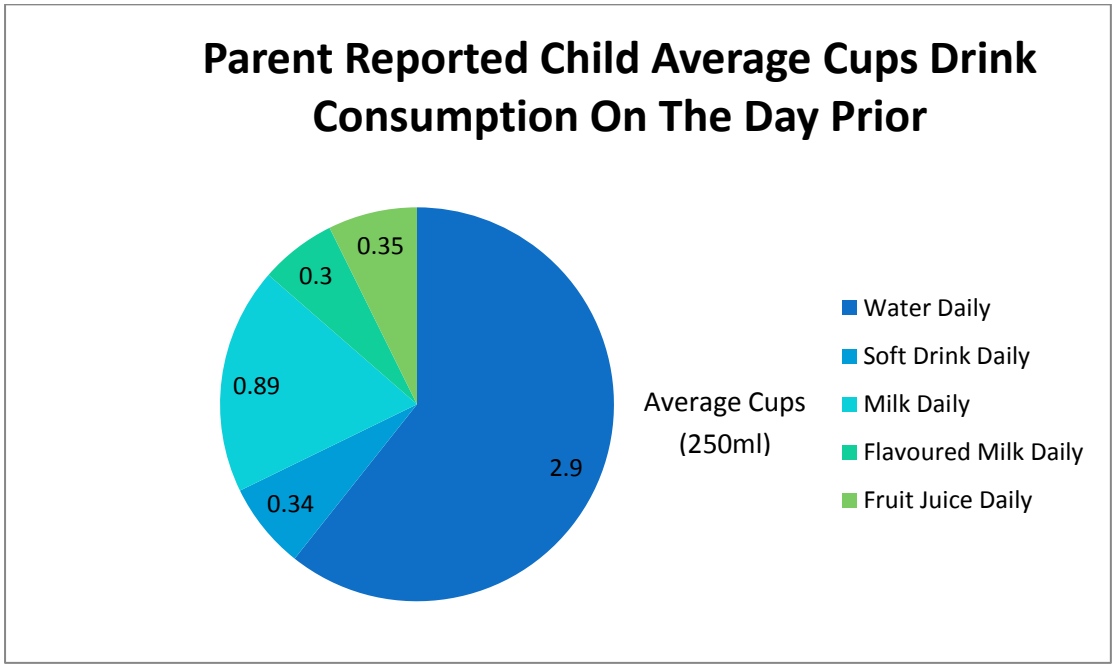
Food and drink consumption

Child fruit and vegetable consumption as reported by parents averaged 2.77 and 2.99 serves per day respectively. As Table 3 below suggests, a large range of reported intake were reported by parents, with up to 9 serves of fruit and 14 serves of vegetables serves evident. However the standard deviation suggests the majority of reported serves of vegetables were between 0.9 and 4.94, while fruit intake varied between 1.1-4.45 serves per day. This suggests the higher reports were from a very small number of parents and may be due to overestimation by participants or errors in data entry.

Table 3: Parent survey summary of their child's food consumption on the day prior to survey completion

Servings consumed yesterday by their child (N=94)	Minimum - Maximum	Mean	Std. Deviation	Variance
Fruit	0-9	2.77	1.688	2.848
Vegetables	0-14	2.9309	2.013	4.052
Soft drink	0-7	0.3404	0.86202	0.743

Fig 1: Parent reported child drink consumption on day prior to survey completion

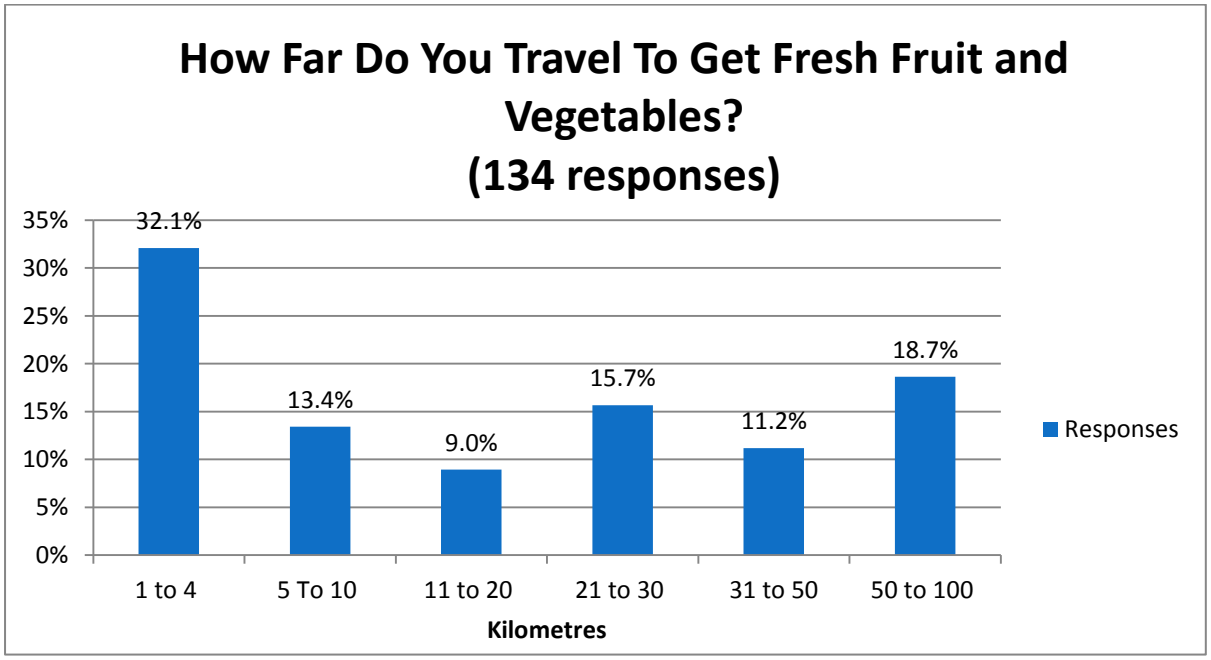


Sourcing Healthy Food

Table 4: Parent survey responses to food security related questions

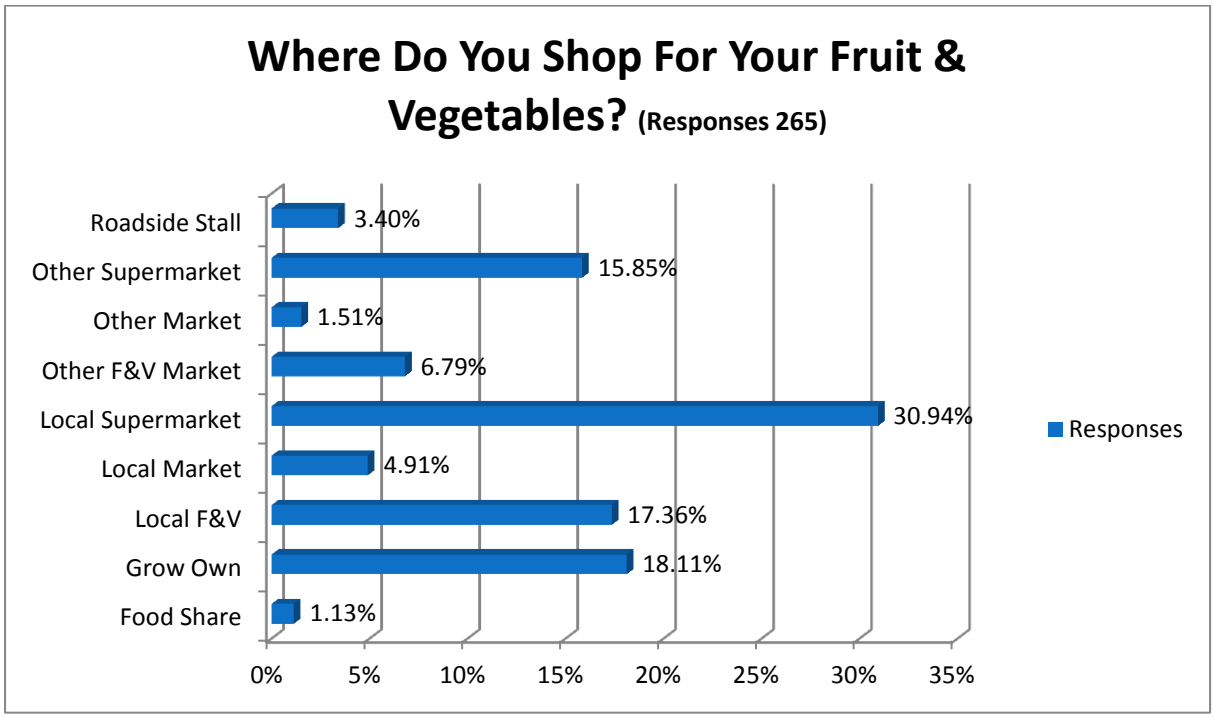
Question	Number of parents responding yes (total respondents to question)	(% of respondents)
In the past 12 months, have you ever run out of food and not been able to afford more?	2(96)	2%
If you run out of food would you?		
Go to friend/family house for meals	30	36%
Borrow money from friend or family member	31	38%
Go to food bank	5	6%
Use credit	24	29%
Take out a loan	0	0%
Not eat	4	5%

Fig 2: Distance travelled to get fruit and vegetables



NB: the total is larger than the sample size as respondents were able to tick multiple boxes

Fig 3: Outlets where respondents shop for fruit and vegetables



How do you travel to get fresh fruit and vegetables? Due to the study being conducted in regional towns where public transport is non-existent 95% of respondents said they used a car to shop while 22% said they sometimes walk. There were no responses for using public transport or catching a taxi.

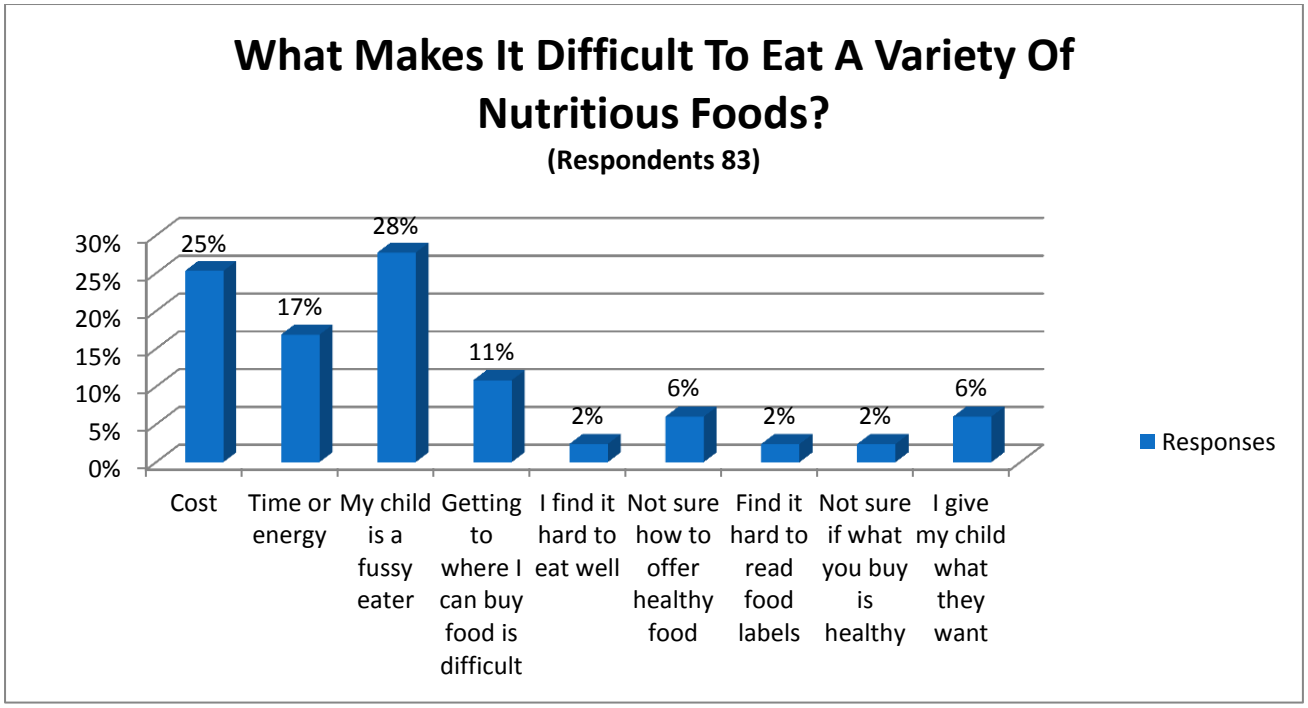
Healthy Eating

Using a likert scale, parents were asked to rate how much they cared about eating nutritious foods and to rate their knowledge about healthy foods. In response to the question *How much do you personally care about eating nutritious foods?,* response options included *very much*, *quite a lot*, *a little bit*, or *not at all*. Majority of responses feel between very much and quite a lot, with none of the parents indicated that they did not care about eating nutritious foods.

In respect to knowledge of nutritious foods, the majority of parents rated their own knowledge as either *excellent* or *above average*, with none of the parents indicating they perceived their own knowledge as *poor* or *very poor*.

Figure 4 below summarises perceived factors that parents report make it difficult to eat a variety of nutritious foods. Most commonly factors cited by parents were their child's fussy eating, cost and time.

Fig 4: The difficulties in getting children to eat a variety of nutritious foods



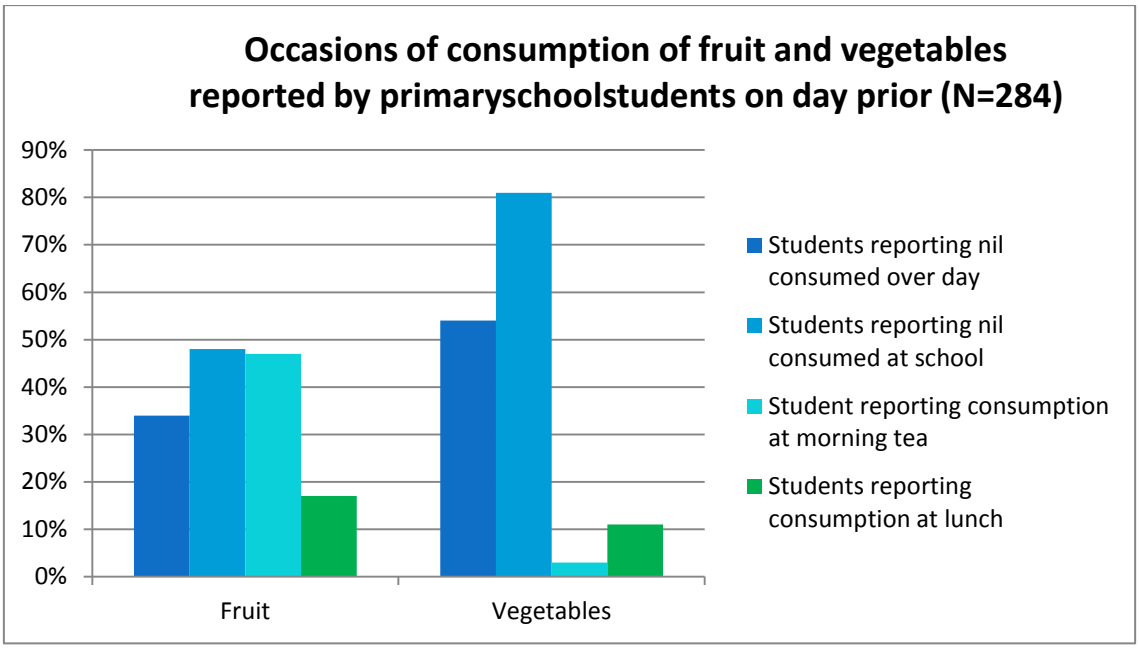
Children's Day in the Life Questionnaire

The following tables provide a summary of occasions of consumption reported by primary school children on the day prior to completion of the survey. The tables focus primarily on fruit and vegetable consumption and the patterns of their consumption over the day.

The DILQ indicates that 54% of children did not report the consumption of vegetables over the day, while 34% did not indicate that fruit was consumed (see Figure 5). In addition, vegetable consumption at school was minimal, with only 55 (19%) children reporting consuming some vegetable during school time (compared to 146 [51%] children consuming fruit at school).

The highest number of occasions of fruit consumption (133) occurred at school morning tea break, while the highest number of occasions of vegetable consumption (114) occurred at the evening meal. At lunch, 31 (9%) children reported the consumption of vegetables, while 49 (11%) students reported the consumption of fruit. Only 2 of the total 284 students reported consumption of all 6 food groups that are recommended for inclusion in children's lunch boxes.

Fig 5: Occasions of consumption of fruit and vegetables reported by primary school students on day prior to survey completion (N=284)



As Figure 6 indicates, more than 60% of students reported the consumption of discretionary foods on 2 or more occasions. It is worth noting that one of the smaller primary schools surveyed hosted an evening school based event during the survey period which was catered with a high number of discretionary foods and may have impacted results. Also worth noting is that 59% children did not report the consumption of any sweet drinks over the day. Further to this, 25 or 9% of students reported a fruit juice or sweet drink in their school lunch box, while only 8 (3%) did the same at morning tea break.

Fig 6: Occasions of consumption of discretionary foods reported by primary school students on day prior to survey completion (N=284)

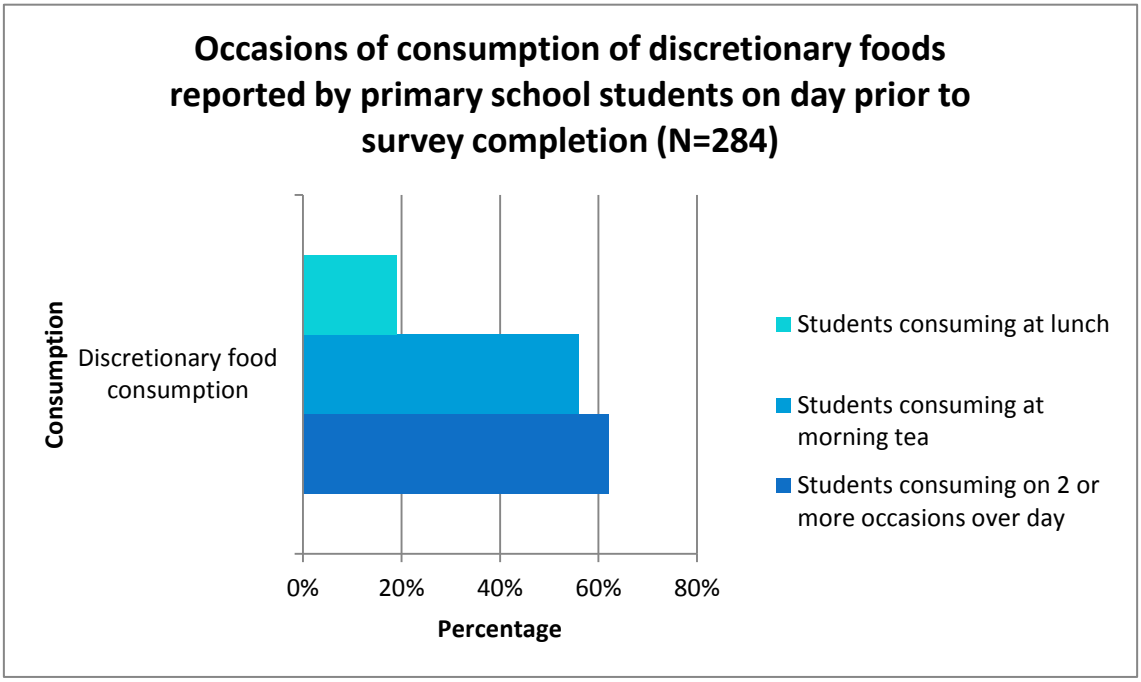
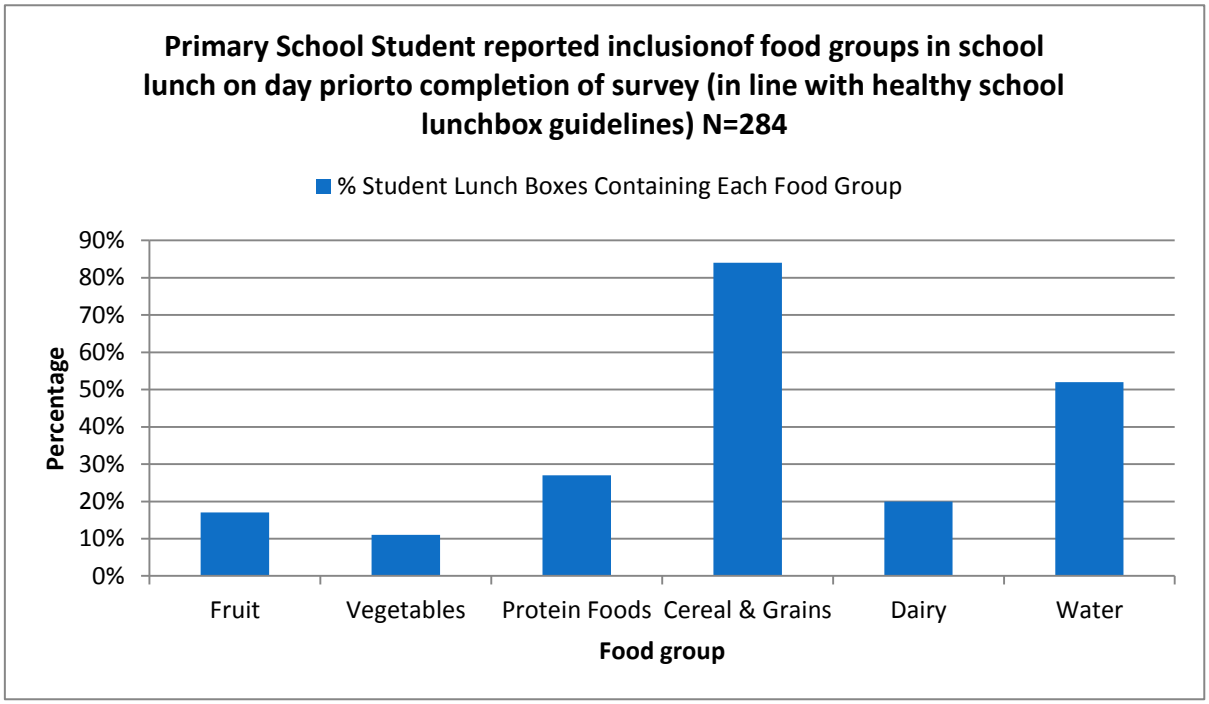


Fig 7: Reported school lunches containing particular food groups



Figures 7 and 8 summarise analysis of student reporting in relation to adherence to current healthy lunch box guidelines. These guidelines (Healthy Eating Advisory Service 2015) recommend the inclusion of at least one food from 6 groups which include cereals and grains, protein foods, dairy foods, fruit, vegetables and water. Cereal products were most likely to be present in student lunch boxes with over 80% reporting this. As previously stated, vegetables were the least likely to be present. Only 2 students reported the inclusion of all 6 food groups in their lunch box, while 6 and 24 students reported the inclusion of 4 and 5 of the food groups in their lunch box respectively.

Fig 8: Student lunch boxes containing 4 or more recommended 6 food groups

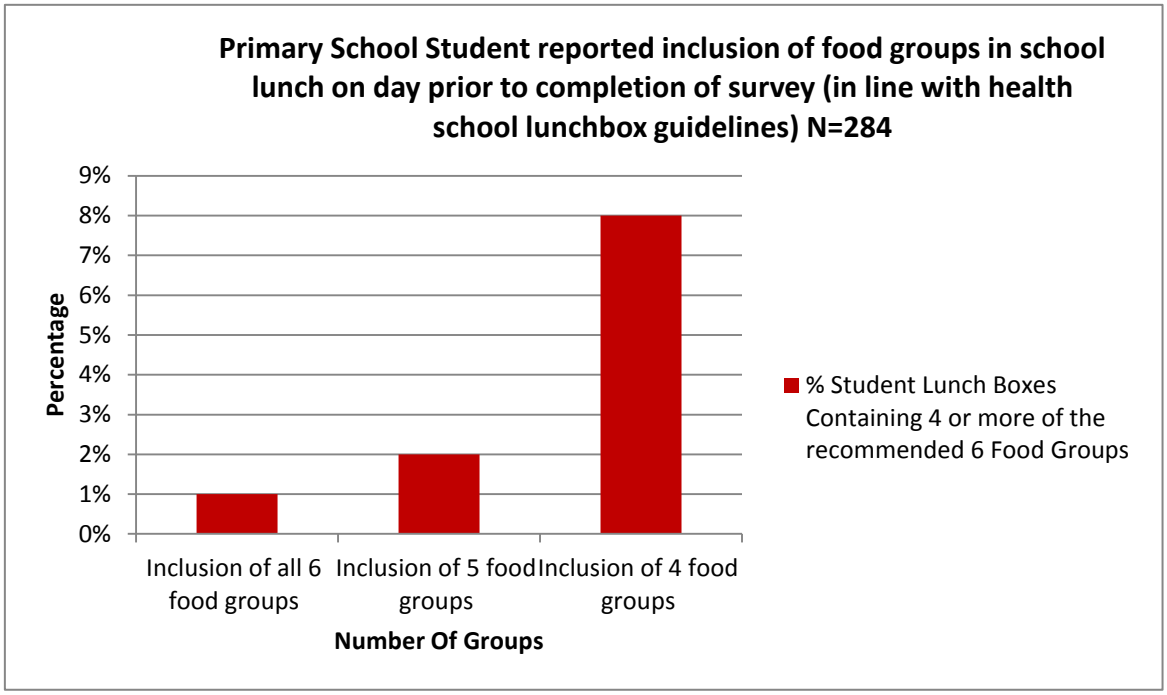


Fig 9: Student reported mode of transport to and from school N= 284

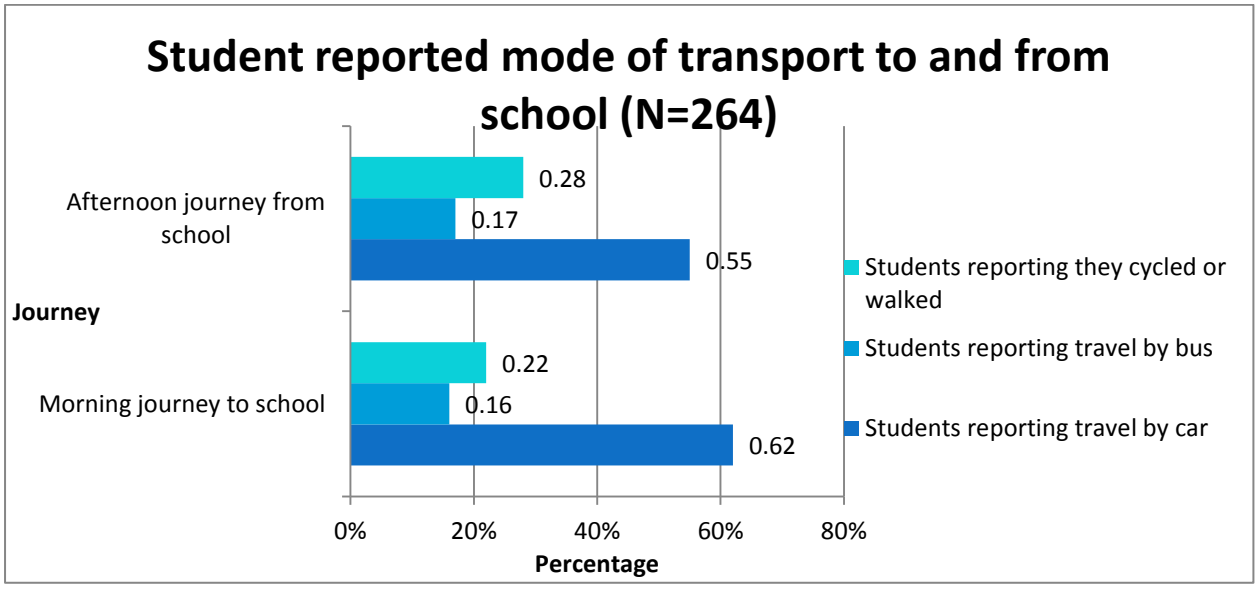
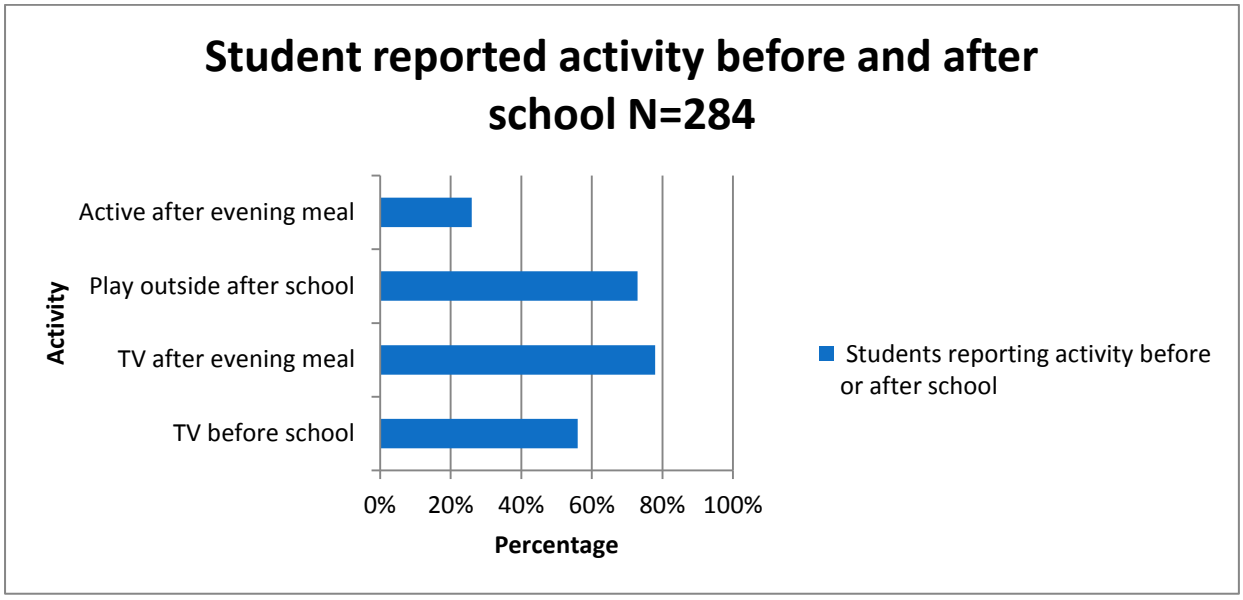


Fig 10: Type of activity reported by primary school students on day prior to survey completion



Matched Data

As part of the process the NFS survey for parents and the DILQ for students were conducted for confirmation and comparison. We chose to look at the difference between the student's data whose parents had also submitted a survey (identified as 'matched' data), with student's data where their parents had not submitted a survey (identified as 'unmatched' data). Below are the percentages where there was more than 5 percentage points different in a question and where there was more than 10 percentage points different.

It is often the case that those people who complete surveys are those already engaged in healthy behaviours (potentially more health literate) and therefore this type of analysis allows for identification of differences in eating patterns in the cohort not usually observed through parent surveys.

Table 5: Greater than 5 or 10 difference in percentages, between children whose parents completed a survey and for those that didn't

Matched % N=75	Unmatched % N=210	
97	90	had breakfast
91	79	had cereal at breakfast
49	58	watched TV before school
53	42	had fruit in AM
16	9	had veg at lunch
24	18	had dairy at lunch
58	50	had water at lunch
80	71	played outside after school
49	37	had veg at tea
44	33	had water at tea
64	51	had protein at tea
33	22	were active after tea
4	10	had fruit after tea

Key:

>5 difference in %

>10 difference in %

As indicated in Table 5, overall it appears that students whose parents also completed the survey were more likely to eat fruit in the morning, eat vegetables, water and protein at tea, and be active after tea. There was no statistical significance in the student's data that was matched or unmatched.

DISCUSSION

In 2013/2014 six primary schools in the Lower Hume catchment took part in the completion of baseline student and parent healthy eating surveys. This represents less than one quarter of primary schools in the area. The main aim of this activity was to identify children's fruit and vegetable consumption; however more detailed information has been obtained.

A total of 284 students from years Prep to 6 completed the Day In the Life Questionnaire (DILQ) from a possible 295 students. Parent Nutrition and Food Security (NFS) Surveys were completed by 96 parents.

Fruit and vegetable consumption

The average child fruit consumption reported by parents was 2.77 serves daily, with 2 serves recommended by the Australian Dietary Guidelines (NHMRC 2013). An average child consumption of vegetables of 2.9 serves per day was also reported by parents, which is less than the recommended 4.5-5 serves. In comparison, the National Nutrition Survey (ABS 2015) indicated that on average, children aged 2-18 years consumed 2 serves of fruit and 1.9 serves of vegetables each day in 2014-15, suggesting the survey population are consuming an additional serve of vegetables more than the national average.

As per Table 3, a large range of reported fruit and vegetable intakes was evident with up to 9 serves of fruit and 14 serves of vegetables serves reported per day. Results suggest the higher reports were from a very small number of parents and may be due to overestimation by participants or errors in data entry. Alternatively it suggests that a small number of students are consuming more than 4 times the recommended intake of fruit and 3 times the recommended vegetable intakes.

Unfortunately while the parent surveys indicated the estimated numbers of serves of fruits and vegetables that children consume, the DILQ only indicates the occasions of consumption, not the quantity. The DILQ survey however, does provide an indication of when particular foods were consumed over the day, which is a valuable indicator of dietary habits.

In line with parental reporting, suboptimal vegetable intake is supported by the student completed DILQ, which suggested that 54% of children did not consume any vegetables on the day prior to survey completion. Interestingly, the majority of vegetable consumption occurred at the evening meal, with only 19% of children indicating they consumed vegetables while at school. In contrast, 51% of children reported the consumption of fruit at school with 47% consuming fruit at morning tea. A greater consumption of fruit at school may be contributed to by policy driven "morning fruit breaks" that occur at the majority of early childhood centres and primary schools.

Taking all of the above into account, the poor consumption of vegetables at schools suggests that this may be an area of future focus when promoting healthy eating initiatives in the school setting.

Lunch box guidelines

Current healthy lunch box guidelines for students (Healthy Eating Advisory Service 2015) recommend the inclusion of at least one food from 6 food groups. These groups are cereals and grains, protein foods, dairy foods, fruit, vegetables and water. Using these guidelines to assess student reporting on the DILQ, food variety in lunch boxes was limited. More specifically, only 2 (1%) students reported all 6 food groups in their lunch, 6 (2%) students reported they included 5 food groups and only 24 (8%) indicated they included at least 4 food groups in their lunch box.

The most common item to be included in students' lunchboxes was food from the bread and cereal groups, while less than one fifth of students reported the inclusion of either fruit, vegetables or dairy. Vegetables were the group least likely to be included with only 11% of students including vegetables in their lunch box. At school, consumption of discretionary foods was highest at morning tea (56%) compared to lunch, while 19% of student reported inclusion of a discretionary food in their lunch box.

At lunch 25 (9%) of students reported either juice or sweet drink in their school lunch, while 8 (3%) had similar at morning tea break. This information is grouped together because the DILQ survey process did not allow for differentiation between 100% fruit juice, no added sugar juice or sweetened fruit drink or juice.

Child and family eating habits

Just under two thirds (62%) of children indicated the consumption of discretionary foods on at least 2 or more occasions over the day. The DILQ also showed the consumption of discretionary foods ranged between 0 to 6 occasions over the day, however as previously discussed it is not possible to ascertain the actual serves sizes of discretionary foods.

Based on parental reports of their children's fluid intake, the average daily soft drink consumption was 0.34 glasses, while average water consumptions were 2.9 glasses. In addition, 59% of students completing the DILQ did not report the consumption of sweet drinks over day.

While not statistically significant, comparison of children's DILQ results that had parents completing the NFS survey (matched) to those children that did not have a parent complete a survey (unmatched) suggests that matched children had slightly healthier eating habits than their non-matched counterparts. For example matched children were more likely to report that they consumed fruit at morning tea, water and vegetables at lunch and evening meal and be active in the evening than the unmatched group. As per Limitations, it is not possible to confirm that this slight difference is due to differences in parental educational level or socioeconomic status, however it does suggest that that responder-bias may be a contributor to the findings of the parental NFS surveys.

Travel and Activity

Travel by car was the most common way for students to travel to school with 55-62% reporting they travelled to school by car (see Figure 9). Walking or cycling was the next most common with 22% and 28% traveling to school in this way in the morning and afternoon, respectively.

As per Figure 10, just over 50% of students reported watching TV before school, while over 70% reported that they played outside after school. Just under 80% of students reported watching television after their evening meal.

Food security

The World Food Summit (1996) defined “food security as existing when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy active life” (cited in WHO 2013). There are three components of food security suggested which include food access (time, mobility and ability to buy, transport, store and prepare nutritious food; food availability (location of shops, availability and price within community); and food use (knowledge of basic nutrition and food safety) (World Health Organization 2011, cited in Rosier 2011).

Living in rural or remote areas means there will be a heavy reliance on driving to do shopping. This is evident from the current study, where 95% of parents reported using their car to do their shopping. Fewer than 22% indicated they were able to walk to their food store, while none of the parents reported using public transport to access food. The latter is a likely reflection of the limited public transport options in the small regional towns in the study area. The finding that 11% of respondents said getting to a location to buy food was difficult also suggests that transport may be an issue.

Parents were also asked how far they travelled to access fruit and vegetables, with 45% of respondents indicating they drove over 20 kilometres to shop despite local food store options being available. In relation to accessing local food stores, 31% of respondents indicated a reliance on the local supermarket for buying fruit and vegetables, while just below 18% reported they shopped at their local fruit and vegetable shop. The reasons for this relatively low use of local food stores was not explored, however anecdotally, the low use of local supermarkets and food stores may be contributed to by the perceived high costs and limited variety and parents already travelling to larger regional or metropolitan areas for other reasons.

In relation to food costs a Monash University study (2016a) reported that the price of fruit and vegetables from supermarkets has increased by 12% since 2012-2014 and the price of fruit and vegetables increases the further the store is from the capital city Melbourne. The latter is significant in light of a recent Victorian Healthy Food Basket survey which suggested that the average cost of a healthy basket of food within the Mitchell/Murrindindi catchment for a typical family represented 31% of household income (Lower Hume PCP 2016), with suggestions that any food costs above 30% of income are "unaffordable" (Monash University 2016b). Of the 94 parents who completed the survey, 2 reported running out of food in the last 12 months, with one of these respondents indicating a credit card would be a management strategy in this situation.

In respect to food use or knowledge, results of the survey found that only 6% of parents said stated that they were not sure how to make or offer healthy food. More specifically, 2% of respondent said they found it hard to read food labels, while 2% also said they were not sure if what they were buying was healthy. Eighteen percent of parents also reported that they were growing their own vegetables (18%).

Barriers to healthy eating

Parents' top 3 barriers to consuming a variety of nutritious foods were cost, time and their child's fussy eating. Fussy eating was the most common with 28% of parents identifying this as a barrier. This is not surprising with fussy eating a normal behaviour that can occur in around half of toddlers and can continue on into the primary school years (Victoria Government 2016). Financial considerations were next, with 25% of parents suggested that food costing too much made it difficult to eat a variety of nutritious foods.

On average parents believed that their knowledge of nutritious foods was excellent or above average. This is further confirmed by only a small number of parents identifying not knowing what to buy is a barrier to healthy eating. Parents also rated that they cared about eating nutritious foods either *Very much* or *Quite a lot*.

These findings suggest that parents are interested and willing for their families to eat well, but find food cost, time and fussy eaters make it hard. This also suggests that initiatives that demonstrate cheap, easy and nutritious foods may be useful in supporting parents, while strategies for parents to manage fussy eaters, perhaps with a focus on parents of toddler aged children, would also be welcome.

Parents perceived solutions to Healthy Eating

Parents were asked '*What changes do you think would help our children eat nutritiously?*' in a variety of settings, including home, school, shop and community to establish parent identified strategies to encourage healthy eating habits in children. Some parent suggestions are already occurring in (eg. Fruit breaks in schools) while others ideas could be further investigated to gauge support and get a better understanding of how changes could be implemented.

The most common changes suggested by respondents at home were to *'limit unhealthy foods in the house/only for special occasions*' and to *'have a good supply of healthy food/drinks at home*'. As discussed above, the majority of parents indicated that they cared very much about healthy eating and felt they had high levels of nutrition knowledge. Based on this it could be concluded that parents are aware of their role they play in their child's eating habits.

The two other most popular changes suggested were 'more time for food preparation' and 'recipes for cooking interesting and tasty food and cook from scratch'. This reflects the common theme of time constraints as identified as a barrier by parents to healthy eating (See Figure 4). While the first suggestion of '*more time*' would be difficult to influence, these results suggest there is parental interest in quick and healthy meals using basic ingredients.

Another suggested change was to '*grow fruit and vegetables at home*' and interestingly 'gardening at school' was a popular change in the school setting. There are a number of existing garden programs in Murrindindi and Mitchell schools which can be an effective way of increasing the exposure of children to vegetables. Conversely, parents' responses suggested that 82% of parents were not growing vegetables at home, suggesting this is a possible area of focus.

At school '*fruit/healthy snack break/reward program*' and *'restriction and policies on what foods and drinks children can bring/buy*' were the most common changes suggested. This suggests that parents are supportive of school based initiatives like the Achievement Program which use a Health Promoting School approach to healthy eating behaviour.

The most common shop changes that were suggested by parents have been identified in other studies, with evidence to show they are viable opportunities to increase nutritious food consumption. There are currently initiatives to implement the strategies they suggested:

- Promotion of healthy options
- Less junk food/don't position where attractive to children
- Healthy food at cheap/affordable price

Promotion of healthy eating through the print media, radio and food packaging, education programs on nutrition and cooking and local food swaps, stores and markets were the most popular changes suggested in the area of Community. Many of these strategies do exist locally, driven by community groups and government agencies in the form of community garden, websites and food op-shops. Similar to the schools suggestions, this suggests that parents support these initiatives within their communities.

It is worth noting that the above parent suggestions that were cited as the most commonly provided were provided by between 10-18 of respondents, which represents between 11-20% of the parents who completed the survey, and as such may not be considered a majority response.

Limitations

It was suggested that both parent and student surveys be completed in order to verify intake data. This capacity was limited as questions on each survey were different, one being 'serves' the other being 'occasions'. As a result comparison based on intake was not possible.

Further limitations relate to completion of the DILQ by students which is developed for use by Grades 3 to 6 students. Five of the 6 primary schools decided to include all students including Prep to Grades 2. Completion of this survey by students may have posed some difficulty for those who had forgotten aspects of their previous day's food intake. This may have been particularly relevant for students in Prep to Year 2 levels whose recall, understanding and interpretation may have been limited. In addition, the team underestimated interpretation difficulties of the DILQ response. As this became evident after the first

surveys were completed, every effort was made to ask students what their picture was during survey completion and researchers labelled the pictures. This was not always possible, and interpretation of student pictures relied on subjective interpretation during data analysis. Future surveys will need to lessen the chance of subjectiveness.

The complexity of analysis of the data was much greater than anticipated and when a key expert was no longer in the team it was challenging to understand the analysis and write an accurate and meaningful report that made best use of the data collected.

While the method of survey completion for the DILQ meant that in most cases all school students completed the survey, the parent surveys were voluntary and had a much lower response rate. Due to the voluntary nature, responder bias may be a limitation of the NFS Survey as parents who completed the survey may have had differing characteristics to those non-responders (Queensland Government 2015). One could suggest for example, that parents who have a greater interest in healthy eating would be more likely to complete a voluntary written survey on the subject. This is supported by findings that none of the parents completing the survey reported they had poor nutrition knowledge or that they did not care about healthy eating. Also worth noting is that only 2 of the 94 parents (or less than 1%) who responded reported that they had run out of money to buy food in the last 12 months. Apart from this question, the survey did not explore parent background such as education level or socioeconomic status which would have helped explore responder bias.

CONCLUSIONS

Developing an understanding of shopping habits of regional and rural people at multiple sources and the heavy reliance on using the car are key to understanding and developing strategies to effect positive change. Understanding the habits of parents shopping will help with strategies to assist parents with budgeting, home based gardening and quick affordable healthy meal ideas. The trends in consumption of fruit, vegetables and discretionary foods throughout the day by children will also help guide health promotion practice in the future. The reasoning behind certain habits and trends will also help with the time, energy and fussy eating being identified as the largest contributing factors to poor eating habits while knowledge and difficulty reading food labels were regarded as non-issues for the majority of people. The insight and understanding about parents and students habits, knowledge and their beliefs about healthy eating are also important to understand and develop strategies to modify poor health habits. Working in schools using a settings based approach is an effective way of helping to educate and revise poor habits as well as building skills and knowledge to improve future outcomes.

Achievements

The report was able to create a baseline of data that documented the fruit and vegetable intake of children within the Lower Hume region and highlight some of the factors that affected intake. The results also allowed a detailed description of where people in regional and remote areas source their fruit and vegetables from as well as the transport options available to them. The range of locations that food was being sourced from in rural areas was insightful.

The process and results of the surveys allowed for greater engagement with schools as both highlighted the importance of healthy eating in schools.

The data was able to be used and inform other projects, such as food security initiatives in the area.

Lessons learned

- The two tools weren't useful as intended for comparison as measurements were not comparable and differences not significant.
- Tool needs to be appropriate for the participant – Grades Prep to 2 was too young for DILQ.
- Underestimating the subjective nature of interpretation.
- Complexity of tool and analysis could have been simplified.

Recommendations

- Vegetable consumption is an area of focus, particularly in the school setting.
- Continue with a settings based approach to reach all children.
- Further investigate strategies to assist parents in regards to food budgeting, home based gardening and quick, affordable and healthy meal ideas.
- Develop some support strategies for parents in respect to fussy eating in children management, with consideration of targeting parents of children in the 1-5 year age group.
- Consider reach of follow up survey and whether only Achievement Program schools included or whether surveys repeated with all previous schools regardless of Achievement Program involvement.
- As intended by the tools developers, when the follow up survey is completed, the DILQ should only be completed by Grades 3-6 student, with Grades Prep-2 excluded
- Continue to focus on the social determinants of healthy eating, like accessibility and affordability of food

Dissemination Strategies

- Investigate whether this study is suitable for journal publication
- Report back to schools and acknowledge their contribution
- Disseminate copies of this report to other Hume Region Primary Care Partnerships and Health Promotion agencies/organisations who are working in the area of healthy eating in the 0-12 year old age group
- Present findings at relevant Health Promotion forums within Hume Region.

APPENDICES

Appendix 1: Thematic Analysis themes and number of responses in each theme

HOME

Limit Unhealthy foods in the house/only for special occasions	18
More time for food preparation and recipes for cooking interesting and tasty food/cook from scratch	17
Grow fruit and vegetables at home	14
Good supply of healthy food/drinks at home	12
Other	8
Barriers	7
Involve kids in cooking	7
No change needed	5
Parents as role models	4

SCHOOL

Restriction and policies on what foods and drinks children can bring/buy	13
Grow fruit and vegetables at school	12
Other	11
Parents pack healthy food for their children	10
Fruit/healthy snack break/reward program	10
Healthy eating education	8
No suggestions, school does a good job	7
No rubbish/nude food lunchbox policy	5
Positive role models/guest speakers	5
Talking / discussing / promoting healthy eating	5
Cooking programs/days	3
Healthy lunchbox ideas	2
Assistance with food prep-heating meals/cutting fruit/access to fridge	2
Cookbook	2
Allow nuts	2

SHOPS

Promotion of healthy options	13
Other	12
Less junk food/don't position where attractive to children	11
Healthy food at cheap/affordable price	10
Nothing – parents responsibility	8
Wide variety of healthy foods available	7
Recipes/ideas	5
Local produce	4
Taste tests/samples	3
Education	2

COMMUNITY

Promotion / advertising through newspaper, newsletter, radio, packaging etc.	15
Education programs/workshops cooking/recipes/nutrition	12
Other	12
Local food swaps/stores/markets	10
Community gardens	7
Less fast food/healthier options	6
Exercise programs	3
Better food labelling	2

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