

# Baseline Assessment of Promoting Healthy Eating in Primary Schools

## Supplementary Report on School Lunch



# 小學推行健康飲食基線研究 小學午膳附加報告



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**Table 3. Schools by lunch subscription rate among P4 and P5 students**

Lunch subscription rate among P4 and P5 students	Number of Schools	Percentage
Less than 50%	3	9.1%
50% to 59%	6	18.2%
60% to 69%	8	24.2%
70% to 79%	11	33.3%
80% to 89%	3	9.1%
90% or above	2	6.1%
<b>Total</b>	<b>33</b>	<b>100%</b>

### 2.2.3 Price range of lunch

Thirty-five schools provided information on the lunch price. The price varied from \$13.4 to \$25, with the majority (80%) lying between \$14 and \$16 (Table 4).

**Table 4. Schools by the price range of lunch**

Lunch price	Number of Schools	Percentage
Less than \$14	1	2.9%
\$14 to less than \$14.9	15	42.9%
\$15 to less than \$15.9	13	37.1%
\$16 to less than \$16.9	1	2.9%
\$17 to less than \$17.9	2	5.7%
\$18 to less than \$18.9	0	-
\$19 to less than \$19.9	0	-
\$20 or above	3	8.6%
<b>Total</b>	<b>35</b>	<b>100%</b>

## **1. Background**

Healthy eating is essential for the growth of school-aged children and prevention of diet-related health problems including obesity, heart disease, cancer and diabetes.

The Department of Health (DH) has recorded a rising trend of obesity among primary school students, from 16.4% in 1997/98 to 18.7% in 2004/05. That is to say, almost one in five schoolchildren is obese. In this light, initiatives which aim at preventing childhood obesity should be implemented.

Promoting healthy eating habit among school children is one of the new initiatives in the 2005 - 2006 Policy Address. To prepare for the territory-wide “EatSmart@school.hk” campaign organized by DH, a Baseline Assessment of Promoting Healthy Eating in Primary Schools has been conducted in the first quarter of 2006. The results of this study would be used as a reference in developing relevant health promotion resources and for subsequent evaluation.

The assessment consisted of three separate sets of self-administered questionnaires which were prepared for the Primary 4 (P4) and Primary 5 (P5) students, their parents, and the school principals/ representatives. Apart from these three sets of questionnaires, information on school lunch menus, tuck shops and vending machines were also collected from the school principals/ representatives as appendices:

**Appendix 1: the one-week lunch menu of school lunch**

**Appendix 2: the standardized recipe for the most popular daily lunch selection**

Appendix 3: the list of food and beverage available in school tuck shops

Appendix 4: the list of food and beverage available in school vending machines

This supplementary report would describe the analysis on school lunch and so only results from appendices 1 and 2 were discussed.

## 2. Analysis of One-week School Lunch Menu

### 2.1 Study Design

Forty-four schools were recruited in the study. A self-administered questionnaire which included a sample of one-week school lunch menu was distributed to the school representatives for collecting information on the school eating environment. Forty-one schools (93.2%) provided school lunch, and one-week school lunch menu was collected from all of them for analysis.

“Nutritional Guidelines on School Lunch for Primary School Students” (hereafter referred as “the Lunch Guidelines”) produced by DH (2006)<sup>1</sup> was used to determine the healthiness of the one-week menu. Five criteria were drawn from the Lunch Guidelines (Table 1). Assessment was based on the names of lunch choices appeared in the menu and advice from a dietician.

**Table 1. Criteria used to assess the healthiness of one-week lunch menu**

Criteria	Requirement
I	Vegetables are mentioned in all lunch choices on every school day
II	Whole grains are mentioned in at least one lunch choice on every school day
III	Reduced fat dairy products or other calcium-rich food items are mentioned in at least one lunch choice on every school day
IV	Limited food items are served in no more than two school days
V	No strongly discouraged food items are found on all school days

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<sup>1</sup> “Nutritional Guidelines on School Lunch for Primary School Students” published by the Department of Health in 2006 can be retrieved from [http://www.cheu.gov.hk/files/professional/Nutritional\\_Guidelines\\_on\\_School\\_Lunch\\_Eng.pdf](http://www.cheu.gov.hk/files/professional/Nutritional_Guidelines_on_School_Lunch_Eng.pdf)

## **2.2 Results**

Forty-one among the 44 schools (93.2%) replied that they offered lunch for their students. The remaining three schools only had classes in the afternoon and thus did not provide lunch for their students.

Based on the collected information, number of daily lunch choices, lunch subscription rate of P4 and P5 students and the price range of school lunch were found.

### **2.2.1 Number of lunch choices per day**

Number of school lunch choices per day varied from one to four, most schools had three (39%) or even four choices (29.3%) each day (Table 2). However, about one fifth of schools (19.5%) offered only one set-lunch each day.

**Table 2. Schools by number of lunch choices offered**

<b>Number of lunch choices offered</b>	<b>Number of Schools</b>	<b>Percentage</b>
1	8	19.5%
2	5	12.2%
3	16	39.0%
4	12	29.3%
<b>Total</b>	<b>41</b>	<b>100%</b>

### **2.2.2 Lunch subscription rate**

The lunch subscription rate was the number of P4 and P5 students who took school lunch divided by all P4 and P5 students. Among the participating schools, only 33 have provided sufficient information for the calculation. Of 7 396 P4 and P5 students successfully enumerated, 5 011 of them have taken school lunch, giving an overall subscription rate of 68%. The lunch subscription rate of individual schools varied from 27.5% to 100%. One third of the schools had 70% to 79% of P4 and P5 students taking school lunch while 15% of the schools had 80% or more (Table 3). It was found that students' subscription for lunch varied between school days within the same week thus the lunch subscription rates were average figures only.



**Table 3. Schools by lunch subscription rate among P4 and P5 students**

Lunch subscription rate among P4 and P5 students	Number of Schools	Percentage
Less than 50%	3	9.1%
50% to 59%	6	18.2%
60% to 69%	8	24.2%
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<b>Total</b>	<b>33</b>	<b>100%</b>

### 2.2.3 Price range of lunch

Thirty-five schools provided information on the lunch price. The price varied from \$13.4 to \$25, with the majority (80%) lying between \$14 and \$16 (Table 4).

**Table 4. Schools by the price range of lunch**

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\$17 to less than \$17.9	2	5.7%
\$18 to less than \$18.9	0	-
\$19 to less than \$19.9	0	-
\$20 or above	3	8.6%
<b>Total</b>	<b>35</b>	<b>100%</b>

#### 2.2.4 Degree of compliance with the five assessment criteria

The one-week school menu was assessed by using the criteria stated in Table 1. Some common food items appeared in the menu were given in Table 5.

**Table 5. Food items commonly appeared in the menu by corresponding food types specified in the five assessment criteria**

Food types	Food items appeared in the menu	
<b>Whole grains</b>	<ul style="list-style-type: none"> <li>• Whole-wheat bread</li> <li>• Whole-wheat noodles</li> <li>• Brown rice</li> </ul>	<ul style="list-style-type: none"> <li>• Rolled oats</li> <li>• Whole-wheat cereals flakes</li> <li>• Red rice</li> </ul>
<b>Reduced fat dairy products or other calcium-rich food items</b>	<ul style="list-style-type: none"> <li>• Low-fat or skimmed milk</li> <li>• Low fat yoghurt</li> <li>• Low-fat cheese</li> <li>• Tofu</li> </ul>	<ul style="list-style-type: none"> <li>• High-calcium soya milk</li> <li>• Green vegetables, e.g. choy sum, broccoli, spinach, string beans</li> </ul>
<b>Limited food items which have higher salt or fat content</b>	<ul style="list-style-type: none"> <li>• Full cream milk</li> <li>• Full cream yoghurt</li> </ul>	<ul style="list-style-type: none"> <li>• Cheese</li> </ul>
	<ul style="list-style-type: none"> <li>• Stir-fried rice</li> <li>• Stir-fried noodles</li> <li>• Stir-fried spaghetti</li> <li>• Oil noodles</li> </ul>	<ul style="list-style-type: none"> <li>• 'E-meen / E-fu noodles</li> <li>• Baked rice, spaghetti or noodles with sauces</li> </ul>
	<ul style="list-style-type: none"> <li>• Beef brisket</li> <li>• Spareribs</li> <li>• BBQ pork ribs</li> <li>• Chicken flaws</li> <li>• Minced pork</li> <li>• Spicy pork (canned food)</li> </ul>	<ul style="list-style-type: none"> <li>• Meat balls</li> <li>• Steamed minced pork</li> <li>• Pork fillets</li> <li>• Chicken wings, chicken drumsticks and other poultries with skin</li> </ul>

**Table 5. Common food items appeared in the menu by corresponding food types specified in the five assessment criteria (cont')**

<b>Food types</b>	<b>Food items appeared in the menu</b>	
<b>Limited food items which have higher salt or fat content (cont')</b>	<ul style="list-style-type: none"> <li>• BBQ pork</li> <li>• Bacon</li> <li>• Ham</li> <li>• Luncheon meat</li> <li>• Sausages</li> <li>• Jumbo sausages</li> </ul>	<ul style="list-style-type: none"> <li>• Dried pork sausages</li> <li>• Fish balls</li> <li>• Pickled cucumbers</li> <li>• Other pickled or preserved vegetables</li> </ul>
	<ul style="list-style-type: none"> <li>• Black soy sauce</li> <li>• Sweetened soy sauce</li> <li>• Salted shrimp sauce</li> <li>• Belachan</li> </ul>	<ul style="list-style-type: none"> <li>• Sauces made with cheese, evaporated milk, preserved bean curd, thick broad-bean sauce, oyster sauce</li> </ul>
<b>Strongly discouraged food items which have high salt, sugar or fat content</b>	<ul style="list-style-type: none"> <li>• French fries</li> <li>• Deep fried pork chop</li> <li>• Deep fried chicken drumsticks</li> <li>• Deep fried dim sum ( e.g. spring rolls, curry puffs )</li> </ul>	<ul style="list-style-type: none"> <li>• Pork chop cutlet</li> <li>• Chicken steak cutlet</li> <li>• Fish fillet cutlet</li> </ul>
	<ul style="list-style-type: none"> <li>• Salted fish</li> </ul>	<ul style="list-style-type: none"> <li>• Salted eggs</li> </ul>
	<ul style="list-style-type: none"> <li>• Ice-cream</li> <li>• Chocolates</li> <li>• Cookies</li> <li>• Cheese cakes</li> </ul>	<ul style="list-style-type: none"> <li>• Sponge cakes</li> <li>• Egg custard buns</li> <li>• Puff pastries</li> </ul>
	<ul style="list-style-type: none"> <li>• Food added with lard, chicken oil, butter, palm oil, coconut oil, coconut flesh or margarine (e.g. curry or desserts with coconut added products)</li> </ul>	

Among the 41 schools, none of them met all the five criteria. Moreover, no school was able to provide whole grains, reduced fat dairy products or other high calcium food items in at least one lunch choice on every school day. More than 85% of the one-week menu did not mention vegetable in all lunch choices on every school day. Over 95% and 60% of the weekly menu provided more than the specified frequencies of “Limited” and “Strongly discouraged” food items respectively (Table 6).

**Table 6. Degree of compliance with the five assessment criteria**

<b>Criteria</b>	<b>No. of menu met the criterion</b>	<b>Percentage</b>	<b>No. of menu NOT met the criterion</b>	<b>Percentage</b>
I. Vegetables	6	14.6%	35	85.3%
II. Whole grains	0	0%	41	100.0%
III. Reduced fat dairy products or other calcium-rich food	0	0%	41	100.0%
IV. Limited food items	2	4.9%	39	95.1%
V. Strongly discouraged food	16	39.0%	25	61.0%

### 3. Analysis of Popular School Lunch Recipes

#### 3.1 Study Design

Forty-four schools were recruited in the study. A self-administered questionnaire which attached with a sample of standard recipe was distributed to the school representative for collecting information on the eating environment in schools. Forty-one schools (93.2%) provided school lunch. Among them, thirty-three schools (80.5%) submitted the recipes of those lunch choices that were most popular during the study week. A total of 125 recipes were received for analysis in this survey.

The Lunch Guidelines was used to determine the healthiness of the recipe. Food ingredients in each recipe were classified into one of the four major food groups, namely

- (I) Grains & cereals,
- (II) Vegetables,
- (III) Meat, poultry, fish, eggs and beans; and
- (IV) Fats and oils.

Based on the Lunch Guidelines, recommended quantity of daily school lunch with respect to the four food groups for P4 to P6 students was given in Table 7. Rules for classifying equivocal ingredients into specific food category and measuring food quantity were defined as listed in Table 8, after seeking advice from a dietician. The number of servings in each food group was obtained by adding the serving sizes of respective ingredients in the recipe.

**Table 7. Recommended daily nutritional requirements on the four major food groups of school lunches for P4 to P6 students**

<b>Food groups</b>	<b>Recommended quantity</b>
(I) Grains and cereals	At least 5 servings
(II) Vegetables	At least 1 serving
(III) Meat, poultry, fish, eggs and beans	1.5 to 2.5 servings
(IV) Fats and oils	2 servings maximum

**Table 8. Rules of classifying equivocal food ingredients into specific food group and measuring food quantity**

<b>Rules of classifying equivocal food ingredients into specific food group</b>
<ul style="list-style-type: none"> <li>• ‘Potato’ is classified as grains &amp; cereals</li> <li>• ‘Pumpkin’ is classified as vegetables</li> <li>• ‘Corn’ may be classified as grains &amp; cereals or vegetables depends whether the supplier treated it as grains or vegetables in the recipe</li> </ul>
<b>Rules of measuring the food quantity</b>
<ul style="list-style-type: none"> <li>• If not specified, all provided ‘rice’ measurement is considered as cooked rice</li> <li>• If not specified, all provided ‘vegetable’ measurement is considered as raw vegetable</li> <li>• Two-third of the weight of ‘chicken leg’ is considered as ‘chicken meat’</li> <li>• A food group would have ‘zero’ serving if the recipe has no corresponding ingredients</li> <li>• Food ingredients without measurement would be regarded as ‘not enough information’ and hence would not contribute to the overall serving size of respective food groups</li> </ul>

Notes:

1. Bread and noodles without further specification are not classified as whole grains.
2. Egg tofu is made by egg with minimal or no calcium sulfrate (gypsum). Hence it is not classified as calcium-rich food item.
3. Only those dairy products which were specified as low-fat would be classified as reduced fat dairy products.
4. Chicken drumsticks, chicken fillets, steamed chicken and chicken balls are classified as limited food items, except those are specified as skin-off.
5. Minced pork but not minced lean pork is classified as limited food item.
6. Items which are specified as low salt, low sugar or low fat would not be classified as limited or strongly discouraged food items.
7. Drinks with known added sugar content are categorised as limited or strongly discouraged food items.

## 3.2 Results

Some food ingredients, which were regarded as “limited” or “strongly discouraged” food items according to the Guidelines, could not be quantified because their standard servings were not specified in our database. These food ingredients all belonged to either food group I or III. For the sake of description, they were referred as “less healthy ingredients” in this report. It was found that 79 recipes (more than 60%) had at least one “less healthy ingredients” (Table 9). As information of servings on food group I and III were not available for recipes containing “less healthy ingredients”, separate analyses for recipes with and without “less healthy ingredients” were conducted.

**Table 9. Recipes by the presence of “less healthy ingredients”**

Recipes	Number of recipes	Percentage
Recipes with one or more “less healthy ingredients”	79	63.2%
Recipes without “less healthy ingredients”	46	36.8%
<i>Total</i>	<b>125</b>	<b>100%</b>

### 3.2.1 Recipes with “less healthy ingredients”

#### 3.2.1.1 Number of “less healthy ingredients” within a recipe

The number of “less healthy ingredients” contained within a recipe varied from one to four. More than half of these recipes had more than one “less healthy ingredients” and about 5% of the recipes had even four unhealthy food ingredients (Table 10).

**Table 10. Recipes by the number of “less healthy ingredients” found**

Number of “less healthy ingredients” found within a recipe	Number of recipes	Percentage
1	36	45.6%
2	25	31.6%
3	14	17.7%
4	4	5.1%
<i>Total</i>	<b>79</b>	<b>100%</b>

### 3.2.1.2 “Less healthy ingredients” by categories specified in the Lunch Guidelines

About half (45.7%) of the 79 recipes contained processed or preserved food, the most common items being ham, sausages and bacon. Fatty cut of meat and poultry with skin (16.4%), desserts or beverages with more than 10 grams or 2 teaspoons of added sugar in each serving (12.1%) and cheese (10.7%) were also common. The number of recipes which had various “less healthy ingredients”, with corresponding section of the Lunch Guidelines stated in the bracket, were shown in Table 11 – 18.

**Table 11. Number of recipes with “grains and cereals with added fat or oil”**

<b>Limited food items (3.1): Grains and cereals with added fat or oil</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Croissant	2	1.4%
Pan-fried buns	2	1.4%
Glutinous rice dumplings	2	1.4%
Bread crumbs	1	0.7%
‘E-meen’ / E-fu noodles	1	0.7%
Pizza	1	0.7%
<b>Total</b>	<b>9</b>	<b>6.4%</b>

**Table 12. Number of recipes with “fatty cut of meat and poultry with skin”**

<b>Limited food items (3.2): Fatty cut of meat and poultry with skin</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Chicken wings	11	7.9%
Pork Loins	4	2.9%
‘Siu mai’	4	2.9%
BBQ pork	2	1.4%
BBQ ribs	1	0.7%
Steamed beef balls	1	0.7%
<b>Total</b>	<b>23</b>	<b>16.4%</b>



**Table 13. Number of recipes with “whole fat dairy products”**

<b>Limited food items (3.3): Whole fat dairy products</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Cheese	15	10.7%
<b>Total</b>	<b>15</b>	<b>10.7%</b>

**Table 14. Number of recipes with “processed or preserved meat, egg and vegetable products”**

<b>Limited food items (3.4): Processed or preserved meat, egg and vegetable products</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Ham	22	15.7%
Jumbo sausages	12	8.6%
Chicken sausages	7	5.0%
Sausages	6	4.3%
Bacon	3	2.1%
Romanian sausages	3	2.1%
Frankfurters	2	1.4%
Crab sticks	1	0.7%
Dried shrimps	1	0.7%
Shrimp rolls	1	0.7%
Japanese fish rolls	1	0.7%
Japanese fish sausages	1	0.7%
Stuffed fish balls with meat	1	0.7%
Pork flosses	1	0.7%
Seaweeds	1	0.7%
Pickled vegetables	1	0.7%
<b>Total</b>	<b>64</b>	<b>45.7%</b>

**Table 15. Number of recipes with “sauce or gravy with high salt or fat content”**

<b>Limited food items (3.5): Sauce or gravy with high salt or fat content</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Meat sauces with gravy	9	6.4%
<b><i>Total</i></b>	<b>9</b>	<b>6.4%</b>

**Table 16. Number of recipes with “deep-fried food items”**

<b>Strongly discouraged food items (4.1): Deep-fried food items</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Deep fried fish fillets	1	0.7%
French fries	1	0.7%
<b><i>Total</i></b>	<b>2</b>	<b>1.4%</b>

**Table 17. Number of recipes with “desserts or beverages with more than 10 grams or 2 teaspoons of added sugar in each serving”**

<b>Strongly discouraged food items (4.3): Desserts or beverages with more than 10 grams or 2 teaspoons of added sugar in each serving</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Cakes	4	2.9%
Jellies	2	1.4%
Baked red bean cake	1	0.7%
Branded soy milk	1	0.7%
Branded sweetened juice	1	0.7%
Branded yoghurt drinks	1	0.7%
Canned apple	1	0.7%
Canned mixed fruit	1	0.7%
Canned peach	1	0.7%

**Table 17. Number of recipes with “desserts or beverages with more than 10 grams or 2 teaspoons of added sugar in each serving” (cont’)**

<b>Strongly discouraged food items (4.3): Desserts or beverages with more than 10 grams or 2 teaspoonfuls of added sugar in each serving</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Egg custard buns	1	0.7%
Rice crackers	1	0.7%
Sweetened apple juice	1	0.7%
Sweetened peach juice	1	0.7%
<b><i>Total</i></b>	<b>17</b>	<b>12.1%</b>

**Table 18. Number of recipes with “items with very high salt content”**

<b>Strongly discouraged food items (4.4): Items with very high salt content</b>	<b>Number of recipes</b>	<b>Percentage among all “less healthy ingredients”</b>
Canned tuna in brine	1	0.7%
<b><i>Total</i></b>	<b>1</b>	<b>0.7%</b>

### 3.2.1.3 Servings on vegetables, fats and oils

Since information on the number of servings for food group I and III was incomplete for the 79 recipes, analysis could only be carried out for food group II (vegetables) and IV (fats and oils). Two and six recipes did not provide adequate information on vegetables and fats and oils respectively. Overall, one third (33.8%) contained the recommended quantity of vegetables (Table 19). On the other hand, 82.2% of these recipes met the recommended quantity of fats or oils (Table 20).

**Table 19. Recipes with “less healthy ingredients” by servings on vegetables**

Number of servings on vegetables	Number of recipes	Percentage
Not being mentioned	18	23.4%
Less than 1 serving	33	42.9%
1 serving ( <i>recommended</i> )	2	2.6%
More than 1 serving ( <i>recommended</i> )	24	31.2%
<b>Total</b>	<b>77</b>	<b>100%</b>

**Table 20. Recipes with “less healthy ingredients” by servings on fats and oils**

Number of servings on fats and oils	Number of recipes	Percentage
Not being mentioned ( <i>recommended</i> )	28	38.4%
Less than or equal 2 servings ( <i>recommended</i> )	32	43.8%
More than 2 servings	13	17.8%
<b>Total</b>	<b>73</b>	<b>100%</b>

### 3.2.2 Recipes without “less healthy ingredients”

#### 3.2.2.1 Servings on grains, vegetables, meats, fats and oils

Forty-six recipes had no “less healthy ingredients”. As each ingredient in these recipes could be classified into one of the four food groups and quantified into corresponding servings, the number of servings on grains, vegetables, meats, fats and oils could be analyzed. Among 46 recipes which provided sufficient information for calculation of servings, it was found that 86.1%, 62.2%, 60.5%, and 64.8% contained the recommended quantity of grains and cereals, vegetables, meats, fats and oils respectively (Table 21 – 24).

These recipes were found to have more vegetable than those recipes with “less healthy ingredients” (62.2% vs. 33.8%).

**Table 21. Recipes without “less healthy ingredients” by servings on grains and cereals**

Number of servings on grains & cereals	No. of recipes	Percentage
Not being mentioned	1	2.3%
Less than 5 servings	5	11.6%
5 servings ( <i>recommended</i> )	3	7.0%
More than 5 servings ( <i>recommended</i> )	34	79.1%
<b>Total</b>	<b>43</b>	<b>100%</b>

**Table 22. Recipes without “less healthy ingredients” by servings on vegetables**

Number of servings on vegetables	No. of recipes	Percentage
Not being mentioned	1	2.2%
Less than 1 serving	16	35.6%
More than 1 serving ( <i>recommended</i> )	28	62.2%
<b>Total</b>	<b>45</b>	<b>100%</b>

**Table 23. Recipes without “less healthy ingredients” by servings on meats, poultry, fish, eggs and beans**

Number of servings on meats, poultry, fish, eggs and beans	No. of recipes	Percentage
Less than 1.5 servings	3	7.0%
Between 1.5 to 2.5 servings ( <i>recommended</i> )	26	60.5%
More than 2.5 servings	14	32.6%
<b>Total</b>	<b>43</b>	<b>100%</b>

**Table 24. Recipes without “less healthy ingredients” by servings on fats and oils**

Number of servings on fats and oils	No. of recipes	Percentage
Not being mentioned ( <i>recommended</i> )	15	40.5%
Less than 2 servings ( <i>recommended</i> )	7	18.9%
2 servings ( <i>recommended</i> )	2	5.4%
More than 2 servings	13	35.1%
<b>Total</b>	<b>37</b>	<b>100%</b>

### 3.2.2.2 Lunch price with respect to compliance with the Lunch Guidelines

Among the 46 recipes, 13 of them (28.3%) fulfilled the recommended servings of food groups I, II and III as stated in the Lunch Guidelines, that is, provided at least 5 servings on grains & cereals, at least 1 serving on vegetables and between 1.5 and 2.5 servings on meats.

Price information was given along with 36 recipes. Table 25 showed the average price of those recipes which fulfilled the recommended servings was lower (HK\$14.8) than those which did not fulfil the recommendation (HK\$16).

**Table 25. Lunch price with respect to compliance with the Lunch Guidelines**

Recipes	No. of recipes	Percentage	Mean lunch price
Fulfilled recommended servings on grains, vegetables and meats	11	28.3%	\$14.8
Not fulfilled recommended servings on at least one of the food groups	25	71.7%	\$16.0
<b>Total</b>	<b>36</b>	<b>100%</b>	

## 4. Conclusion

Most schools examined in this study provided more than one lunch choice for students. Usually some choices were healthier. Thus, students and parents should be encouraged to make a choice good for their health.

The overall school lunch subscription rate of P4 and P5 students among the participating schools was 68%. With this large number of students eating lunch provided by schools five days a week, nutritional value of school lunch has profound and long term impact on public health.

The relatively unsatisfactory findings of the one-week menus as judged by the five assessment criteria extracted from the Lunch Guidelines suggest that children may either be consuming a less than balanced diet or taking in an inappropriate amount of food. Lunch suppliers should make more effort to prepare all lunch choices in a healthy manner. Specifically, more vegetables, whole grains, reduced fat dairy products or other calcium-rich food items, and fewer less healthy food items such as grains and cereals with added fat or oil, fatty cut of meat and poultry with skin, whole fat dairy products, and processed or preserved meat, egg and vegetables, etc. should be supplied.

Nearly two third of all recipes analyzed contained “less healthy ingredients”, mostly processed or preserved food. Among these recipes, only one third provided the recommended amount of vegetables. Whereas for recipes which had no “less healthy ingredients”, more than half provided recommended quantity of grains and cereals (86.1%), vegetables (62.2%), meats (60.5%), fats and oils (64.8%) for P4 to P6 students. Even so, less than 30% of them could fulfil the recommended quantity of the major food groups. The results indicated that the existing lunch recipes have much room for further improvement.

Healthy recipes are not necessarily more expensive. It was found that lunch recipes which met the recommended amount of the three major food groups was comparatively cheaper (mean price HK\$14.8) than those which did not (mean price HK\$16), both being popular lunch selections. Although factors other than production cost such as marketing strategy may account for such a difference in price, real saving from serving less meat in those recipes, which met the recommended amount of the three major food groups, could be a genuine reason.



## 5. Limitations

1. Information submitted by some schools about the number of lunch choices subscribed by P4 and P5 students, and the quantity of individual food ingredients were incomplete. This might have affected the accuracy on calculating the lunch subscription rate and servings of each food group.
2. The classification of food was conducted purely by inferring from their names appeared in the school lunch menu. Although such classification was made by health professionals and dietician, error was likely to persist if the description on the menu choices was not clear.
3. Only the most popular lunch selection on each school day was requested from schools. However, a few returned recipes were not the most popular choices. It was unknown whether these recipes would be more or less healthy.
4. The accuracy of food grouping and calculation of servings for food ingredients was dependent on the information contained in the submitted recipes. Error may arise during analysis for those recipes with unclear description.

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21. LOK SIN TONG PRIMARY SCHOOL
22. NG WAH CATHOLIC PRIMARY SCHOOL
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