The Chinese University of Hong Kong
Department of Biochemistry (Science)
生物化學系(理學院)
Biochemistry(Science)

Hong Kong Population-Based Food Consumption Survey 2005-2007

Final Report

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Correspondence:
Risk Assessment Section
Centre for Food Safety
Food and Environmental Hygiene Department
43/F, Queensway Government Offices,
66 Queensway, Hong Kong
Email: enquiries@fehd.gov.hk

Foreword

Food safety is a key and inseparable part of our public health system. Given its importance, food safety policies must be scientifically-based and supported by the best available scientific evidence. In order to provide scientific support on food-related risk assessment work, it is essential to obtain information on food consumption pattern of the Hong Kong population.

With the aim to investigate the food consumption pattern of the Hong Kong adult population, the Food and Environmental Hygiene Department (FEHD) commissioned the Chinese University of Hong Kong (CUHK) to conduct the first territory-wide food consumption survey of Hong Kong in 2005-2007. This Survey provided valuable food consumption data that can be used for future risk assessment work and food regulatory measures development so as to ensure food safety and facilitate the protection of public health in Hong Kong. With utmost effort, the CUHK compiled the Survey data and prepared this report to present the findings and provide comments on food consumption pattern of the local adult population.

I would like to express my heartfelt gratitude to the experts, especially the members of the Advisory Panel on Food Consumption Survey, for their useful and valuable expert advice on this Survey. I also extend my thanks to the Survey respondents who have participated in the study and contributed to a successful outcome. We believe that the new information available would better equip the Centre for Food Safety, FEHD in enhancing food safety in Hong Kong.

Dr Constance CHAN
Controller, Centre for Food Safety
Food and Environmental Hygiene Department

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List of Abbreviations

24-hr recall	24-hour dietary intake
BMI	Body Mass Index
C&SD	Census and Statistics Department
Ca	Calcium
CFS	Centre for Food Safety
CODEX	Codex Alimentarius
CSFII	Continuing Survey of Food Intakes by Individuals
CUHK	The Chinese University of Hong Kong
DH	Department of Health
FBQ	Food Behavior Questionnaire
FCS	Food Consumption Survey
FEHD	Food and Environmental Hygiene Department
FFQ	Food Frequency Questionnaire
FIB	Food Instruction Booklet
g	gram
HA	Hospital Authority
HKSARG	The Government of the Hong Kong Special Administrative Region

List of Abbreviations (contd.)

Kcal	Kilocalories
kg	kilogram
m	meter
ml	milliliter
NHANES	The National Health and Nutrition Examination Surveys
SD	Standard deviation
SPSS	Statistical Package for the Social Sciences
USDA	United States Department of Agriculture
WHO	World Health Organization

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* Chinese versions of the questionnaires available from the website of the Centre for Food Safety—http://www.cfs.gov.hk

Executive Summary

1. This report presents the findings of the first territory-wide food consumption survey (Survey) conducted in Hong Kong in 2005-2007 to investigate the food consumption of Hong Kong adults aged 20 to 84 years. The Chinese University of Hong Kong was commissioned by the Food and Environmental Hygiene Department (FEHD) for the work of the Centre for Food Safety (CFS) to utilize in its risk assessment work to enable it to provide adequate protection of consumer health and food safety.

2. This Survey aimed to obtain up-to-date food consumption information (for example, the types and amounts of food consumed) among individuals in Hong Kong; collect weight measurements among individuals in Hong Kong; identify dishes consumed among individuals in Hong Kong; and develop recipes for the dishes identified. All objectives were achieved through three interviews and subsequent data management and analyses.

3. The three interviews and body weight measurement were conducted by trained interviewers. Interviewers used two non-consecutive days of 24-hour dietary intake (24-hr recall) questionnaires and a 110-item food frequency questionnaire (FFQ) to obtain food consumption estimates. Respondents' food knowledge and behavior were obtained through the food behavior questionnaire (FBQ). Socio-demographic information of the respondents was also collected.

4. The sample for the Survey was selected using two-stage stratified random sampling with quotas by age and gender. A total of 5,008 adults participated in the Survey, representing 48.1% of those originally selected as eligible. Not all respondents permitted a weight measurement, which was achieved among 4,971 or 99.3% of the respondents. At the end of the Survey, a food consumption database was developed, including a Food and Recipe Database with 1,706 foods, of which 1,429 were consumed by respondents of this Survey, along with 1,591 recipes. Data collected during the Survey was analyzed, and the results presented in this report have been age- and gender- weighted and represent a population of about 5,394,000 Hong Kong residents aged 20-84.

Key Findings

Food Consumption Pattern from 24-hr Recall

5. Information on food consumption amounts were collected and analyzed. The main findings are presented in this report. The analyses resulted in several key findings. Concerning food consumption, the average of total daily consumption of solid food was found to be about 1.12 kg. Liquid food intake was about 1,860 ml per day on average, of which 57.3% (1,065.62ml) was from water. Fluids intake, which include water and other non-alcoholic beverages, soup, milk and milk beverages, but excluding water used for cooking, was found to be 1,787.11 ml and contributed to about 96% of the total liquid food intake.

6. Cereals and grains products were consumed in the amount of 488.75 g/day, 60.8% (297.16 g/day) of which was from the rice subgroup, which included items

such as white rice, congee and brown rice. Wheat products made up another 33.5% of the cereals and grains products group. It was estimated that 8.65 g of this group were consumed as whole grains.

7. Vegetables and fruits were consumed in the amount of 176.96 g/day and 146.81 g/day respectively. Two thirds (68.4%) of the vegetables consumed were those of the leafy/stalk/shoot vegetables and brassica group. Soybeans and their products, with 8.62 g/day consumed on average, made up over half (61.0%) of the daily legume consumption of 14.13 g. When tubers such as potato and taro (about 8.05 g/day) were not included in the calculation, vegetables consumption was found to be 168.91 g/day. Only 2.58 g of the nuts and seeds group were consumed.

8. A total of 112.50 g/day of meat group, poultry group, and game group items was consumed. Meat was consumed in the amount of 74.23 g/day, 72.5% of which was from pork (53.81g/day). From the poultry group, chicken was consumed in the amount of 32.90 g/day, making up 88.0% of the total poultry consumption of 37.38 g/day. Only 0.89 g of the game group was consumed.

9. Fish and other aquatic animal (i.e. crustaceans and molluscs) consumption was found to be 70.78 g/day in total. The average daily fish consumption was 57.48 g, while crustaceans and molluscs (such as oyster and cuttlefish) were consumed in the amounts of 7.35 g/day and 5.95 g/day, respectively.

10. The consumption of egg and egg products was 15.18 g/day, more than 90% of which was from chicken eggs. Together with the legumes, meat, poultry, fish and aquatic animals mentioned above, as well as nuts, seeds and game, a total of 215.17 g of meat and meat alternatives were eaten daily, with more than 90% (198.46 g/day; 92.2%) from animal sources, and the remaining 7.8% from the plant sources such as legumes, nuts and seeds.

11. Milk and milk products were consumed in an amount of 34.23 g/day on average, of which about three-quarters (74.6%) was made up of the milk subgroup.

12. Dim sum, a group of local favorites, was consumed on average in the amount of 44.75g of per day. Additionally, the average daily consumption amounts for the sashimi and sushi group (4.68 g/day) and the burgers group (4.74 g/day) were only one-tenth each of the consumption of the dim sum group.

13. With regard to fluid consumption, non-alcoholic beverages were consumed in a total volume of 1,616.97 ml/day. Soups were consumed in the amount of 170.78 g/day. Among all fluids, water (1,065.62 ml) and tea (376.36 ml) made up by far the bulk of the total fluid consumption.

Anthropometry and Reported Health Status

14. A total of 47.1% of the population (54.2% of the males and 40.6% of the females) were overweight or obese according to the World Health Organization proposed classification of weight by BMI in adult Asians. Another 8.5% was underweight, with females in the youngest age group (20-29 years) making up 29.8%

of the underweight individuals. Hypertension was the most commonly reported diagnosed disease (12.5%), and 4.7% of the population reported to have diabetes.

Food Knowledge and Behavior

15. The FBQ revealed some 'health-driven' behaviors among the population. More than half of the women and more than one-third of the men did not eat meat fat or poultry fat or skin when eating these meats. About one-fifth of the population took nutritional supplements, mostly vitamins or minerals. A similar proportion took Chinese or other herbal medicines. Washing fruits and vegetables before consumption was almost universal. However, less than half (about 40%) of the population reported 'never' looking for nutrition information on food labels when purchasing biscuits, bread, canned food and beverages, while only a bit more than one-fourth (about 30%) of the population reported 'often/always' doing so.

16. Among the younger population aged 20 through 59 years, food safety was found to be 'very important' to 57.7% of the male and 68.7% of the female. Somewhat fewer, but again more than half of the males and females, also found 'how well the food keeps' to be 'very important'. Less than half of the population found the other factors, i.e., taste, nutrition, price and ease of preparation, to be 'very important'. However, this population's behavior showed a general lack of attention to nutrition labels.

17. This subgroup aged 20 to 59 years was further asked how many servings of fruits and vegetables were needed for good health. Most (62.7%) of the females reported that two or more servings of fruits (one serving equals to the size of a medium orange or a handful of grapes) were needed. A similar proportion (61.1%) thought that two or more servings of vegetables (one serving in this Survey equals to a medium rice bowlful of cooked vegetable per serving) should be eaten daily, with only 32.3% believing that only one or less of these servings were needed. However, only 48.4% of the males reported that two or more servings of fruits should be eaten, while similarly only 46.9% thought that two or more servings of vegetables were required, and 44.5% of them thought that one serving or less of vegetable was needed.

18. Finally, this same younger subgroup of population was asked about important diet/nutrient and disease relationships. While more than half of them could mention relationships between calcium and bone problems, sugar and diabetes, and fiber and digestive problems, only just less than half of them could mention relationships between dietary fat and heart problems, being overweight and heart problems, and dietary cholesterol and heart problems.

Conclusions and Recommendations

19. Food consumption information collected in this Survey will be useful in risk assessment work, including total diet studies. This report also summarized findings, including the measured weights of the population and the food behavior and knowledge information. These will be useful for public health policy formulation and for epidemiological and clinical work of a wide variety of professionals.

20. The adult population needs to become much more aware of the effects of their diets on their health. The forthcoming nutrition labeling scheme is a step in the right direction, and has the potential to become a key source of nutrition information for the public. However, from the results of this Survey, people will have to be much more motivated to use them as well as be effectively and appropriately educated in how to use them. At the same time, promotion of balanced diet should continue. Specific promotions using effective communications promoting whole grain could be considered, while also continuing to promote the '2 fruits plus 3 vegetables' message.

21. In order to obtain updated information of the population's food consumption pattern, which is essential for risk assessment on food safety and public health, it is suggested that food consumption trends be monitored every five to ten years. This is also useful for evaluating any food safety and healthy eating campaigns that may be undertaken. Continually changing food prices, food supplies and population demographics also warrant this exercise.

22. Additionally, since children and youth who are more susceptible to food risk have different food consumption behavior than adults, and eating behavior is developed during early childhood and youth, a food consumption survey of the younger generation under age 20 is suggested to be conducted soon. By doing so, the food consumption pattern of this population group thus captured could facilitate risk assessment work as well as the adoption of evidence-based comprehensive life course strategies on healthy eating.

重點概要

一. 本報告描述全港首個食物消費量調查的結果，調查於 2005-2007 年間進行，訪問對象是介乎於 20 至 84 歲的香港人。此調查由食物環境衞生署的食物安全中心委託香港中文大學進行，用作食物風險評估，以確保食品安全和保障消費者的健康。

二. 此調查目的是收集香港成年人最新的食物消費數據（例如食物的種類和份量）、成年人的體重、常吃的餸菜及制定餸菜食譜。所有資料分別透過三次訪問收集，然後進行數據整理和分析。

三. 該三次訪問和體重測量的工作均由受過訓練的調查人員進行。訪問員以兩天非連續 24 小時膳食攝取量（24-hr recall）問卷和包括 110 項食物的食物頻率問卷（FFQ）來獲取食物消費數據，同時亦使用飲食行為問卷(FBQ)來收集受訪者的飲食知識、飲食行為和社會人口統計等資料。

四. 調查樣本是採用兩個階段分層與按年齡和性別配額隨機抽樣，合共 5,008 位成年人接受調查，佔最初被抽選而合資格的人數的 48.1%。只有 4,971 位受訪者同意量度體重，佔總受訪者的 99.3%。調查結束後，所得結果被用作建成一個食品消費數據庫，當中包含 1,706 種食物(其中 1,429 種曾被受訪者食用)以及 1,591 個食譜的數據。調查所收集的數據經過分析，本報告內的結果按受訪者年齡與性別加權，能夠代表約 5,394,000 個年齡介乎於 20-84 歲的香港人。

<u>主要結果</u>

24 小時膳食攝取量

五. 食物消費量的數據經收集和分析後，所得的主要結果在此報告中闡述。在食物消費方面，調查發現固體食物的總消費量為平均每日約 1.12 千克，而液體食物的總消費量則為平均每日約 1,860 毫升，其中水佔了 57.3%（1,065.62 毫升）。流質的總消費量為平均每日 1,787.11 毫升，當中包括水及其他非酒精飲料、湯、牛奶及奶類飲品(但不包括用於煮食用的水)，約佔總液體食物消費量的 96%。

六. 穀類和穀類製品平均每日的總消費量是 488.75 克，其中飯類如白飯、粥和糙米飯佔此消費量的 60.8%（每日 297.16 克），而麥類製品則佔 33.5%，估計當中約 8.65 克為全穀類。

七. 蔬菜和水果類平均每日的總消費量分別為 176.96 克和 146.81 克，當中三分之二（68.4%）來自葉菜/莖菜/芽菜/芸苔屬類的蔬菜。大豆及其製品平均每日的總消費量為 8.62 克，是總豆類消費量(每日 14.13 克)的一半以上（61.0%）。當塊莖類蔬菜，如馬鈴薯、芋頭等（每日約 8.05 克）沒有被列入計算

時，蔬菜平均每日的消費量為 168.91 克。堅果和種子類平均每日的消費量只有 2.58 克。

八. 肉、家禽和野味類的總消費量為平均每日 112.50 克。肉類的消費量平均每日 74.23 克，當中豬肉佔 72.5%（每日 53.81 克）。家禽類的總消費量是平均每日 37.38 克，當中雞的消費量為平均每日 32.90 克，佔總家禽類的 88.0%。野味類的消費量平均每日只有 0.89 克。

九. 魚類和其他水產類（即甲殼類動物和軟體動物）的總消費量是每日 70.78 克。魚類的總消費量為平均每日 57.48 克，而甲殼類動物和軟體動物（如蠔和墨魚）的消費量分別為平均每日 7.35 克和 5.95 克。

十. 蛋及蛋製品類的總消費量為平均每日 15.18 克，當中 90%以上為雞蛋。豆類、肉類、家禽類、野味類、魚類、水產類及堅果和種子類的總消費量合共是平均每日 215.17 克，當中多於 90%（每日 198.46 克; 92.2%）來自動物，其餘 7.8%是來自植物，如豆類、堅果和種子。

十一. 奶及奶製品類的消費量為平均每日 34.23 克，其中牛奶約佔四分之三（74.6%）。

十二. 本地常見的點心，平均每日的消費量為 44.75 克。此外，魚生及壽司平均每日的消費量是 4.68 克，漢堡包類則為每日 4.74 克，兩者均只是點心總消費量的十分之一。

十三. 至於流質方面，非酒精飲料的消費量為平均每日 1,616.97 毫升，湯的消費量是平均每日 170.78 克，而水（1,065.62 毫升）和茶（376.36 毫升）則佔流質消費量的大部分。

人體測量和自我報告的健康狀況

十四. 按世界衛生組織成年亞洲人參照身體質量指數(BMI)的擬議體重分類計算， 在整體人群中，有 47.1%屬於過重或肥胖（包括 54.2%的男性及 40.6%的女性），另有 8.5%屬過輕，女性的最小年齡組別（20-29 歲）佔其中的 29.8%。在各種自我報告的疾病中，高血壓是最常見的疾病(12.5%)，而糖尿病則佔 4.7%。

飲食知識和行為

十五. 飲食行為問卷的結果發現一些『健康為導向』的行為。有一半以上的女性及超過三分之一的男性不吃肉類的脂肪或家禽類的脂肪或皮。人群中約五分之一有進食營養補充劑的習慣，主要是維生素和礦物質。此外，也有相約比例的人有進食中藥或其他草藥的習慣。差不多所有人在進食水果和蔬菜前都有清洗的習慣。但是，接近一半的人（約 40%）在購買餅乾、麵包、罐頭食品和飲

料時『從未』閱讀營養標籤，而只有略多於四分之一（約 30%）表示『經常』閱讀這些產品的營養標籤。

十六. 此外，在較年輕(年齡介乎 20 至 59 歲之間)的人群組別中，57.7%的男性及 68.7%的女性表示食物的安全性是『非常重要』。同樣地，有一半以上的男性和女性都表示『食物保存的狀況』是『非常重要』。此人群組別中，不到半數表示味道、營養、價格和易於準備是『非常重要』。然而，結果顯示此人群普遍缺乏閱讀營養標籤的習慣。

十七. 年齡介乎 20 至 59 歲之間的受訪者也被問到應進食多少水果和蔬菜來維持良好的健康。大多數（62.7%）的女性指出兩份或更多的水果（一份水果相等於一個中等大小的橙或一手掌能抓住的葡萄的份量）是必要的。同樣地，有61.1%的女性認為，每天應該吃兩份或以上的蔬菜（於此調查中一份蔬菜相等於一個中型飯碗已煮熟的蔬菜），只有 32.3%的女性認為只需進食少於一份蔬菜。然而，48.4%的男性指出應該吃兩份或更多的水果，46.9%的男性則認為每天應該吃兩份或以上的蔬菜，44.5%的男性則認為需要進食一份或以下蔬菜。

十八. 最後，這較年經的人群組別也被問及一些重要的飲食/營養和疾病關係。在此人群中，有超過半數能正確指出鈣和骨骼、糖和糖尿病、及纖維和消化系統的關係，可是，當中只有不到半數能正確指出膳食中的脂肪和心臟問題、體重過重和心臟問題、以及膽固醇和心臟問題的關係。

結論和建議

十九. 這次調查收集的食物消費量數據，將有助於食物風險評估工作，包括總膳食研究。這份報告總結的調查結果，包括體重量度、飲食行為和知識，將有助於制定公共衛生政策，以及各種專業的流行病學和臨床工作。

二十. 市民需要更加注意飲食對健康的影響。即將實施的營養標籤制度是向正確方向邁出的一步，並能成為一個為市民提供營養資料的主要來源。然而，這項調查結果顯示，我們將需鼓勵市民使用營養標籤，而且必須有效和適當地教育市民如何使用營養標籤。另一方面，我們應該繼續促進均衡飲食，並可以考慮特別推廣全穀物，同時繼續推廣『2 份水果+3 份蔬菜』的訊息。

二十一. 對於食物風險評估及公共衛生的工作，食物消費量數據是必須的。為了獲得更新的數據，我們建議食物消費量調查應每五至十年進行一次，以便監測食物消費量趨勢，有助於評估食品安全和推廣健康飲食。鑑於不斷變化的食品價格、食品供應和人口變動，此食物消費量監測亦是有必要的。

二十二. 此外，由於兒童和青年人的食物消費行為與成年人有所不同，他們更容易受到食物風險的影響，加上飲食習慣是在幼兒和青年期建立，所以我們建議應盡快進行 20 歲以下人士的食物消費量調查。這樣，從有關調查中收集

的食物消費模式便可以有助風險評估工作，以及制訂以證據為基礎和貫穿人生歷程的促進健康飲食策略。

INTRODUCTION

1. Our Hong Kong food supply is part of a global food system, with global food production, processing, preparation and distribution that together involve the transportation of food across long distances. This global food system requires a wide range of monitoring and surveillance mechanisms to protect the Hong Kong public's health and prevent the spread of disease through the food supply. Minimizing these foodborne threats requires continuing food safety research and surveillance to ensure a safer Hong Kong food supply.

2. To provide adequate protection of consumer health and food safety, the Centre for Food Safety (CFS) of the Food and Environmental Hygiene Department (FEHD) continually monitors the food supply to ensure that it is safe, and that foods comply with relevant standards, such as those for microbiological and chemical contaminants. This work involves risk assessment, a food safety research tool, which is the scientific evaluation of known or potential adverse health effects resulting from human exposure to foodborne hazards. This evaluation is conducted in order to check if the levels of the contaminants and other chemicals in foods and their dietary intakes are within the local, national and international standards or guidelines. The risk assessment procedures integrate the identification and characterization of a foodborne hazard with an estimation of the degree of intake or exposure likely to occur, resulting in an estimation of the adverse effects likely to occur in the population.

3. The degree of intake or exposure, or the amount of a chemical likely available to individuals from their food, can only be estimated with food consumption data of the relevant population. Up to the release of this report in Hong Kong, the CFS has had only food consumption data from the year 2000 from 903 Hong Kong adolescents. To obtain adult food consumption data, therefore, in 2004, the FEHD commissioned the Department of Biochemistry of The Chinese University of Hong Kong (CUHK) to undertake the first Population-based Food Consumption Survey of the People of Hong Kong (the Survey). An Advisory Panel on Food Consumption Survey, a multidisciplinary panel of statisticians, dietitians and public health specialists, was established by the FEHD to provide advice on the methodology and conduct of the Survey. This Survey of 5,008 adults aged 20-84 is the most comprehensive food consumption survey to date in Hong Kong, and the results of this first territory-wide, population based Survey will be important to the work of the CFS and will be used in dietary exposure estimation. This report describes the methodology and results of this Survey.

OBJECTIVES

4. The primary aim of the Survey was to provide estimates of food consumption for the risk assessment work of the CFS, as well as for its planning, research and public health policy work. The objectives of the Survey were as follow:

- To obtain up-to-date food consumption information (for example, the types and amounts of food consumed) among individuals in Hong Kong;
- To collect weight measurements among individuals in Hong Kong;
- To identify dishes consumed among individuals in Hong Kong; and
- To develop recipes for the dishes identified.

METHODOLOGY

5. This section presents the methodology of the Survey described in the following eight subsections to give an overview of the design of the Survey: (i) sample design; (ii) instrument development; (iii) data collection methods; (iv) food and recipe database development; (v) recipe documentation; (vi) data management; (vii) seasonal foods determination; and (viii) the analysis plan.

(i) Sample design—eligibility and methods

6. Food consumption patterns differ by gender and over the life course for diverse physiological and environmental reasons. Based on the sample size estimation from earlier dietary data from adults obtained from the Hong Kong Adult Dietary Survey 1995 (1), a sample size of 400 per 10-year age-gender group was targeted in order to obtain larger samples of the eldest and youngest groups that would be adequate for risk assessment work and reflect the subgroup heterogeneity of adults aged 20 to 84. Thus, a quota sampling method, based on age and gender, was adopted to ensure an adequate number of respondents in each age group. The initially targeted minimum total number of successful interviews for all 14 age-gender categories from age 20 to 84 years was 5,200 individuals. However, due to the small numbers of adults in the population in the two eldest age-gender groups, the numbers were collapsed in these two age categories, targeting 600 in total to be completed for each gender group for ages 70-84.

7. The Survey adopted a two-stage stratified random sample design with quotas for 14 age-gender groups after the required sample size (i.e. quotas) for the 14 age-gender categories was determined. Then in the first sampling stage, a systematic replicated sample of living quarters (i.e. 13,086 addresses) stratified by area and type of housing was drawn by the Census and Statistics Department (C&SD) from the frame of living quarters. The frame of living quarters covered both permanent and temporary living quarters in built-up areas.

8. In the second stage, one eligible member was drawn randomly from each living quarter to participate in the Survey. In order to obtain the required number of elder respondents targeted for the Survey, the living quarters were stratified into two groups, with and without elder adult members aged between 55 and 84. For the stratum with household members aged 55-84, one member aged 55-84 was randomly selected. For the other stratum, one member was likewise randomly selected. This method aimed to give the elder adults a higher chance of being selected in order to obtain these respondents in the numbers required, which was 400 males and 400 females in each 10-year age group, and 600 males and 600 females in the eldest age group, a 15-year age group of those aged 70-84. This was needed because proportionately, the population of adults aged over 55 years is lower than that of younger adults. The member was selected by the Kish Grid method in the early part of the Survey. The selection mechanism changed toward the end of the Survey, during which the eldest or youngest member in the household was selected with a view to filling the quotas for the eldest and youngest age groups. Recruitment of respondents continued until the required quotas for the age-gender categories were filled.

9. Eligible participants were adults aged between 20 and 84 years, residing in Hong Kong in the previous 12 months and reachable during the interview period. Adults who could not communicate in Cantonese, Putonghua or English were excluded from the Survey. When respondents with physiological or cognitive communication difficulties were selected for interview, they were interviewed through surrogate primary caregivers for information.

(ii) Instrument development—Questionnaire design and pilot testing

10. In this Survey, estimates of food consumption were taken from two non-consecutive 24-hour dietary intake (24-hr recall) interviews and a 110-item food frequency questionnaire (FFQ) interview, which are currently the two most commonly used dietary assessment methods for collecting dietary intake information from individuals. Additional information was gathered from a food behavior questionnaire (FBQ) interview.

11. From March 2004 to March 2005, three instruments for the Survey (FBQ, FFQ and the two Day 1 and Day 2 24-hr recall questionnaires) were developed. These questionnaires were developed based on instruments already in research use by CUHK for other dietary assessment surveys in Hong Kong and Mainland China, and were then further adapted according to the objectives and sample characteristics of this Survey. They were originally based on those instruments used in the United States Department of Agriculture (USDA)'s Continuing Survey of Food Intakes by Individuals (CSFII) and, the Diet and Health Knowledge Survey (2). All questionnaires used in the Survey had Cantonese, Putonghua, and English versions.

12. Also, a 60-page Food Instruction Booklet (FIB) was developed in English and Cantonese (54 pages in Cantonese version). The FIB served as guidance for the interviewers to probe for detailed food consumption data required during the 24-hr recall interviews. The FIB was developed specifically for this Survey by the CUHK. It was adapted for the Hong Kong diet from the USDA's Food Instruction Booklet used for 24-hr recall interviews in their Supplemental Children's Survey (3). Subsequently, some minor modifications were made after discussing the draft instruments with the Advisory Panel on Food Consumption Survey.

13. The FBQ (Appendix A) was a questionnaire with 18 questions querying respondents' behaviors and knowledge about various areas of food and diet-related health such as nutrition label reading behaviors, knowledge of diet/disease relationships and some meal consumption patterns. Among these questions, 11 questions on diet and disease knowledge were only used for those respondents aged 20-59 as these questions were found to be too difficult for most elder respondents. Besides information on food behavior and knowledge, the FBQ also elicited respondents' demographic information, i.e., sex, age, length of residence in Hong Kong, ethnic group, education level, working status, and household income.

14. The FFQ (Appendix B) interview, a list-based dietary assessment method, aimed to understand the 'usual' or longer term food consumption of 110 foods and beverages chosen by the FEHD. The listed foods were mostly items less likely to be captured in the 24-hr recall interviews, such as festive foods, or items of special interest for risk assessment which may be related to certain food risks. In this

interview, respondents were asked to indicate how many times a day, week, month or year that they consumed these items over the past 12 months. If consumed, they were then asked how much of the foods were consumed each time. Respondents were aided by a colored Food Photo Booklet (Appendix C) developed for this Survey to help them estimate the consumed amount of each item relative to the photo. Later, the frequency of consumption of each food could be multiplied by the amount consumed (in grams or milliliters) to calculate the estimated daily amount consumed.

15. The two 24-hr recall interviews (Appendices D and E), a short term meal-based dietary assessment method, aimed to understand the total food consumption of the respondents on two non-consecutive days, or two 24-hour periods 3 to 11 days apart. Since a single 24-hr recall is a poor descriptor of an individual's usual intake, two separate recalls were obtained from each respondent, the first in person and the second by telephone. This method has been shown in the USDA National Health and Nutrition Examination Survey (NHANES) to be feasible and valid (4). During each of these interviews, the interviewer asked the respondent to recall in detail all the food and beverages consumed during the 24-hour period from 6 a.m. of the day before interview to 6 a.m. of the interview day. To elicit the required detail and limit underreporting, a multiple pass interview method was used involving asking the respondent to review his/her food intake several times with clarifying probes about ingredients, preparation and amounts. Standard bowl, plate, cup, and spoon, as well as photos of utensils in other sizes were shown to the respondent to help him/her estimate the amount of food taken. The respondent was also required to have the Food Photo Booklet in hand for the second 24-hr recall interview, which was a telephone interview with the same interviewer. The two interviews were arranged on non-consecutive days of the week and from 3 to 11 days apart, but not on the same day of the week, so that the foods consumed on those days would be more likely to be independent than if consumed on consecutive days or on the same day of the week.

16. The dietary assessment methods FFQ and 24-hr recall interviews were used together for dietary intake assessment in the Survey because both methods in combination are believed to allow a better estimate of usual intake, especially for foods consumed less frequently and which may be of special interest for risk assessment. The combined methods should therefore also allow a better estimate of contaminants appearing infrequently.

17. In order to field test the three questionnaires and methodologies for the Survey, a pilot test was conducted among 50 respondents aged 20 to 84 years in December 2004 and January 2005. After six training sessions in all the procedures of the Survey, investigators interviewed respondents who were recruited through the personal and professional networks of the CUHK survey team, and included mostly individuals of the approximate age, gender and ethnic mix as would be recruited for the actual Survey. For that pilot test, respondents of mainly lower educational levels were recruited so as to understand their ability to comprehend the interview questions and visual aids as designed.

18. The pilot test did result in some revisions to the FBQ and the FFQ. Some FBQ response options were changed, and some questions proved too difficult or abstract for the elder respondents, so those questions were moved into the section to be queried only among respondents aged 20 through 59. Amendments made to the

FFQ included simplifying some food option numerical codes, adding some new practical serving sizes and also omitting the unit *tael* for those foods not usually measured in *taels*. The multiple pass procedures for the two 24-hr recalls were suitable, and no modifications were made. Finally, some additional labels were added to the Food Photo Booklet.

(iii) Data collection methods

19. Data was collected for this Survey over a period of about 2 years, from March 2005 to July 2007. Figure 1 shows the operational procedures flow chart for the Survey. After receiving the addresses of the sampled cases from the C&SD, one invitation letter was sent to each address to invite the household to participate in the Survey. The letters were sent out between March 2005 and January 2007 in eight waves, to briefly introduce the Survey by providing the Survey purpose and a brief description of the procedures, and to request the households to phone CUHK to make an interview appointment. When a phone call was received from a household, the caller was asked about the numbers and ages of the adults in the household for recruitment screening. If there were more than one eligible adult in the household, the adult that would become that household's Survey respondent was selected throughout most of the Survey using Kish Grids, or, in the latter part of the Survey, the eldest or youngest member was selected as described in paragraph 8. The FBQ interview was conducted with the selected respondent immediately after recruitment, if possible. Most of the households did not phone the CUHK within about two weeks, so they had to be visited for recruitment of an eligible adult and administration of the FBQ. A total of at least five attempted home visits for each address were made on different days and times before determining the final disposition of the address to be a failed attempt.

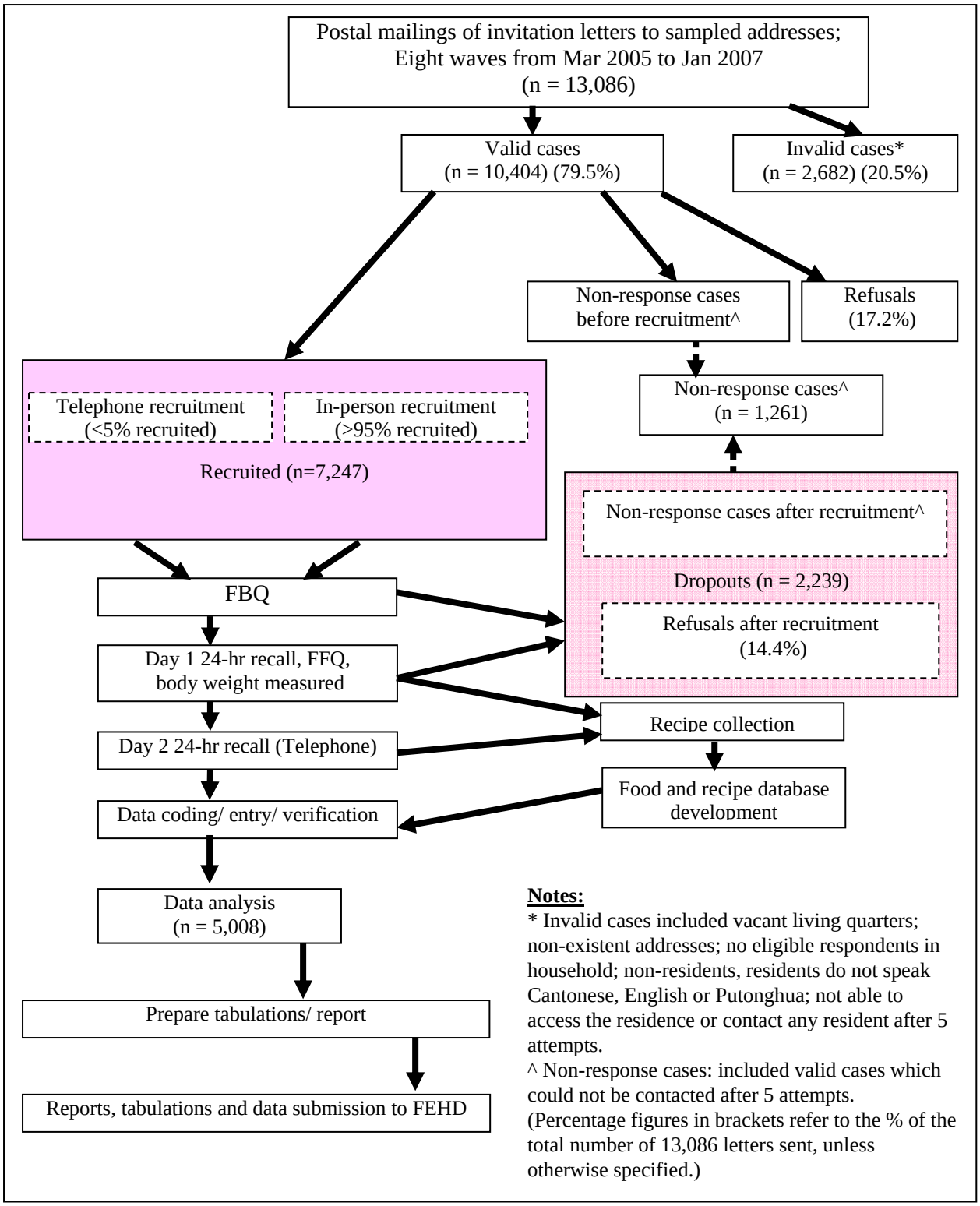

Figure 1. Hong Kong Population-based Food Consumption Survey 2005-2007 operational procedures flow chart

20. After the recruitment and FBQ interview, the contact number/method for reaching the selected adult was recorded and passed to the interviewers who then arranged an appointment for the first in-person food consumption interview, which consisted of the FFQ, Day 1 24-hr recall, and a body weight measurement. The recruited adults could choose to have the in-person food consumption interviews and weight measurement at his/her living quarters or at the CUHK Survey Interview Centre. A cash incentive was given to the respondent if he/she chose to come to the CUHK Survey Interview Centre for interview. Also, grocery coupons were offered as incentives to potential recruits to entice them to participate in the Survey. Most of these first food consumption interviews were conducted in the respondents' homes, while a few were conducted in other places, such as in the respondents' offices or in cafés, or in the CUHK Survey Interview Centre. At the end of the first interview, an appointment was made with the respondent for the Day 2 24-hr recall interview to be conducted by telephone at a time convenient to the respondent.

21. During the first food consumption interview, a body weight measurement was taken following standard procedures, while the respondents usually reported their height. Respondents who did not know their height were asked to have their height measured by the interviewers who were prepared with a tape measure for this purpose. From the weights and heights, the Body Mass Indexes (BMIs) of the respondents with both these measurements were calculated and the result was compared to the World Health Organization (WHO) proposed BMI classification of weight status for adult Asians (5) to understand the weight status distribution.

22. The food consumption amounts collected from the FFQ and 24-hr recall refer to the weight or volume of edible portion of food in the form as consumed, unless otherwise specified. For example, the amount of 'chicken wing' refers to the weight of cooked chicken wing without bone, while the amount of 'winter mushroom/Shiitake mushroom (dried)' refers to the weight of the mushroom after soaking and cooking. However, foods such as beverage powders, e.g., 'coffee powder' and 'skimmed dried milk' can appear in the database and results as a weight or as a volume, depending on how they were consumed, either as part of food recipes or as part of beverages. When these powders were consumed as part of a food recipe and not a beverage, they were reported as the weight of solid powder consumed. If, however, they were consumed as part of beverages, the items were reported as beverage volumes with different beverage food codes. For example, an amount of chocolate powder consumed added to an oatmeal mixture was reported as the weight in grams added to the preparation. If, however, chocolate powder was consumed as part of a fluid beverage mixture in which the powder was added to a fluid, such as water or milk, its consumption data was captured in the form of the prepared beverage. In this case, the volume of 'chocolate drink' consumed in milliliters was reported instead of reporting the constituent amounts of chocolate powder and fluid milk/water separately.

(iv) Food and recipe database development

23. The 24-hr recall food intake data processing was facilitated by the Food and Recipe Database created for this Survey, which is a computer-assisted food coding and data management system designed using Microsoft ACCESS 2000 (Microsoft Corporation, Seattle WA, USA) and tailored specifically to achieve the aims and to

cater for the quality control and data processing needs of the Survey. The Food and Recipe Database contains (a) a food database and (b) a linked recipe database with food descriptions and measures of ingredients and typical edible portion or yield amounts in corresponding gram weights or milliliter volumes.

The Food Database

24. The Food Database was developed based on the FEHD's food coding system. During coding of 24-hr recall questionnaire, new food codes resulting from reports of additional items consumed were added to the database. As such, the database expanded as the coding work proceeded. Approximately 450 new food codes were added, resulting in a total of 1,706 FCS food codes, 1,429 of which were foods consumed by Survey respondents. Non-used food codes included those foods that were (i) not consumed by any respondents, or (ii) consumed only within prepared or combined food items and treated in the database as individual foods (e.g., dim sum/dumpling wrapping with wheat starch, which was consumed as an ingredient of dumplings such as shrimp dumpling and was not consumed by itself and therefore its food code was not used) or (iii) treated as recipes instead of individual food items (e.g., 'tuna sandwich' was treated as a recipe and was broken down into its ingredients when recording the consumption amount, therefore without using a food code for 'tuna sandwich'—refer to paragraph 28 below for details).

25. The Food Database

- contains a coded list of 1,706 food items—including the foods on the FEHD's food coding system as well as foods reported by the 5,008 Survey respondents.
- displays the common name of each coded food, food group and food subgroup in Chinese and English where possible.
- includes gram weights or milliliter volumes of food amounts for the 1,429 food items consumed by the respondents.
- is indexed for search and retrieval under the items' specific and general names, e.g., a soup can be found both by its specific name as well as under its general category of soups, as well as by its CODEX code which is also in the database
- is linked to the recipe database.

The Recipe Database

26. The recipe database created for this Survey is a collection of the 1,591 representative or 'standard' as well as less typical recipes reported eaten by the Survey respondents and grouped into 17 groups that can be used in food consumption analyses as well as in later food and nutrient surveys if desired. Each recipe includes both Chinese and English recipe names. In addition to the names, there are also the ingredient amounts, total yield of each recipe, and portion amounts in standard volumes or weights, such as 250-ml cup or bowl, along with documentation of the source of the recipe. Two sample recipes are shown in Figure 2.

27. The recipes in the database consist of all mixed food combinations reported to be consumed during the Survey interviews, including both home cooked dishes and those prepared outside the home, e.g., in restaurants and other catering establishments.

The ingredients listed in the recipe database are coded with the same set of FCS food codes in the Food Database, so that the consumption amounts of constituent individual ingredients including condiments from mixed dishes can be calculated based on the recipes stored in the Recipe Database. However, as the aim of the Survey is to obtain consumption amounts of individual foods, the consumption amounts of recipes or mixed food combinations consumed is not retained in the database after calculations.

R01001 Almond Drink 杏仁霜

(Edible amount or yield: 244ml)

Food Code	English name	Chinese name	Edible Amount	Unit
1600019	Almond drink powder	杏仁霜粉	10	gram (g)
1005999	Evaporated milk	淡奶/花奶	30	milliliter (ml)
1801003	Granulated sugar	砂糖/白糖	4	gram (g)
1608998	Water (for recipe use)	水(食譜專用)	200	milliliter (ml)

R07001 Braised Pork Belly with Preserved Vegetable 梅菜扣肉

(Edible amount or yield: 1,183g)

Food Code	English name	Chinese name	Edible Amount	Unit
2000030	Chicken powder/ cube	雞粉/ 雞精粒	4	gram (g)
1500999	Fats and Oils (item not specified)	油脂（未指明項目）	30	gram (g)
0301005	Ginger	薑	5	gram (g)
1801003	Granulated sugar	砂糖/白糖	40	gram (g)
0602046	Pork belly	豬腩肉	600	gram (g)
0306009	Preserved mustard/ "Mui Choy"	梅菜	160	gram (g)
2001001	Soya sauce	豉油	44.25	milliliter (ml)
1608998	Water (for recipe use)	水(食譜專用)	300	milliliter (ml)
1703001	Yellow wine (Shaoshing wine/huadiao)	黃酒（紹興酒／花雕)	0.1	milliliter (ml)

Figure 2. Two sample recipes from the recipe database

28. A minority (18%; n=287) of food items in the database, usually common local foods such as ‘milk tea’, and ‘sausage bun’, have both an FCS food code and a recipe code number in the database. When food consumption amounts for these items are calculated, these items will not be broken down into their ingredients. For example, the sugar or milk in milk tea does not become part of the total sugar or milk consumption amounts of the respondents. However, the amount of milk tea consumed and a recipe for milk tea is provided, so that these individual ingredient consumption amounts may be calculated in future studies if desired.

29. The Recipe Database

- contains 1,591 coded recipes which were adopted from or provided by named sources where possible.
- originates from the two days' 24-hr recall data from the 5,008 Survey respondents.
- includes gram weights or milliliter volumes of common recipe/food portions determined by weighing cooked items.
- contains gram weights or milliliter volumes of constituent ingredients, including condiments.
- serves as a disaggregated ingredient list for mixed foods consumed by the respondents enabling (a) the calculation of consumption amounts of individual ingredients including condiments and (b) the selection and grouping of similar foods as needed, either by local food or food group or food subgroup codes, as well as by the CODEX food and group codes.
- displays a common name of each recipe in Chinese and English where possible.
- is structured so that the amount of condiment consumption from foods with recipes is also able to be captured and calculated.
- contains amounts of food ingredients, but not cooking methods, temperatures or cooking times of the recipes.

(v) Recipe documentation

30. Each recipe in the database has a documented source, usually one of the recipe consultants. To obtain the recipes, research was undertaken by these individuals to establish the most representative version(s) of a dish to be included as its standard recipe(s) in the database. These recipe consultants, including catering managers with chef backgrounds and cooking dietitians provided most of the recipes from their expertise, and sometimes local recipe books and cooking websites were consulted as necessary.

31. The term 'standard recipe' as used in this Survey applies to a list of ingredients likely combined in a local home or commercial kitchen to make a food, and it includes the exact amounts of the commodities used. Most recipes for this database were created by the recipe consultants who were specialists skilled in culinary aspects of food preparation and usually work in food preparation environments. These specialists were asked to provide recipes for requested dishes as they would ordinarily be prepared locally. For respondents who cooked their own foods, the recipes developed were based on the respondents' reported amounts and ingredients used. When respondents did not know the ingredients but could name a dish eaten, the recipe consultants created the 'standard' recipes according to their expertise/experience. However, as there is variation in personal taste and other factors from home to home and caterer to caterer, the exact recipes actually followed individually would vary somewhat from the 'standard'.

32. Sometimes common variants of a recipe affect composition, so some different variations were entered into the database if necessary. The amounts given in the final recipe for use in the system were the yields, or net edible amounts after processing, if processing or cooking was involved. This was because there is usually weight change

upon preparation and cooking, often because of the removal of non-edible portions, trimming and/or loss or gain of water and/or fat.

33. Each recipe and each ingredient in a recipe are also identified both with their FCS food code(s) and CODEX code(s) where possible, so that their amounts would be interchangeable and retrievable using either coding system.

34. After the new FCS food codes and CODEX codes were assigned to the new foods, recipe codes to the new recipes, and new food and recipe names added to the Food and Recipe Database, the new items requiring recipes to be developed were sent to the recipe consultants for recipe development. The newly developed recipes were then added to the recipe database. Typical portion sizes per eating occasion were usually expressed as bowls, cups, and spoonfuls, or 250- to 300-ml portions. Other portion sizes were based on measurements obtained when developing the Food Photo Booklet of weighed food amounts used during the interviews, with ml and g as the units used. Table 1 shows the numbers of recipes of each group in the recipe database.

Table 1. Recipe groups and number of recipes in each group in the Food and Recipe Database

Recipe group	Number of recipes
Beverages	23
Congee dishes	64
Rice dishes	142
Non-stir-fried, non-soup noodles/pasta dishes	44
Noodles/pasta-in-soup dishes	83
Stir-fried noodles/pasta dishes	79
Meat	180
Poultry	67
Seafood	170
Egg dishes	47
Vegetables	337
Salads	13
Sushi	48
Pies and bread-based savory dishes	92
Soups	53
Dessert	52
Dim sum	97
Total	1,591

(vi) Data management

35. After interviews, the completed questionnaires were collected for checking and coding. The coded data were then entered into the computer for further processing.

36. For the completed Day 1 and Day 2 24-hr recall questionnaires, each food or recipe consumed was assigned a code for computer analysis. Questionnaire coding was performed by food coders who were trained in recognizing the detail required for coding the foods and recipes of different types according to the food and recipe code list which expanded as the fieldwork progressed. The food and recipe codes,

organized by food and recipe types into groups, subgroups and individual items according to the system originally developed and in use by the FEHD, were provided to the coders on-line for reference during their work. The coded questionnaires were first double entered into MS Excel files (Microsoft Corporation, Seattle WA, USA) and then into the Statistical Package for the Social Sciences (SPSS) Data Entry Builder 4.0 (SPSS Inc., Chicago, IL, USA) for verification. After verification, the files were imported into the Food and Recipe Database. After data cleaning, Day 1 and Day 2 food consumption data were exported from the Food and Recipe Database into 19 separate SPSS (SPSS for Windows, release 16.0; SPSS Inc., Chicago, IL, USA) files for data analysis (Table 2).

Table 2. Groupings of foods exported from the ACCESS Food and Recipe Database into 19 SPSS files for further analyses of Day 1 and Day 2 24-hr recall data

File no.	Food grouping	Total no. of items in the food coding list	No. of consumed items stored in SPSS files
1	Cereals and grains products	232	204
2	Legumes, nuts, and seeds	75	68
3	Vegetables	151	136
4	Fruits	88	77
5	Meat, poultry and game	181	145
6	Eggs and egg products	19	13
7	Milk and milk products	81	52
8	Fish and seafoods	180	156
9	Fats and oils	36	21
10	Non-alcoholic beverages	132	114
11	Alcoholic beverages	12	12
12	Sugar and sweets	115	108
13	Condiments, sauces, herbs, and spices	81	76
14	Snack foods	11	10
15	Dim sum	131	129
16	Sashimi and sushi	65	56
17	Mixed dishes	45	16
18	Traditional Chinese herbs	51	24
19	Miscellaneous	20	12
	Total	1,706	1,429

37. Results from the SPSS and ACCESS Food and Recipe Databases were compared for all food groups, subgroups and individual foods. While the ACCESS Food and Recipe Database calculated food consumption amounts to up to 14 decimal places, 7 significant figures (up to 10 decimal places) were retained in the 19 resulting SPSS files. This may result in small differences in the food amounts when the results from the two programs are compared.

38. After coding, the FBQ data were double entered and verified using EpiData (The EpiData Association, Odense, Denmark). Then after data cleaning, the FBQ data was entered into SPSS for further processing and analysis. The checked, coded FFQ data was double entered and verified using SPSS for Windows 16.0 and SPSS

Data Entry Builder 4.0 resulting directly in an SPSS FFQ data file ready for cleaning, further processing and analysis.

Quality Control

39. Quality control measures were taken at different steps in the Survey procedure as follow:

Data collection

40. Prior to data collection, to minimize measurement errors and ensure data quality, the food consumption interviewers were extensively trained for the Survey during a weeklong training period. After being introduced to the Survey and data collection instruments, feedback on supervised practice was given to further demonstrate the quality of data collection required by the Survey. During data collection, the interviewers were also encouraged to check over their completed forms for errors and omissions soon after each interview was conducted, and respondents were re-contacted if necessary to complete missing data. Finally, after submission of the completed questionnaires, the field supervisor would also perform some data checking and contact the interviewer regarding any problems found.

41. The body weight measurement procedure was also part of the food consumption interviewer training, in which the food consumption interviewers learned the correct use, including calibration, of the digital weight scale (SECA Onda 843). Weight was read to the nearest 0.1 kg, and two measurements were taken in immediate succession and recorded.

Data coding

42. The coders were intensively trained prior to commencing their work, and only two 'specialist' coders for the FFQ and nine coders for the 24-hr recall were employed to keep coding errors from unfamiliarity with the task and food codes to a minimum. Each coded questionnaire was checked by an experienced coder before data entry could be performed. Questionnaires with major coding problems were recoded by another coder, while problem coders were retrained until they could produce satisfactory results before they were allowed to continue the coding work, in order to ensure data quality.

Data entry

43. Data from all questionnaires were double-entered and verified. By doing so, incorrectly entered data could be identified and corrected afterwards.

Data cleaning

44. Data cleaning was conducted after data entry and verification to ensure problem data not identified during the verification could be identified and corrected. Data cleaning consisted of a two-step process involving detection of errors from among the potential outliers and then correcting any errors after checking back with the raw data on the original questionnaires. The detection of errors also involved logic checks between variables, followed by correction after checking back with the raw data. For 24-hr recall data, cross-checking between the SPSS data, ACCESS data and 24-hr recall questionnaires was also performed.

Criteria of acceptance of data

45. The underlying aim of food consumption data analysis is to learn as much as possible from the collected data, whose acceptable quality must meet certain criteria before it is analyzed. Two considerations used for this Survey as criteria for acceptable data quality were criteria for missing data and outliers.

Missing data

46. To be considered as a usable case in this Survey, each respondent needed a 'complete' data set, including a FBQ, a FFQ and two days of 24-hr recall data. That said, each respondent's questionnaires may have had some individual missing values which had to be dealt with according to the procedures outlined in the following paragraphs 47-50.

47. For the FBQ questionnaires, up to 15 missing, which included items that the subjects refused to answer were allowed per questionnaire. When one of these occurred, the data point was set to missing.

48. In the FFQs, occasionally respondents had one or more questions completely or partially blank. Although minimization of this situation was attempted in these interview-administered FFQs by having the interviewers check the questionnaires immediately after completing the FFQ interview and asking any missing items, still some missing data errors occurred. In this Survey, entire skipped questions were considered missing. In several cases, respondents reported 'don't know/not sure' when asked if they had consumed certain foods over the past 12 months, but because their amounts consumed were left blank, no consumption amount could be calculated. At other times the respondent reported a frequency, but not an amount consumed, so again no food amount could be calculated. For these situations, the whole question was not considered missing, although in fact no food consumption amount could be calculated for these questions. Up to 10 completely missing questions were allowed before an FFQ was invalidated. The self-administered Health Professionals Follow-up Study in the U.S. uses a criterion of 70 missing items in a questionnaire with 131 Items (6).

49. As for missing data on the 24-hr recall, this was examined by checking the total amount of food consumed by each respondent in a single day and looking for extremely low intakes by any respondents. Those eating an unusually low amount had the questionnaire examined for either coding errors or other substantiating data (subject reporting eating less than usual on the interview day, or only eating a particular food that day due to illness or unusual circumstances, etc.) and judgment was made on a case by case basis as to whether or not to accept that day's questionnaire.

50. No imputation was performed for any missing values found in any of the Survey data on any questionnaire.

Outliers

51. For both FFQ and 24-hr recall, the consumption amount distribution of each food item was examined. Unusually large amounts were identified and the original questionnaires were checked to explore whether the large amount was a result of a large consumption report from the respondent or the result of a calculation, coding or data entry error.

52. It was difficult to create biologically/physiologically justifiable exclusion rules, as some extreme values likely represented unusual food intake patterns without error and will be important in risk assessment work and may be important in the identification of any high-risk groups. Although criteria for exclusion have been proposed for other types of survey applications, little work has been done for food consumption variables. When deciding whether to accept certain values captured in the Survey, care was taken to confirm that the conclusions were not sensitive to the small number of extreme values. In this Survey, outliers did not exist because extreme values (low or high consumption amount) identified during the data checking and cleaning procedures could be explained almost entirely by coding errors which were subsequently corrected (i.e. not outliers) or by the possibility of actual consumption by individuals.

Weighting of the food consumption and FBQ data

53. As described, quota sampling by gender and age group was adopted for the sample selection. In the sampling design, an equal number of 400 respondents from each 10-year age-gender group was targeted, and 600 from the two oldest 15-year age-gender groups, resulting in unequal probability of sampling for persons in different age-gender groups. The oldest and youngest groups were therefore over-represented in the sample as compared to the Hong Kong population. Weighting by age-gender group was therefore applied to adjust for bias arising from the age-gender quotas.

54. Therefore, when deriving the overall population estimates for the food consumption and other variables, the weighting aimed to adjust for the under- and over-representation of the different age-gender groups present in the sample. The weighting was based on the 2006 Population By-census population distribution by age and gender and aimed to minimize the quota sampling bias. To perform the weighting, the responses from different subpopulations were multiplied by appropriate ratios so that the age and gender distribution of the sample resembled that in the population.

55. After weighting by age group and gender, the demographic characteristics of the population estimates from the Survey were compared with those obtained from the 2006 Population By-census again. The distribution after weighting was more in line with the Hong Kong adult population characteristics, though under- and over-representation of certain groups still exist.

56. Hence the food consumption and food behavior results presented have been age- and gender-weighted to represent a population of about 5,394,000 Hong Kong residents aged 20-84. For some of the FBQ items queried only to those aged 20

through 59 years, the results, also age- and gender-weighted, represent a population of 4,387,000 Hong Kong residents aged 20-59.

(vii) Seasonal foods determination

57. In the FFQ interview, 13 of the questions collected information on 20 foods whose availability and consumption fluctuated throughout the year, either because of climate or because they were holiday foods consumed mainly during festive periods. In order to calculate these foods' daily consumption over a year as well as their daily consumption during those seasonal periods, the length of the season of each had to be estimated.

58. Information on duration of providing and selling those foods was obtained from various outlets (supermarkets and caterers) supplying those items. Relevant information was also obtained from books and the internet. At the same time, the dates of consumption for those foods reported by the 5,008 respondents in their 24-hr recall interviews were examined. From the food consumption information as well as the supplier data, a season length for the data collection period for each of the 20 foods was estimated. For foods with relatively more consumers, the data were considered to be more important, but for foods with fewer consumers, the information from the suppliers was used. Table 3 shows the food items, the number of consumers identified in this Survey, and the estimated season length used in the FFQ data analyses for these foods. One problem in observing the consumption pattern of the several Chinese New Year foods was that no interviews were arranged for a one-week period at that time as households were busy with their celebrations. Therefore, for those foods, the peak consumption days may have been missed. However, it was found that some of these foods, such as pumpkin seeds, sunflower seeds, and sesame balls did not appear to be seasonally consumed by the limited reports of consumption of these items in the 24-hr recall data. For these foods, the season length could only be estimated from supplier data.

Table 3. Number of consumers in 24-hr recall, estimated season length and basis for season length determination of FFQ seasonal foods

Food item	No. of consumers in 24-hr recall	Estimated season length in 2005-2007	Basis for decision	Reason
Lychee 荔枝	74	3 months (May-July)	24-hr recall data and supplier data	Both data consistent
Longan 龍眼	88	3 months (Jul-Sept)	24-hr recall data and supplier data	Both data consistent
Salted and smoked pork 臘肉	36	2 months (Jan-Feb)	Supplier data used	Consumers' data sparsely distributed with no clear peak
Preserved duck 臘鴨	18	1 month (Jan/Feb)	24-hr recall data and supplier data	Both data consistent
Mitten crab/ Freshwater hairy crab 大閘蟹	8	5 months (Aug-Dec)	Supplier data	Too few consumers from 24-hr recall
Candied/ glace lotus root 糖蓮藕	1	1 month (Jan/Feb)	Supplier data	Too few consumers from 24-hr recall
Candied/ glace carrot 糖甘筍	0	1 month (Jan/Feb)	Supplier data	No consumer from 24-hr recall
Candied/ glace water chestnut 糖馬蹄	0	1 month (Jan/Feb)	Supplier data	No consumer from 24-hr recall
Candied/ glace winter melon 糖冬瓜	0	1 month (Jan/Feb)	Supplier data	No consumer from 24-hr recall
Candied/ glace lotus seed 糖蓮子	1	1 month (Jan/Feb)	Supplier data	Too few consumers from 24-hr recall

Table 3 (contd.). Number of consumers in 24-hr recall, estimated season length and basis for season length determination FFQ seasonal foods

Food item	No. of consumers in 24-hr recall	Estimated season length in 2005-2007	Basis for decision	Reason
Candied/ glace coconut 糖椰絲/ 糖椰角	0	1 month (Jan/Feb)	Supplier data	No consumer from 24-hr recall
Sunflower seeds 葵花籽仁/摩登瓜子	8	1 month (Jan/Feb)	Supplier data	Too few consumers from 24-hr recall
Watermelon seeds 瓜子（紅/ 黑）	17	1 month (Jan/Feb)	24-hr recall data and supplier data	1/3 of consumers ate in Feb, smaller groups ate in Mar and Nov
Pumpkin seeds 南瓜子仁	5	1 month (Jan/Feb)	Supplier data	Too few consumers from 24-hr recall
Crispy dumpling (Chinese New Year food) 油角/角仔	5	1 month (Jan/Feb)	Supplier data	Too few consumers from 24-hr recall consumers
Sesame ball (Chinese New Year food) 煎堆	21	1 month (Jan/Feb)	Supplier data	No clear peak observed from 24-hr recall data
Chinese New Year pudding/cake 年糕	20	1 month (mostly Feb)	24-hr recall data	Supplier data not available
Glutinous rice dumpling 粽	7	1 month (mostly May)	24-hr recall data	Supplier data not available
Traditional mooncake 傳統月餅	61	1.5 months (Sept-Oct)	24-hr recall and supplier data	Both data consistent
Snowy mooncake 冰皮月餅	10	1.5 months (Sept-Oct)	24-hr recall and supplier data	Both data consistent

(viii) Analysis plan

59. Demographic, food behavior and food consumption results were examined. Some demographic characteristics of the sample were compared to those of the Hong Kong 2006 Population By-census results to understand the extent to which the sample approximated the distributions in the overall Hong Kong adult population. After weighting, the food behavior and food consumption results were tabulated and examined by gender in either (i) two younger and elder groups or (ii) five 10-year age groups and one 15-year eldest age group.

60. Although food consumption data from 24-hr recall interviews were collected for two separate days, two-day average consumption was calculated and used for further analysis. The 24-hr recall and FFQ results are presented in this report as weighted means, medians, and 5^{th}, 95^{th} and 97.5^{th} percentile amounts consumed, in grams or milliliters by consumers only and by all respondents for each of the 1,429 consumed foods in 24-hr recall and 110 food items queried in the FFQ.

61. Both weighted and unweighted food group, subgroup and individual food item consumption results from the 24-hr recall interviews were also tabulated altogether, by gender, and by gender and age group. Both weighted and unweighted FFQ results, tabulated by gender and by gender and age group, were also generated. Daily food consumption amounts for the FFQ assessment were calculated, which involved the calculation of consumption during peak and non-peak seasons of the seasonal foods.

62. For the FBQ analyses, some questions were only asked of those aged up through 59 years, and these results are presented and analyzed by gender and 10-year age groups. Other questions were asked for all respondents from age 20 to age 84. These results were analyzed by gender and two age groups, i.e. a younger group made up of respondents aged 20-59 years and older group aged 60-84 years, as the labor force participation drops steeply between the sixth and seventh decade of life (7), meaning that there may be a shift in daily lifestyle patterns and income, both of which would be associated with food consumption patterns.

FINDINGS

63. This section presents the (i) fieldwork response, (ii) respondents' demographic characteristics, (iii) anthropometry and reported health status, (iv) food consumption information from the 24-hr recall interviews, (v) food consumption data from the FFQs and (vi) food behaviors and knowledge data from the FBQ. All results are presented as weighted data according to the weighting methods as mentioned in paragraphs 53-56. The weighted food consumption results from the 24-hr recall interviews were also compared to the recommended food consumption amounts.

(i) Fieldwork response

64. Fieldwork for the Survey began on 10 March 2005 with the sending of the first replicate's invitation letters to the addresses received from the C&SD. Table 4 shows the dates of sending letters of the eight replicates. A total of 13,086 individual letters were sent throughout the fieldwork period. The 7th and 8th replicates were smaller than the initial six replicates because these two final replicates were sent as the Survey was nearing the end, and their size was calculated based on earlier replicate response experience. Data collection was conducted over a period slightly longer than two years, beginning from March 2005 and ending in July 2007. Of the valid cases (n=7,247), 69.7% were successfully recruited, while 69.1% of those recruited cases completed the interviews. The overall response rate was 48.1%.

65. The respondent distribution for the four quarters of the Survey, which roughly corresponded to the four seasons, is shown in Table 5. Quarter 2, the summer months, achieved the highest proportion, 27.1%, of Survey respondents, while Quarter 4, with its numerous December through February holidays, achieved the lowest proportion of respondents, 22.0%.

Table 4. Survey fieldwork statistics by replicate

Rep-licate	Month advance letters sent	No. of letters sent	No. of respondents recruited	No. of invalid cases#	No. of non-response cases^	No. of complet-ed cases	Response rate*, %
1st	Mar 2005	1,800	1,015	216	218	698	44.1
2nd	May 2005	1,800	1,059	256	186	648	42.0
3rd	Sept 2005	1,800	1,078	239	189	683	43.8
4th	Nov 2005	1,800	1,079	282	157	752	49.5
5th	Mar 2006	1,800	1,081	385	136	737	52.1
6th	May 2006	1,800	1,055	416	138	797	57.6
7th	Oct 2006	885	380	338	85	295	53.9
8th	Dec 2006	1,401	500	550	152	398	46.8
	Total	13,086	7,247	2,682	1,261	5,008	48.1

Notes:

Invalid cases included: vacant living quarters; non-existent addresses; no eligible respondents in household; non-residents; residents do not speak Cantonese, English or Putonghua; not able to access the residence or contact any resident after 5 visits.

^ Non-response cases included: valid cases which could not be contacted for interviews, after 5 attempts, i.e. recruited cases which could not be contacted for completing FBQ or subsequent interviews after 5 attempts.

* Response rate = No. of completed cases ÷ (No. of letters sent – No. of invalid cases) × 100%

Table 5. Distribution of respondents by gender and age group in the four Survey quarters*

Age group	Quarter 1		Quarter 2		Quarter 3		Quarter 4		Total
	M	F	M	F	M	F	M	F	
20-29	77	95	84	75	99	108	140	125	803
30-39	57	109	94	145	117	118	136	42	818
40-49	90	147	138	144	115	89	61	57	841
50-59	117	80	121	104	111	125	54	93	805
60-69	89	142	117	92	101	82	99	84	806
70-84	119	157	114	128	104	104	122	87	935
Sub-totals	549	730	668	688	647	626	612	488	5,008
Quarter totals (%)	1,279 (25.5%)		1,356 (27.1%)		1,273 (25.4%)		1,100 (22.0%)		5,008 (100%)

*Quarter 1: 10 Mar 05 — 9 Jun 05; 10 Mar 06 — 9 Jun 06; 10 Mar 07 — 9 Jun 07
Quarter 2: 10 Jun 05 — 9 Sept 05; 10 Jun 06 — 9 Sept 06; 10 Jun 07 — 10 July 07
Quarter 3: 10 Sept 05 — 9 Dec 05; 10 Sept 06 — 9 Dec 06
Quarter 4: 10 Dec 05 — 9 Mar 06; 10 Dec 06 — 9 Mar 07

(ii) Respondents' demographic characteristics

66. As explained in paragraph 53, comparison between the demographic characteristics of the sample and those of the Hong Kong 2006 Population By-census was conducted. It was found that the demographic characteristics of the sample better resembled the population distribution after weighting by age group and gender.

67. The comparison of the characteristics between the respondents for completing the questionnaires and the drop-out cases were also performed. Those comparisons indicated that the major differences between the two groups were in the areas of ethnicity, age group, region of residence, educational level, and working status. When interpreting the Survey data, the reader should therefore be cautioned about the possible bias introduced by these differences.

(iii) Anthropometry and reported health status

68. The weighted mean of the population's body weights, reported or measured heights, and calculated BMIs by age and gender group, together with their standard deviation (SD), are shown in Tables 6 – 8, respectively. The weighted average body weight of the population was 62.26$\pm$12.49 kg. The lightest men were those elder ones aged 70 to 84, while the lightest women were those aged 20 to 29 (Table 6). The men's weights peaked in their 30s and 40s, while those of the women peaked in their 50s. The mean weighted BMI of the males was 23.7$\pm$3.8 kg/m^2, and that of the females was 22.7$\pm$4.3 kg/m^2. The mean BMIs (Table 8) for men aged 30 and above and women aged 40 and above all fell in the overweight category (BMI: 23-24.9 kg/m^2) under the WHO proposed classification of weight by BMI in adult Asians (5).

Table 6. Weighted body weight in kg among persons aged 20 to 84 by gender and age group

	Males		Females	
Age group	Number*	Mean (SD)	Number*	Mean (SD)
20-29	445,000	66.1 (11.6)	521,000	52.5 (9.1)
30-39	485,000	70.1 (11.5)	639,000	55.7 (11.5)
40-49	624,000	70.0 (11.6)	699,000	56.7 (10.5)
50-59	477,000	67.4 (10.6)	476,000	57.6 (10.8)
60-69	253,000	63.7 (11.3)	231,000	56.9 (9.0)
70-84	237,000	62.1 (11.1)	274,000	55.0 (9.6)
Missing	15,000	--	18,000	--
All population	2,536,000	67.5 (11.6)	2,858,000	55.7 (10.5)

* Rounded to the nearest thousand; may not add up to the total due to rounding.

Table 7. Weighted heights in cm among persons aged 20 to 84 by gender and age group

	Males		Females	
Age group	Number*	Mean (SD)	Number*	Mean (SD)
20-29	444,000	172.8 (6.9)	520,000	159.3 (7.0)
30-39	486,000	171.3 (6.3)	631,000	158.3 (6.3)
40-49	627,000	169.0 (6.1)	694,000	157.1 (5.9)
50-59	475,000	167.3 (6.7)	464,000	156.0 (6.2)
60-69	249,000	164.9 (6.1)	226,000	154.4 (6.1)
70-84	231,000	163.2 (6.2)	266,000	151.8 (7.1)
Missing	23,000	--	57,000	--
All population	2,536,000	168.9 (7.1)	2,858,000	156.9 (6.7)

* Rounded to the nearest thousand; may not add up to the total due to rounding.

Table 8. Weighted BMI[*] in kg/m^2 among persons aged 20 to 84 by gender and age group

	Males		Females	
Age group	number[#]	Mean (SD)	Number[#]	Mean (SD)
20-29	443,000	22.1 (3.6)	518,000	20.8 (4.0)
30-39	485,000	23.9 (3.5)	630,000	22.2 (4.4)
40-49	623,000	24.5 (3.9)	693,000	23.0 (4.1)
50-59	473,000	24.1 (3.7)	464,000	23.7 (4.4)
60-69	249,000	23.4 (3.8)	225,000	23.9 (3.6)
70-84	230,000	23.4 (4.1)	263,000	24.0 (4.3)
Missing	33,000	--	65,000	--
All population	2,536,000	23.7 (3.8)	2,858,000	22.7 (4.3)

* Note: BMI (kg/m^2) = weight (kg)/ height $(m)^2$

[#] Rounded to the nearest thousand; may not add up to the total due to rounding.

69. Table 9 shows the distribution by gender and age group of the weight status according to the WHO proposed classification of weight by BMI in adult Asians (5). Overall, less than half (44.5%) of the 5,296,158 adults with BMI measurements were in the WHO normal BMI range of 18.5-22.9 kg/m^2 for adult Asians. A greater proportion (47.1% in total; males: 54.2%; females: 40.6%) were either overweight (BMI 23-24.9 kg/m^2; 20.1%) or obese (BMI$\geq$25 kg/m^2; 27.0%), while 8.5% were underweight (BMI <18.5 kg/m^2).

70. As illustrated in Table 9 and Figure 3, females had more than twice as many underweight individuals as the males, and for both genders they were most prevalent in the 20- to 29-year-old age groups. Females in this age group made up almost one-third (29.8%) of the underweight individuals. Similar to findings of other surveys in Hong Kong (8), this Survey revealed that, at younger ages, the proportion of overweight and obese males was higher than the corresponding proportion among the females. However, after age 60, the proportion of females who were obese was greater than that of the males. For the females, except for the eldest age group, the proportion of normal weight generally decreased with increasing age, while the percentage of overweight and obese increased with age.

Table 9. Number (%) of persons aged 20 to 84 in different WHO categories of proposed classification of weight by BMI in adult Asians* by gender and age group

BMI category	Age subgroup						Total
	20-29	30-39	40-49	50-59	60-69	70-84	20-84
Males							
Underweight	52,000[#] (11.5%)	20,000 (4.2%)	6,000 (1.0%)	21,000 (4.5%)	14,000 (5.4%)	15,000 (6.3%)	128,000 (5.1%)
Normal	257,000 (57.3%)	185,000 (37.9%)	218,000 (34.7%)	167,000 (34.7%)	95,000 (37.7%)	97,000 (40.3%)	1,018,000 (40.1%)
Overweight	61,000 (13.5%)	114,000 (23.4%)	163,000 (26.0%)	113,000 (23.6%)	66,000 (26.1%)	60,000 (24.8%)	576,000 (22.7%)
Obese	74,000 (16.5%)	167,000 (34.2%)	235,000 (37.4%)	172,000 (36.0%)	74,000 (29.1%)	59,000 (24.4%)	780,000 (30.8%)
Missing	6,000 (1.3%)	1,000 (0.2%)	6,000 (1.0%)	6,000 (1.2%)	4,000 (1.7%)	10,000 (4.1%)	33,000 (1.3%)
Total	449,000 (100.0%)	486,000 (100.0%)	629,000 (100.0%)	479,000 (100.0%)	253,000 (100.0%)	240,000 (100.0%)	2,536,000 (100.0%)
Females							
Underweight	134,000 (25.6%)	73,000 (11.4%)	53,000 (7.6%)	24,000 (5.0%)	15,000 (6.5%)	22,000 (7.8%)	321,000 (11.2%)
Normal	291,000 (55.6%)	355,000 (55.3%)	333,000 (47.4%)	192,000 (40.1%)	76,000 (32.8%)	92,000 (32.9%)	1,339,000 (46.8%)
Overweight	48,000 (9.2%)	89,000 (13.8%)	137,000 (19.5%)	103,000 (21.7%)	54,000 (23.0%)	56,000 (19.3%)	486,000 (17.0%)
Obese	45,000 (8.7%)	114,000 (17.7%)	170,000 (24.3%)	145,000 (30.4%)	80,000 (34.3%)	93,000 (33.1%)	647,000 (22.7%)
Missing	5,000 (1.0%)	11,000 (1.7%)	10,000 (1.4%)	13,000 (2.7%)	8,000 (3.5%)	18,000 (6.3%)	65,000 (2.3%)
Total	524,000 (100.0%)	641,000 (100.0%)	702,000 (100.0%)	477,000 (100.0%)	233,000 (100.0%)	281,000 (100.0%)	2,858,000 (100.0%)
All							
Underweight	185,000 (19.1%)	93,000 (8.3%)	59,000 (4.5%)	45,000 (4.7%)	29,000 (5.9%)	37,000 (7.1%)	449,000 (8.3%)
Normal	548,000 (56.4%)	539,000 (47.8%)	551,000 (41.4%)	358,000 (37.4%)	172,000 (35.3%)	189,000 (36.3%)	2,356,000 (43.7%)
Overweight	109,000 (11.2%)	202,000 (18.0%)	300,000 (22.5%)	217,000 (22.6%)	120,000 (24.6%)	115,000 (22.2%)	1,063,000 (19.7%)
Obese	119,000 (12.3%)	280,000 (24.8%)	405,000 (30.5%)	318,000 (33.2%)	154,000 (31.6%)	152,000 (29.1%)	1,428,000 (26.5%)
Missing	11,000 (1.1%)	12,000 (1.1%)	16,000 (1.2%)	19,000 (2.0%)	13,000 (2.6%)	28,000 (5.3%)	98,000 (1.8%)
Total	972,000 (100.0%)	1,127,000 (100.0%)	1,331,000 (100.0%)	956,000 (100.0%)	487,000 (100.0%)	521,000 (100.0%)	5,394,000 (100.0%)

* Note: WHO proposed classification of weight by BMI in adult Asians: underweight = BMI <18.5 kg/m^2; normal = BMI 18.5-22.9 kg/m^2; overweight = BMI 23-24.9 kg/m^2; obese = BMI$\geq$25 kg/m^2

Numbers rounded to the nearest thousand and may not add up to the total due to rounding

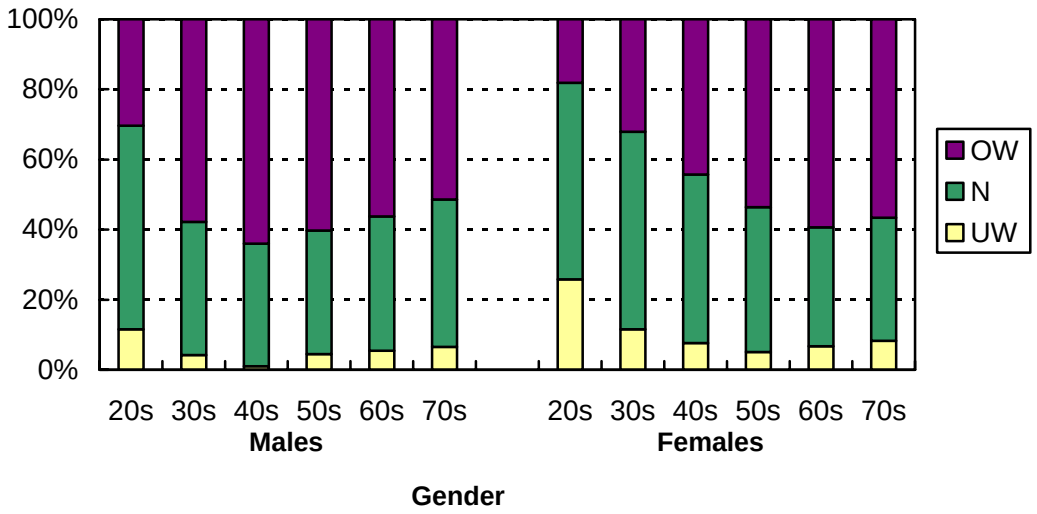

Figure 3. Percentage of persons aged 20 to 84 in different WHO categories of the proposed classification of weight by BMI in adult Asians by gender and age group

Note: underweight (UW) = BMI <18.5 kg/m^2; normal (N) = BMI 18.5-22.9 kg/m^2; overweight and obese (OW) = BMI $\geq$23 kg/m^2.

71. Selected health problems of the population are shown in Table 10. Hypertension was the most common health problem, with 12.5% of the population affected by this, and 4.7% of the population had diabetes. The findings were based on self-reported information.

Table 10. Number (%) of persons aged 20 to 84 reporting different health problems

Health problems	No such health problem	Reported to have the condition	Not sure/ don't know	Refused / missing
Hypertension	4,625,000 (85.7%)	672,000 (12.5%)	37,000 (0.7%)	61,000 (1.1%)
Diabetes mellitus	5,043,000 (93.5%)	252,000 (4.7%)	27,000 (0.5%)	72,000 (1.3%)
Arthritis	5,037,000 (93.4%)	211,000 (3.9%)	73,000 (1.4%)	73,000 (1.4%)
Osteoporosis	5,035,000 (93.3%)	174,000 (3.2%)	112,000 (2.1%)	73,000 (1.4%)
Heart diseases	5,166,000 (95.8%)	126,000 (2.3%)	35,000 (0.7%)	67,000 (1.2%)
Gout	5,174,000 (95.9%)	107,000 (2.0%)	35,000 (0.6%)	79,000 (1.5%)
Chronic bronchitis/ Pulmonary emphysema	5,238,000 (97.1%)	70,000 (1.3%)	20,000 (0.4%)	66,000 (1.2%)
Asthma	5,227,000 (96.9%)	82,000 (1.5%)	16,000 (0.3%)	70,000 (1.3%)
Cancer	5,238,000 (97.1%)	60,000 (1.1%)	20,000 (0.4%)	76,000 (1.4%)
Cerebrovascular disease	5,279,000 (97.9%)	39,000 (0.7%)	17,000 (0.3%)	59,000 (1.1%)
Intestinal ulcer	5,273,000 (97.7%)	28,000 (0.5%)	18,000 (0.3%)	76,000 (1.4%)
Pulmonary tuberculosis (TB)	5,266,000 (97.6%)	36,000 (0.7%)	17,000 (0.3%)	75,000 (1.4%)
Pneumonia	5,286,000 (98.0%)	22,000 (0.4%)	15,000 (0.3%)	71,000 (1.3%)
Mental disorder(s)	5,274,000 (97.8)	17,000 (0.3%)	16,000 (0.3%)	87,000 (1.6%)
Parkinson's/Dementia	5,306,000 (98.4%)	11,000 (0.2%)	16,000 (0.3%)	62,000 (1.1%)
Others	4,408,000 (81.7%)	737,000 (13.7%)	41,000 (0.8%)	208,000 (3.9%)

(iv) Food consumption information from 24-hour recall interviews

72. The first of the two non-consecutive 24-hr recall interviews with each respondent was conducted in person, while the second interview, 97.2% of which were conducted from between 3 to 11 days (inclusive) after the first interview, was conducted by telephone by the same interviewer. Both 24-hr recall interviews' durations had equal modes of 15 minutes. More than three-quarters (77.5%) of the Day 1 interviews were conducted on weekdays, and the remaining 22.5% were on weekends. More than three-quarters of the Day 1 interviews (78.1%) were conducted in the interviewees' homes, 18.6% in other places (offices, cafes, etc.), and the remaining 2.6% were conducted at the CUHK Survey Interview Centre.

73. Close to half of the respondents (48.4%) reported being the persons mostly responsible for their household meals, which included more female than male respondents and more elder respondents aged above 60 than younger respondents aged 20-59. For both 24-hr recall interviews, more than four-fifths of the respondents (82%) reported that their intakes were as usual, while approximately 18% reported consuming either more or less than usual for various reasons. The most common reasons given for eating more on the interview days were attending banquets, having a holiday, or feeling very hungry, while the most common reasons for eating less were being too busy, having a special occasion, having holidays, or not hungry. Almost three-quarters of the respondents (71.3%) reported themselves not under any diet control, while nearly one quarter of them (23.9%) reported that they were controlling their diet, and 1% of them said they were vegetarians. Ten of the women were pregnant, ten were lactating and two were not sure if they were pregnant.

Food Consumption

74. The purpose of the Day 1 and Day 2 24-hr recall interviews was to provide weighted estimates of consumption quantities of all foods and beverages as reported by the 5,008 respondents completing both interviews. These were tabulated by 28 food groups, 123 subgroups and the 1,429 foods consumed.

75. Tables 11 and 12 show the weighted mean, median and percentile consumed amounts of food groups and food subgroups, respectively, from the two days of 24-hr recall by all respondents and by consumers only. The weighting method used for both consumers and all respondents were the same. All amounts were given in grams and represent edible amount of food in their form as consumed except where noted. For the groups or subgroups of foods that contained different items, of which some were measured in grams and other in milliliters, the unit was noted as gram, and the weight calculated was the total of the gram weight and milliliter volume of all food items in the group or subgroup, assuming that 1 gram is equal to 1 milliliter for all foods, i.e., no conversions between the gram and milliliter amounts were performed during the summation.

76. From 24-hr the recall results, a more comprehensive picture of the population's food consumption could be revealed than from the FFQ results which queried only a limited number of foods and beverages. According to 24-hr recall data, the average of total daily consumption of solid food was found to be about 1.12 kg. Liquid food intake, which included the water added to cooked recipes, was about 1,860 ml per day on average, of which 57.3 % (1,065.62 ml) was from water. Fluids intake, which included water and other non-alcoholic beverages, soup, milk and milk beverages, but excluded water used for cooking, was found to be 1,787.11 ml and contributed to about 96% of the total liquid food intake.

77. The mean daily consumption for the cereals and grains products group was 488.75 g. In this group, the rice subgroup, which included items such as white rice, brown rice and congee, was by far the most common type of grain consumed, at 297.16 g/day, making up 60.8% of the total cereals and grains consumption. This was followed by wheat products, in the forms of the pasta/noodles subgroup (119.79 g/day) and the bread/rolls/buns subgroup (44.04 g/day), which made up 33.5% of the cereals and grains products group. These three subgroups' consumption together

made up 94.3% of the total consumption of the cereals and grains products group. It was estimated that consumption of whole grain items made up less than 2%, or about 8.65 grams of the total amount of cereals and grains consumed. The whole grains included oatmeal, pearl barley, brown rice, red rice, brown rice congee, red rice congee, rye bread and wheat bran breakfast cereal.

78. The vegetables group was consumed in an amount of 176.96 g/day. The leafy/stalk/shoot vegetables and brassica subgroup, which includes Chinese flowering cabbage and European lettuce, the two most consumed vegetables by weight, was consumed in an amount of 121.03 g/day and made up two thirds (68.4%) of the total amount of the vegetables group consumed. The squash/gourd subgroup (17.34 g/day) and root vegetable/tubers subgroup (14.82 g/day) contributed to about 9.8% and 8.4% of vegetable consumption respectively. When tubers such as potato and taro (about 8.05 g/day) were not included in the calculation, vegetables consumption was found to be 168.91 g/day. On the other hand, fruits were consumed in the amount of 146.81 g/day, with oranges (55.51 g/day) and apples (21.46 g/day) found to be the most popular fruits.

79. Soybeans and their products, with 8.62 g/day consumed on average, made up over half (61.0%) of the daily legume consumption of 14.13 g. Only 2.58 g of the nuts and seeds group were consumed.

80. The meat group, poultry group and game group were consumed in the amount of 112.50 g/day in total. Meat was consumed in the amount of 74.23 g/day. Pork was consumed in an amount of 53.81 g/day and made up most (72.5%) of the meat group consumption. This was followed by beef, which was consumed in an amount of 15.06 g/day. With regard to the poultry group, 88.0% of the total consumption (37.38 g/day) was from chicken, which was consumed in the amount of 32.90 g/day. Game was consumed only at an average amount of 0.89 g/day.

81. Fish and other aquatic animal (crustaceans and molluscs) consumption was 70.78 g/day in total, with fish consumption at 57.48 g/day, comprising 81.2% of the consumption total of these three aquatic groups. The fish consumption mainly comprised seawater fish other than coral fish (26.52g; 46.1% of the fish group), followed by freshwater fish (11.76 g/day; 20.5% of the fish group) and preserved fish and fish products (9.48 g; 16.5% of the fish group). Brackish water fish were consumed at an amount of 7.84 g/day, contributing to 13.6% of the total fish consumption. Crustaceans were consumed in the amount of 7.35 g/day, of which 75.2% was from shrimps and prawns (5.53 g/day), while 5.95 g/day molluscs such as oysters and cuttlefish were consumed.

82. The consumption of egg and egg products was 15.18 g/day, of which more than 90% was from chicken eggs (14.02 g/day). Together with legumes, meat, poultry, fish and aquatic animal mentioned above, as well as nuts and seeds and game, a total of 215.17 g of meat and meat alternatives were eaten daily by the population, with most (198.46 g/day; 92.2%) from animal sources, and the remaining 7.8% from the plant sources such as legumes and nuts and seeds.

83. Concerning milk and milk products, the average consumption of the group was found to be 34.23 g/day. The milk subgroup (25.53 ml/day) made up most

(74.6%) of the consumption of the group. The cheese subgroup (0.94 g/day) was only consumed in small amounts on average.

84. Dim sum, a group of local favorites, was consumed on average in the amount of 44.75 g per day, of which 9.71 g (21.7%) was from rice rolls. Other dim sum items consumed include shrimp siu mai (2.54 g), wonton in soup (3.25 g), dumpling in soup (3.45 g) and steamed barbeque pork bun (2.57 g). The average daily consumption for the sashimi and sushi group (4.68 g/day) and the burgers group (4.74 g/day), however, were only one-tenth each of consumption of the dim sum.

85. With regard to fluid consumption, non-alcoholic beverages were consumed in the volume of 1,616.97 ml/day. Soups, on the other hand, were consumed in the amount of 170.78 ml/day. Among all fluids, water (at a consumption of 1,065.62 ml) and tea (376.36 ml) made up by far the bulk of the total fluid consumption. Of the other beverages, carbonated drinks (41.02 ml), coffee (37.00 ml), beer/ales (28.40 ml) were consumed in similar amounts, but at only around one-tenth each of the consumption of the teas.

86. The Survey also collected the consumption amount of fats and oils, sugars and sweets, as well as condiments and sauces. The population's consumption of fats and oils was found to be only 7.32 g/day, probably a result of underestimation. The average consumption of sugar and sweets, including desserts (13.28 g/day) was found to be 16.95 g/day. Condiments and sauces were consumed in the amount of 13.74 g/day, of which almost one third was from soy sauce, siu-mei sauce or lo-mei sauce (4.56 ml/day). Due to limitations of the research methodologies, the estimated intakes of fats and oils, sugars and sweets, as well as condiments and sauces are subject to larger biases. Caution should be taken before using these figures for risk or dietary assessments.

87. The consumption amounts of food groups and food subgroups are summarized in Tables 11 and 12 below.

88. Readers should be cautioned that all consumption amounts reported in paragraphs 75-86 are for the individual food items consumed with corresponding consumption data available in the database. However, as explained in paragraph 28, some food items are made of multiple ingredients, but their consumption amounts were only captured in form of 'mixed food' items instead of being broken down into their ingredients. As a result, the oil or fat in foods such as sausages and spring rolls, the fish in sushi, the milk in milk tea, the red beans in red bean sweet soup and the butter or margarine in cocktail buns are not included in the above calculations, which therefore means that these results necessarily underestimate some of the actual consumption amounts stated for these and some other food items.

Table 11. Weighted daily food group consumption from Day 1 and Day 2 24-hr recall

Food Group		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Cereals and grains	All respondents	g	5,394,000	488.75	465.07	202.86	851.74	936.90
products FGC01	Consumers		5,393,000	488.86	465.09	203.04	851.74	936.90
Legumes	All respondents	g	5,394,000	14.13	0.55	0.00	71.54	100.00
FGC02	Consumers		3,141,000	24.26	10.00	0.13	91.54	138.93
Vegetables *	All respondents	g	5,394,000	176.96	149.06	28.27	416.20	506.78
FGC03	Consumers		5,373,000	177.66	149.60	30.16	418.02	507.32
Fruits	All respondents	g	5,394,000	146.81	113.65	0.00	415.00	500.00
FGC04	Consumers		4,204,000	188.38	160.00	20.00	450.00	530.00
Nuts and seeds	All respondents	g	5,394,000	2.58	0.00	0.00	15.00	25.00
FGC 05	Consumers		1,300,000	10.70	5.00	0.22	40.00	55.00
Meat	All respondents	g	5,394,000	74.23	60.00	0.00	194.98	233.20
FGC06	Consumers		5,012,000	79.90	65.00	10.42	198.00	239.88
Poultry	All respondents	g	5,394,000	37.38	23.07	0.00	130.00	160.00
FGC07	Consumers		3,400,000	59.31	47.21	10.00	150.00	183.42
Game	All respondents	g	5,394,000	0.89	0.00	0.00	0.00	0.00
FGC08	Consumers		131,000	36.74	30.00	7.35	95.00	100.00
Egg and egg products	All respondents	g	5,394,000	15.18	3.55	0.00	60.00	72.97
FGC09#	Consumers		3,139,000	26.09	22.75	0.70	69.83	84.25
Milk and milk products	All respondents	g	5,394,000	34.23	0.00	0.00	236.00	256.00
FGC10#	Consumers		2,010,000	91.87	50.00	1.73	295.00	320.00
Frozen confections	All respondents	g	5,394,000	2.56	0.00	0.00	8.35	48.50
FGC11	Consumers		284,000	48.52	37.50	8.35	105.00	125.00
Fish	All respondents	g	5,394,000	57.48	35.00	0.00	194.82	250.56
FGC12	Consumers		4,049,000	76.57	56.67	7.50	216.14	273.00
Crustaceans	All respondents	g	5,394,000	7.35	0.00	0.00	40.00	70.41
FGC13	Consumers		1,440,000	27.51	14.35	0.86	95.40	150.00
Molluscs	All respondents	g	5,394,000	5.95	0.00	0.00	36.00	50.65
FGC14	Consumers		1,386,000	23.17	14.77	1.90	75.00	100.00
Fats and oils	All respondents	g	5,394,000	7.32	5.34	0.11	20.78	25.30
FGC15#	Consumers		5,194,000	7.60	5.60	0.49	20.93	25.41
Non-alcoholic beverages	All respondents	g	5,394,000	1,616.97	1,562.50	450.00	3,015.16	3,440.00
FGC16#	Consumers		5,387,000	1,619.11	1,564.22	450.66	3,015.16	3,440.00

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml.
Note that values of 0.00 denote an amount less than 0.005; Number of individuals was rounded to the nearest thousand.
* Included tubers. Weighted mean of vegetables excluding tubers (all respondents) =168.91g/day.

Table 11 (contd.) Weighted daily food group consumption from Day 1 and Day 2 24-hr recall

Food Group		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Alcoholic beverages	All respondents	ml	5,394,000	33.04	0.01	0.00	175.00	355.02
FGC17	Consumers		4,042,000	44.09	0.01	0.00	250.00	532.50
Sugars and sweets	All respondents	g	5,394,000	16.95	1.84	0.00	104.42	150.21
FGC18#	Consumers		5,009,000	18.26	2.11	0.11	108.04	151.04
Herbs and spices	All respondents	g	5,394,000	0.30	0.04	0.00	1.26	2.13
FGC19	Consumers		3,420,000	0.47	0.17	0.01	1.74	2.57
Condiments and sauces	All respondents	g	5,394,000	13.74	8.61	0.84	44.90	64.76
FGC20#	Consumers		5,330,000	13.90	8.75	1.08	45.30	64.96
Snacks	All respondents	g	5,394,000	0.94	0.00	0.00	0.00	15.00
FGC26	Consumers		222,000	22.87	19.50	2.50	65.00	90.00
Traditional Chinese herbs	All respondents	g	5,394,000	0.85	0.00	0.00	0.14	1.70
FGC27	Consumers		548,000	8.33	0.13	0.00	50.00	100.00
Enteral nutrition	All respondents	g	5,394,000	0.07	0.00	0.00	0.00	0.00
FGC28	Consumers		8,000	43.62	26.70	7.50	250.00	250.00
Miscellaneous	All respondents	g	5,394,000	0.13	0.00	0.00	0.04	0.22
FGC30#	Consumers		593,000	1.18	0.03	0.01	0.83	10.00
Dim sum	All respondents	g	5,394,000	44.75	0.00	0.00	186.50	238.00
FGC41	Consumers		2,397,000	100.68	83.35	19.00	250.00	284.00
Sashimi and sushi	All respondents	g	5,394,000	4.68	0.00	0.00	15.00	75.00
FGC42	Consumers		282,000	89.48	70.00	15.00	243.75	315.00
Soups	All respondents	g	5,394,000	170.78	125.00	0.00	529.40	648.32
FGC56#	Consumers		3,877,000	237.61	200.00	2.45	600.00	714.63
Burgers	All respondents	g	5,394,000	4.74	0.00	0.00	57.50	73.50
FGC58	Consumers		321,000	79.67	70.50	49.50	150.00	165.00

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml.
Note that values of 0.00 denote an amount less than 0.005 ; Number of individuals was rounded to the nearest thousand.

† Note: A food pyramid analysis comparing food group consumption with consumption recommendations has been conducted for this Survey, and the analysis is available upon request.

Table 12. Weighted daily food subgroup consumption from Day 1 and Day 2 24-hr recall

Food Subgroup		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Cereal (not specified)	All respondents	g	5,394,000	0.10	0.00	0.00	0.00	0.00
FSGC0100	Consumers		39,000	13.32	10.00	2.50	25.00	60.00
Rice	All respondents	g	5,394,000	297.16	271.08	40.00	669.51	783.51
FSGC0101	Consumers		5,189,000	308.92	283.00	72.56	680.00	790.00
Wheat	All respondents	g	5,394,000	0.12	0.00	0.00	0.00	0.00
FSGC0102	Consumers		14,000	47.73	49.83	2.76	100.00	100.00
Corn	All respondents	g	5,394,000	4.03	0.00	0.00	25.00	46.65
FSGC0103	Consumers		901,000	24.12	11.61	1.54	80.00	105.00
Pasta/noodles	All respondents	g	5,394,000	119.79	100.00	0.00	350.00	415.00
FSGC0104	Consumers		3,787,000	170.61	150.00	34.17	383.00	451.85
Flour	All respondents	g	5,394,000	0.42	0.00	0.00	2.72	4.87
FSGC0105	Consumers		709,000	3.22	1.72	0.03	11.17	17.05
Starch/substitute flour	All respondents	g	5,394,000	1.81	0.88	0.00	6.70	8.83
FSGC0106	Consumers		4,488,000	2.17	1.22	0.08	7.23	9.38
Bread/rolls/buns	All respondents	g	5,394,000	44.04	35.00	0.00	125.60	155.00
FSGC0107	Consumers		3,683,000	64.50	52.14	20.00	145.00	175.00
Pancake/waffle	All respondents	g	5,394,000	0.53	0.00	0.00	0.00	0.00
FSGC0108	Consumers		69,000	40.88	35.00	7.78	120.00	175.00
Crackers	All respondents	g	5,394,000	4.25	0.00	0.00	25.00	40.00
FSGC0109	Consumers		1,020,000	22.46	15.00	5.00	58.35	75.00
Cake/pie/tart	All respondents	g	5,394,000	6.48	0.00	0.00	40.00	60.00
FSGC0110	Consumers		948,000	36.88	30.00	10.00	80.00	98.50
Muffin/scone	All respondents	g	5,394,000	0.38	0.00	0.00	0.00	0.00
FSGC0111	Consumers		37,000	56.03	53.50	25.00	107.00	107.00
Breakfast cereal	All respondents	g	5,394,000	6.74	0.00	0.00	44.73	60.00
FSGC0112	Consumers		904,000	40.23	30.00	10.88	120.00	150.00
Chinese pastry	All respondents	g	5,394,000	2.51	0.00	0.00	20.00	40.00
FSGC0113	Consumers		387,000	35.03	25.00	10.00	100.00	100.00
Other bakery/cereal	All respondents	g	5,394,000	0.38	0.00	0.00	0.00	0.00
products FSGC0114	Consumers		81,000	25.46	12.50	1.47	100.00	100.00
Legume other than soy	All respondents	g	5,394,000	5.51	0.00	0.00	33.35	51.00
FSGC0200	Consumers		1,290,000	23.05	12.40	1.05	80.39	114.00
Soy/soybean products	All respondents	g	5,394,000	8.62	0.00	0.00	46.73	75.00
FSGC0201	Consumers		2,473,000	18.80	6.66	0.08	75.00	123.95

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml.
Note that values of 0.00 denote an amount less than 0.005; Number of individuals was rounded to the nearest thousand.
* Data not available due to too small number of respondents

Table 12 (contd.) Weighted daily food subgroup consumption from Day 1 and Day 2 24-hr recall

Food Subgroup		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Vegetables (not specified)	All respondents	g	5,394,000	0.56	0.00	0.00	0.00	0.00
FSGC0300	Consumers		123,000	24.71	15.00	1.86	80.00	150.00
Root vegetables/tubers	All respondents	g	5,394,000	14.82	1.68	0.00	66.17	100.00
FSGC0301	Consumers		4,520,000	17.69	3.67	0.08	75.01	103.56
Leafy/stalk/shoot vegetables and brassica	All respondents	g	5,394,000	121.03	96.54	0.00	327.66	402.88
FSGC0302	Consumers		5,038,000	129.59	104.22	15.00	337.28	407.50
Squash/gourd	All respondents	g	5,394,000	17.34	0.00	0.00	100.00	150.00
FSGC0303	Consumers		1,704,000	54.89	33.50	6.00	170.00	228.00
Fruit vegetable	All respondents	g	5,394,000	9.38	0.09	0.00	50.00	75.00
FSGC0304	Consumers		2,941,000	17.21	5.28	0.06	75.00	100.16
Bulb vegetable	All respondents	g	5,394,000	6.40	2.70	0.00	24.74	33.84
FSGC0305	Consumers		4,880,000	7.08	3.28	0.18	25.58	35.53
Preserved/dried vegetable	All respondents	g	5,394,000	2.14	0.00	0.00	12.31	18.50
FSGC0306	Consumers		1,702,000	6.78	3.17	0.02	24.58	30.00
Mushroom/seaweeds	All respondents	g	5,394,000	5.28	0.00	0.00	27.01	39.80
FSGC0307	Consumers		1,810,000	15.73	10.00	0.61	50.00	65.00
Fruits (not specified)	All respondents	g	5,394,000	146.19	113.35	0.00	410.00	500.00
FSGC0400	Consumers		4,151,000	189.99	160.00	25.00	450.00	530.00
Preserved fruit/other fruit products other than juice	All respondents	g	5,394,000	0.62	0.00	0.00	0.79	6.81
FSGC0401	Consumers		386,000	8.68	3.00	0.04	37.50	50.00
Nuts/seeds (not specified)	All respondents	g	5,394,000	1.88	0.00	0.00	10.00	20.00
FSGC0500	Consumers		803,000	12.61	6.18	0.50	50.00	59.00
Nuts/seeds products	All respondents	g	5,394,000	0.70	0.00	0.00	5.00	8.29
FSGC0501	Consumers		604,000	6.27	4.05	0.11	20.00	30.00
Meat (not specified)	All respondents	g	5,394,000	4.66	0.00	0.00	30.00	50.00
FSGC0600	Consumers		654,000	38.43	25.00	7.01	100.00	125.00
Cattle/calf	All respondents	g	5,394,000	15.06	0.00	0.00	72.02	100.00
FSGC0601	Consumers		2,033,000	39.94	30.00	5.43	111.36	150.00
Pig	All respondents	g	5,394,000	53.81	41.15	0.00	152.00	181.43
FSGC0602	Consumers		4,745,000	61.17	49.56	7.81	157.21	189.90
Sheep	All respondents	g	5,394,000	0.71	0.00	0.00	0.00	0.00
FSGC0603	Consumers		98,000	39.04	30.00	4.00	105.00	121.50

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml.
Note that values of 0.00 denote an amount less than 0.005; Number of individuals was rounded to the nearest thousand
* Data not available due to too small number of respondents

Table 12 (contd.) Weighted daily food subgroup consumption from Day 1 and Day 2 24-hr recall

Food Subgroup		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Chicken	All respondents	g	5,394,000	32.90	16.50	0.00	120.00	152.00
FSGC0701	Consumers		3,164,000	56.08	42.15	10.00	150.00	182.00
Duck	All respondents	g	5,394,000	2.45	0.00	0.00	19.80	37.50
FSGC0702	Consumers		413,000	31.96	28.00	3.76	76.00	100.00
Goose	All respondents	g	5,394,000	1.98	0.00	0.00	10.00	30.00
FSGC0703	Consumers		301,000	35.61	30.00	8.29	80.00	105.00
Turkey	All respondents	g	5,394,000	0.05	0.00	0.00	0.00	0.00
FSGC0704	Consumers		17,000	16.75	20.00	5.00	30.00	30.00
Game (not specified)	All respondents	g	5,394,000	0.01	0.00	0.00	0.00	0.00
FSGC0800	Consumers		*	*	*	*	*	*
Pigeon	All respondents	g	5,394,000	0.47	0.00	0.00	0.00	0.00
FSGC0801	Consumers		64,000	39.36	30.00	11.25	82.50	100.00
Ostrich	All respondents	g	5,394,000	0.09	0.00	0.00	0.00	0.00
FSGC0803	Consumers		19,000	25.56	20.00	8.23	50.00	50.00
Snake	All respondents	g	5,394,000	0.01	0.00	0.00	0.00	0.00
FSGC0804	Consumers		*	*	*	*	*	*
Crocodile	All respondents	g	5,394,000	0.00	0.00	0.00	0.00	0.00
FSGC0805	Consumers		*	*	*	*	*	*
Frog	All respondents	g	5,394,000	0.30	0.00	0.00	0.00	0.00
FSGC0806	Consumers		41,000	39.39	33.35	12.50	100.00	120.00
Goat	All respondents	g	5,394,000	0.02	0.00	0.00	0.00	0.00
FSGC0809	Consumers		*	*	*	*	*	*
Eggs (not specified)	All respondents	g	5,394,000	0.38	0.00	0.00	1.11	4.44
FSGC0900	Consumers		285,000	7.14	4.22	1.11	20.00	32.00
Chicken eggs	All respondents	g	5,394,000	14.02	1.53	0.00	57.43	69.57
FSGC0901	Consumers		2,960,000	25.54	22.75	0.60	68.25	80.00
Duck eggs/salted duck	All respondents	g	5,394,000	0.55	0.00	0.00	0.00	8.40
eggs FSGC0902	Consumers		264,000	11.28	8.97	1.34	32.00	32.00
Quail eggs	All respondents	g	5,394,000	0.00	0.00	0.00	0.00	0.00
FSGC0904	Consumers		*	*	*	*	*	*
Egg products	All respondents	g	5,394,000	0.24	0.00	0.00	0.00	0.00
FSGC0905 #	Consumers		37,000	34.01	20.08	8.03	100.00	100.00
Milk	All respondents	ml	5,394,000	25.53	0.00	0.00	200.00	250.00
FSGC1000	Consumers		1,125,000	122.46	120.00	2.12	300.00	351.81

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml

Note that values of 0.00 denote an amount less than 0.005; Number of individuals was rounded to the nearest thousand

* Data not available due to too small number of respondents

Table 12 (contd.) Weighted daily food subgroup consumption from Day 1 and Day 2 24-hr recall

Food Subgroup		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Milk beverages	All respondents	ml	5,394,000	2.69	0.00	0.00	0.00	0.00
FSGC1001	Consumers		91,000	159.92	125.00	90.00	300.00	375.00
Buffalo milk	All respondents	ml	5,394,000	0.07	0.00	0.00	0.00	0.00
FSGC1002	Consumers		*	*	*	*	*	*
Condensed milk	All respondents	ml	5,394,000	0.59	0.00	0.00	3.61	7.50
FSGC1004	Consumers		395,000	8.05	5.42	1.25	20.00	30.00
Evaporated milk	All respondents	ml	5,394,000	0.15	0.00	0.00	0.00	0.00
FSGC1005	Consumers		48,000	17.11	5.00	0.06	75.00	90.00
Milk shake	All respondents	ml	5,394,000	0.31	0.00	0.00	0.00	0.00
FSGC1006	Consumers		10,000	174.43	125.00	55.50	600.00	600.00
Cream	All respondents	g	5,394,000	0.36	0.00	0.00	2.08	2.86
FSGC1007	Consumers		416,000	4.64	2.60	0.22	11.06	19.83
Cheese	All respondents	g	5,394,000	0.94	0.00	0.00	10.00	13.31
FSGC1008	Consumers		416,000	12.22	10.00	0.63	29.37	34.09
Dairy products other than	All respondents	g	5,394,000	3.04	0.00	0.00	0.00	50.00
cream and cheese	Consumers		192,000	85.30	75.00	25.00	225.00	250.00
FSGC1009 #								
Filled milk products	All respondents	g	5,394,000	0.00	0.00	0.00	0.00	0.00
FSGC1010 #	Consumers		*	*	*	*	*	*
Dried milk	All respondents	g	5,394,000	0.54	0.00	0.00	0.00	2.50
FSGC1011	Consumers		141,000	20.66	15.00	2.50	52.50	60.00
Ice-cream	All respondents	g	5,394,000	1.40	0.00	0.00	0.00	18.00
FSGC1101	Consumers		169,000	44.70	30.00	7.50	125.00	125.00
Soft ice-cream	All respondents	g	5,394,000	0.02	0.00	0.00	0.00	0.00
FSGC1102	Consumers		7,000	17.98	14.50	7.50	45.00	45.00
Sundae	All respondents	g	5,394,000	0.33	0.00	0.00	0.00	0.00
FSGC1104	Consumers		21,000	85.24	90.00	45.00	100.00	100.00
Popsicle	All respondents	g	5,394,000	0.77	0.00	0.00	0.00	0.00
FSGC1105	Consumers		88,000	47.41	37.50	30.00	105.00	105.00
Sherbet/sorbet	All respondents	g	5,394,000	0.03	0.00	0.00	0.00	0.00
FSGC1106	Consumers		*	*	*	*	*	*
Freshwater fish	All respondents	g	5,394,000	11.76	0.00	0.00	71.14	105.58
FSGC1200	Consumers		1,226,000	51.74	35.00	7.35	150.00	197.20

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml

Note that values of 0.00 denote an amount less than 0.005; Number of individuals was rounded to the nearest thousand

* Data not available due to too small number of respondents

Table 12 (contd.). Weighted daily food subgroup consumption from Day 1 and Day 2 24-hr recall

Food Subgroup		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Seawater fish other than coral fish FSGC1201	All respondents	g	5,394,000	26.52	0.00	0.00	128.50	176.37
	Consumers		2,168,000	65.98	45.00	7.50	193.79	250.00
Freshwater/seawater/ brackish water fish FSGC1202	All respondents	g	5,394,000	7.84	0.00	0.00	50.00	79.94
	Consumers		892,000	47.40	30.00	7.50	150.00	169.50
Coral fish FSGC1203	All respondents	g	5,394,000	1.89	0.00	0.00	0.00	24.47
	Consumers		258,000	39.45	25.96	6.49	121.50	132.41
Preserved fish/fish products FSGC1204	All respondents	g	5,394,000	9.48	0.00	0.00	55.75	73.20
	Consumers		1,643,000	31.13	20.00	2.29	90.00	120.00
Shrimp/prawn FSGC1301	All respondents	g	5,394,000	5.53	0.00	0.00	30.00	52.50
	Consumers		1,306,000	22.84	12.50	0.80	76.00	118.19
Crab FSGC1302	All respondents	g	5,394,000	1.51	0.00	0.00	0.00	12.75
	Consumers		238,000	34.24	16.09	1.56	140.00	185.79
Lobster FSGC1303	All respondents	g	5,394,000	0.30	0.00	0.00	0.00	0.00
	Consumers		66,000	24.61	20.00	2.08	50.00	75.00
Molluscs (not specified) FSGC1400	All respondents	g	5,394,000	0.31	0.00	0.00	0.00	1.87
	Consumers		168,000	9.88	5.00	0.93	30.00	45.00
Univalve FSGC1401	All respondents	g	5,394,000	0.47	0.00	0.00	0.00	0.00
	Consumers		120,000	21.24	15.00	3.75	62.50	75.00
Bivalve FSGC1402	All respondents	g	5,394,000	2.29	0.00	0.00	10.57	23.34
	Consumers		795,000	15.54	7.37	0.54	60.40	100.00
Cephalopods FSGC1403	All respondents	g	5,394,000	2.88	0.00	0.00	21.29	34.05
	Consumers		736,000	21.11	15.41	1.34	60.00	75.00
Fats and oils (not specified) FSGC1500	All respondents	g	5,394,000	4.41	2.78	0.00	14.28	18.59
	Consumers		4,916,000	4.84	3.20	0.20	14.72	19.13
Animal fats and oils FSGC1501 #	All respondents	g	5,394,000	1.06	0.00	0.00	5.96	8.87
	Consumers		1,338,000	4.28	3.47	0.07	10.40	14.68
Vegetable oil FSGC1502	All respondents	ml	5,394,000	1.37	0.00	0.00	6.95	10.00
	Consumers		2,219,000	3.33	2.08	0.12	10.85	14.65
Salad dressing FSGC1503	All respondents	g	5,394,000	0.48	0.00	0.00	2.90	7.50
	Consumers		334,000	7.70	5.33	1.50	20.00	24.30
Non-alcoholic beverages (not specified) FSGC1600#	All respondents	g	5,394,000	44.99	0.00	0.00	250.00	312.50
	Consumers		1,288,000	188.50	150.00	75.00	415.00	500.00

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml

Note that values of 0.00 denote an amount less than 0.005; Number of individuals was rounded to the nearest thousand.

* Data not available due to too small number of respondents

Table 12 (contd.). Weighted daily food subgroup consumption from Day 1 and Day 2 24-hr recall

Food Subgroup		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Coffee/coffee substitute	All respondents	g	5,394,000	37.00	0.00	0.00	250.00	300.00
FSGC1601 #	Consumers		904,000	220.72	180.00	75.00	500.00	600.00
Tea	All respondents	g	5,394,000	376.36	250.00	0.00	1275.00	1590.00
FSGC1602 #	Consumers		3,847,000	527.75	400.00	120.00	1425.00	1750.00
Chinese herb tea	All respondents	g	5,394,000	14.53	0.00	0.00	125.00	225.00
FSGC1603 #	Consumers		321,000	244.25	165.00	93.75	625.00	750.00
Sport/"healthy" drink	All respondents	g	5,394,000	7.00	0.00	0.00	0.00	75.00
FSGC1604 #	Consumers		157,000	241.08	170.00	10.00	750.00	863.5
Carbonated drink	All respondents	ml	5,394,000	41.02	0.00	0.00	294.00	355.00
FSGC1605	Consumers		937,000	236.25	177.50	75.00	532.50	710.00
Fresh fruit	All respondents	ml	5,394,000	9.82	0.00	0.00	30.00	150.00
and vegetable juice	Consumers		374,000	141.87	125.00	0.09	412.50	525.00
FSGC1606								
Fruit and vegetable	All respondents	g	5,394,000	19.24	0.00	0.00	150.00	231.00
juice drink FSGC1607 #	Consumers		559,000	185.73	150.00	75.00	420.00	550.00
Water	All respondents	ml	5,394,000	1,065.62	1,009.34	5.11	2,377.89	2,604.26
FSGC1608	Consumers		5,314,000	1,081.75	1,026.26	10.63	2,384.50	2,605.85
"Icy" drinks	All respondents	ml	5,394,000	1.37	0.00	0.00	0.00	0.00
FSGC1609	Consumers		50,000	147.61	150.00	49.82	228.00	300.00
Alcoholic beverages	All respondents	ml	5,394,000	0.54	0.00	0.00	0.00	0.00
(not specified) FSGC1700	Consumers		21,000	142.20	165.00	15.00	277.60	277.60
Beer/ales	All respondents	ml	5,394,000	28.40	0.00	0.00	150.00	355.00
FSGC1701	Consumers		298,000	513.28	330.00	82.50	1,650.00	1,787.50
Grape wine	All respondents	ml	5,394,000	2.65	0.00	0.00	0.00	0.04
FSGC1702	Consumers		313,000	45.61	0.01	0.00	250.00	375.00
Chinese wine	All respondents	ml	5,394,000	0.92	0.00	0.00	0.07	0.29
FSGC1703	Consumers		3,864,000	1.29	0.01	0.00	0.15	0.60
Distilled spirits	All respondents	ml	5,394,000	0.53	0.00	0.00	0.00	0.00
FSGC1704	Consumers		72,000	39.63	0.01	0.00	270.00	300.00
Sugar	All respondents	g	5,394,000	1.67	0.97	0.00	5.33	7.45
FSGC1801	Consumers		4,865,000	1.85	1.16	0.07	5.55	7.81
Sweetener	All respondents	g	5,394,000	0.01	0.00	0.00	0.00	0.00
FSGC1802	Consumers		12,000	2.57	2.00	0.50	10.00	15.00

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml

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* Data not available due to too small number of respondents

Table 12 (contd.). Weighted daily food subgroup consumption from Day 1 and Day 2 24-hr recall

Food Subgroup		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Honey/molasses/syrup	All respondents	g	5,394,000	0.17	0.00	0.00	0.00	0.19
FSGC1803 #	Consumers		172,000	5.32	2.50	0.09	20.00	20.00
Jams/preserves	All respondents	g	5,394,000	0.26	0.00	0.00	0.00	2.50
FSGC1804	Consumers		184,000	7.63	5.00	1.25	20.00	36.50
Jellies	All respondents	g	5,394,000	0.40	0.00	0.00	0.00	0.00
FSGC1805	Consumers		42,000	51.95	50.00	5.00	100.00	150.00
Candy/chocolate	All respondents	g	5,394,000	0.97	0.00	0.00	6.00	12.00
FSGC1806	Consumers		508,000	10.27	7.50	1.50	29.00	43.00
Gum	All respondents	g	5,394,000	0.19	0.00	0.00	1.35	2.80
FSGC1807	Consumers		335,000	3.04	2.10	0.70	9.80	11.20
Desserts	All respondents	g	5,394,000	13.28	0.00	0.00	100.00	140.00
FSGC1808 #	Consumers		757,000	94.64	80.00	10.00	250.00	255.00
Frosting/toppings/dessert	All respondents	g	5,394,000	0.01	0.00	0.00	0.00	0.00
Sauces FSGC1809	Consumers		6,000	5.57	5.00	1.25	10.00	10.00
Herbs and spices	All respondents	g	5,394,000	0.30	0.04	0.00	1.26	2.13
FSGC1900	Consumers		3,420,000	0.47	0.17	0.01	1.74	2.57
Condiments/savory sauces	All respondents	g	5,394,000	8.04	3.90	0.20	27.58	51.27
(not specified)	Consumers		5,269,000	8.23	4.03	0.37	28.41	52.28
FSGC2000#								
Soy sauce/siu-mei sauce/	All respondents	ml	5,394,000	4.56	2.39	0.00	17.20	23.04
lo-mei sauce FSGC2001	Consumers		4,960,000	4.96	2.68	0.17	18.32	23.69
Oyster sauce	All respondents	g	5,394,000	0.73	0.00	0.00	3.63	7.66
FSGC2002	Consumers		1,576,000	2.48	0.42	0.03	15.00	15.71
Vinegar	All respondents	ml	5,394,000	0.32	0.00	0.00	0.85	2.47
FSGC2003	Consumers		465,000	3.67	1.05	0.10	12.50	25.00
Gravy	All respondents	ml	5,394,000	0.09	0.00	0.00	0.00	0.00
FSGC2004	Consumers		23,000	21.12	8.50	2.16	125.00	125.00
Snack foods	All respondents	g	5,394,000	0.94	0.00	0.00	0.00	15.00
FSGC2600	Consumers		222,000	22.87	19.50	2.50	65.00	90.00
Traditional Chinese herbs	All respondents	g	5,394,000	0.48	0.00	0.00	0.07	0.73
FSGC2700	Consumers		526,000	4.92	0.09	0.00	19.00	38.02
Traditional Chinese herb	All respondents	g	5,394,000	0.37	0.00	0.00	0.00	0.00
product FSGC2701	Consumers		26,000	76.98	100.00	1.00	175.00	175.00

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml.
Note that values of 0.00 denote an amount less than 0.005; Number of individuals was rounded to the nearest thousand.
* Data not available due to too small number of respondents

Table 12 (contd.) Weighted daily food subgroup consumption from Day 1 and Day 2 24-hr recall

Food Subgroup		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
Enteral nutrition	All respondents	g	5,394,000	0.07	0.00	0.00	0.00	0.00
FSGC2800	Consumers		8,000	43.62	26.70	7.50	250.00	250.00
Miscellaneous	All respondents	g	5,394,000	0.13	0.00	0.00	0.04	0.22
FSGC3000 #	Consumers		593,000	1.18	0.03	0.01	0.83	10.00
Dim sum other than rice-roll FSGC4100	All respondents	g	5,394,000	35.04	0.00	0.00	155.00	196.00
	Consumers		2,193,000	86.17	70.00	15.00	213.00	251.00
Rice-roll	All respondents	g	5,394,000	9.71	0.00	0.00	75.00	117.00
FSGC4101	Consumers		806,000	64.94	52.50	17.50	156.00	190.00
Fish sashimi	All respondents	g	5,394,000	0.54	0.00	0.00	0.00	0.00
FSGC4201	Consumers		105,000	27.50	20.00	5.00	90.00	113.50
Sashimi other than fish	All respondents	g	5,394,000	0.16	0.00	0.00	0.00	0.00
FSGC4202	Consumers		43,000	20.53	12.50	4.27	60.00	135.00
Sushi	All respondents	g	5,394,000	3.98	0.00	0.00	0.00	70.00
FSGC4203	Consumers		221,000	97.31	75.00	19.00	252.50	314.50
Soups	All respondents	g	5,394,000	170.78	125.00	0.00	529.40	648.32
FSGC5600 #	Consumers		3,877,000	237.61	200.00	2.45	600.00	714.63
Burgers	All respondents	g	5,394,000	4.74	0.00	0.00	57.50	73.50
FSGC5802	Consumers		321,000	79.67	70.50	49.50	150.00	165.00

Food group composed of solid and liquid items. When calculating the amount of food group consumption, the weight of liquid food was assumed to be 1g per 1ml.
Note that values of 0.00 denote an amount less than 0.005; Number of individuals was rounded to the nearest thousand
* Data not available due to too small number of respondents

(v) Food consumption data from the FFQ

89. The median and mode durations of the FFQ interviews were 21 minutes and 20 minutes, respectively. The purpose of the FFQ assessment was to provide weighted estimates of reported consumption quantities of the 110 queried foods targeted because they were of special interest for food safety/risk assessment or were less likely to be captured from the 24-hr recall interviews. These are tabulated in Table 13 both by (a) all respondents as well as (b) consumers only, and presented as the weighted means, medians and 5^{th}, 95^{th} and 97.5^{th} percentile quantities consumed during a day. Consumption amounts of seasonal food were presented separately for peak and non-peak consumption seasons, as well as an annual average was also calculated for these foods. While the consumption amounts of these 110 food items will be useful in subsequent risk assessment work, these results give only an incomplete view of the overall food consumption patterns of the population, so their consumption results are not further discussed.

90. There were some missing values for most of the questions. This was because of the nature of the inquiry to some of the respondents. Some found it difficult to estimate how often in the past year they 'usually' consumed the food, and for others, estimating the amount consumed was difficult or impossible. Although the interviewers tried to elicit useful responses, it could not always be done. Readers should note that the food frequency method attempts to understand intake over the long term but in a cruder fashion than that of the shorter term 24-hr recall, in which the level of intake precision on a specific day is sacrificed in an attempt to capture overall longer term intake patterns.

Table 13. Weighted daily consumption of FFQ items: mean, median, and 5th, 95th and 97.5th percentiles, in g or ml by all respondents and consumers only

Food item*		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
1. Vietnamese rice noodles	All respondents	g	5,350,000	1.74	0.00	0.00	5.33	13.33
	Consumers		2,246,000	4.15	1.53	0.77	13.33	22.86
2. Preserved vegetables	All respondents	g	5,349,000	1.09	0.29	0.00	4.38	5.40
	Consumers		4,540,000	1.29	0.34	0.08	5.00	5.83
3. Dried fungus other than shiitake mushroom	All respondents	g	5,372,000	4.81	1.16	0.00	17.50	30.00
	Consumers		4,405,000	5.87	2.01	0.25	26.25	30.00
4. Spring Onions	All respondents	g	5,366,000	2.03	1.25	0.00	5.00	10.00
	Consumers		4,594,000	2.37	1.43	0.05	6.25	10.00
5. Coriander	All respondents	g	5,354,000	0.40	0.02	0.00	2.14	3.73
	Consumers		3,010,000	0.71	0.17	0.02	2.86	5.00
6. Alfalfa sprouts	All respondents	g	5,324,000	0.09	0.00	0.00	0.29	0.67
	Consumers		945,000	0.53	0.10	0.02	1.67	2.86
7. Aloe	All respondents	g	5,337,000	0.61	0.00	0.00	2.50	5.36
	Consumers		1,640,000	2.00	0.72	0.17	6.25	10.71
8. Tong Ho	All respondents	g	5,358,000	2.60	0.74	0.00	10.08	15.29
	Consumers		3,380,000	4.12	1.49	0.49	12.92	22.14
9. Matrimony vine	All respondents	g	5,361,000	1.32	0.43	0.00	5.04	7.50
	Consumers		3,220,000	2.19	0.86	0.22	7.50	12.86
10. Mustard leaf	All respondents	g	5,368,000	3.63	1.00	0.00	12.92	25.20
	Consumers		3,610,000	5.40	1.49	0.49	22.14	38.75
11. Chinese chives (flower stalks)	All respondents	g	5,374,000	1.72	0.72	0.00	6.25	10.71
	Consumers		3,681,000	2.52	0.72	0.24	10.08	12.50
12. Dried vegetables	All respondents	g	5,373,000	0.64	0.13	0.00	2.29	4.58
	Consumers		2,747,000	1.26	0.53	0.13	4.58	7.86
13. Daylily flowers (Jin Zhen)	All respondents	g	5,382,000	0.37	0.10	0.00	1.67	2.86
	Consumers		3,119,000	0.65	0.19	0.06	2.50	3.33
14. Bamboo shoots	All respondents	g	5,375,000	0.37	0.00	0.00	1.48	2.86
	Consumers		2,053,000	0.98	0.38	0.10	3.33	5.71
15. Fresh ginseng	All respondents	g	5,381,000	0.04	0.00	0.00	0.29	0.58
	Consumers		354,000	0.65	0.58	0.12	1.48	2.00
16. Water chestnuts	All respondents	g	5,355,000	1.60	0.62	0.00	5.42	9.62
	Consumers		3,567,000	2.41	0.80	0.16	8.13	13.54
17. Konjac noodles	All respondents	g	5,372,000	0.74	0.00	0.00	2.66	4.44
	Consumers		2,411,000	1.65	0.58	0.29	5.00	10.00

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Table 13 (contd.). Weighted daily consumption of FFQ items: mean, median, and 5th, 95th and 97.5th percentiles, in g or ml by all respondents and consumers only

Food item*		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
18. Cherries	All respondents	g	5,370,000	3.13	1.05	0.00	9.17	18.33
	Consumers		3,958,000	4.25	1.05	0.35	11.19	18.33
19a. Lychees (peak season)	All respondents	g	5,367,000	16.50	3.31	0.00	64.86	129.71
	Consumers		3,878,000	22.84	4.13	1.09	85.00	172.80
19b. Lychees (non-peak season)	All respondents	g	5,373,000	0.11	0.00	0.00	0.00	0.00
	Consumers		76,000	7.67	2.78	0.54	24.29	48.57
19c. Lychees (annual)	All respondents	g	5,352,000	4.15	0.82	0.00	15.99	31.98
	Consumers		3,871,000	5.74	1.02	0.27	20.96	42.61
20a. Longans (peak season)	All respondents	g	5,359,000	14.86	3.31	0.00	56.53	113.50
	Consumers		4,009,000	19.86	6.61	1.65	85.00	129.71
20b. Longans (non-peak season)	All respondents	g	5,354,000	0.14	0.00	0.00	0.00	0.00
	Consumers		133,000	5.62	2.78	0.54	14.29	32.43
20c. Longans (annual)	All respondents	g	5,325,000	3.78	0.82	0.00	14.97	27.99
	Consumers		3,979,000	5.06	1.63	0.41	20.96	32.94
21. Big red sausages	All respondents	g	5,367,000	1.07	0.34	0.00	5.00	8.75
	Consumers		3,023,000	1.91	0.67	0.22	6.70	10.00
22a. Preserved pork (peak season)	All respondents	g	5,376,000	1.88	0.00	0.00	6.75	12.86
	Consumers		2,543,000	3.98	2.63	1.05	12.86	15.43
22b. Preserved pork (non-peak season)	All respondents	g	5,375,000	0.05	0.00	0.00	0.00	0.21
	Consumers		138,000	1.85	0.75	0.26	6.43	19.29
22c. Preserved pork (annual)	All respondents	g	5,363,000	0.35	0.00	0.00	1.29	2.22
	Consumers		2,544,000	0.74	0.43	0.17	2.22	3.33
23. Chinese ham	All respondents	g	5,378,000	0.12	0.00	0.00	0.37	0.54
	Consumers		1,759,000	0.37	0.14	0.04	1.00	1.67
24. Bacon	All respondents	g	5,377,000	0.24	0.00	0.00	1.25	2.14
	Consumers		2,348,000	0.56	0.14	0.07	2.14	3.21
25. Roasted chicken	All respondents	g	5,382,000	2.36	0.58	0.00	10.00	17.14
	Consumers		3,592,000	3.54	1.15	0.29	15.00	20.00
26. Silky chicken	All respondents	g	5,380,000	0.49	0.00	0.00	2.10	2.83
	Consumers		1,488,000	1.79	0.82	0.20	5.67	8.50
27. Roasted pigeon	All respondents	g	5,386,000	1.22	0.58	0.00	4.00	8.00
	Consumers		3,643,000	1.81	1.15	0.58	5.92	8.57
28. Pigeon (other than roasted pigeon)	All respondents	g	5,376,000	0.34	0.00	0.00	1.50	2.22
	Consumers		1,755,000	1.04	0.43	0.22	3.00	4.44

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Table 13 (contd.). Weighted daily consumption of FFQ items: mean, median, and 5th, 95th and 97.5th percentiles, in g or ml by all respondents and consumers only

Food item*		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
29. Goose (other than roasted goose)	All respondents	g	5,383,000	0.82	0.00	0.00	3.00	5.00
	Consumers		2,582,000	1.72	0.58	0.29	6.00	10.00
30. Turkey	All respondents	g	5,369,000	0.26	0.00	0.00	0.99	1.97
	Consumers		1,174,000	1.21	0.77	0.38	2.67	5.33
31a. Preserved duck (peak season)	All respondents	g	5,382,000	3.04	0.00	0.00	14.00	18.00
	Consumers		2,081,000	7.87	7.00	2.00	18.00	21.00
31b. Preserved duck (non-peak season)	All respondents	g	5,364,000	0.02	0.00	0.00	0.00	0.00
	Consumers		82,000	1.48	0.63	0.31	5.00	8.57
31c. Preserved duck (annual)	All respondents	g	5,355,000	0.27	0.00	0.00	1.15	1.48
	Consumers		2,073,000	0.69	0.58	0.16	1.48	2.22
32. Duck (other than roasted and preserved duck)	All respondents	g	5,372,000	0.98	0.00	0.00	3.60	6.25
	Consumers		2,396,000	2.20	0.72	0.36	6.25	10.71
33. Marinated chicken feet	All respondents	g	5,373,000	0.79	0.19	0.00	2.96	5.00
	Consumers		2,709,000	1.57	0.58	0.19	5.00	8.57
34. Pig offal	All respondents	g	5,382,000	1.09	0.00	0.00	4.00	8.00
	Consumers		2,626,000	2.24	0.69	0.23	8.00	12.86
35. Beef offal	All respondents	g	5,382,000	1.04	0.00	0.00	4.50	7.50
	Consumers		2,339,000	2.39	0.86	0.22	7.50	12.86
36. Chicken offal	All respondents	g	5,381,000	0.50	0.00	0.00	2.50	3.13
	Consumers		1,808,000	1.49	0.72	0.18	6.25	8.33
37. Goose/ duck offal	All respondents	g	5,380,000	0.13	0.00	0.00	0.49	1.33
	Consumers		1,022,000	0.71	0.38	0.10	2.47	3.33
38. Dried oysters	All respondents	g	5,379,000	0.29	0.12	0.00	0.83	1.79
	Consumers		3,292,000	0.47	0.24	0.06	1.25	2.08
39. Cooked oysters (other than dried oyster)	All respondents	g	5,380,000	0.50	0.00	0.00	1.75	3.45
	Consumers		2,563,000	1.05	0.50	0.17	3.50	5.83
40. Raw oysters	All respondents	g	5,384,000	0.43	0.00	0.00	1.92	2.96
	Consumers		1,687,000	1.36	0.77	0.19	3.95	5.71
41. Mussels	All respondents	g	5,381,000	0.43	0.00	0.00	1.44	2.47
	Consumers		2,365,000	0.98	0.48	0.24	2.47	4.17
42. Bloody cockles	All respondents	g	5,382,000	0.06	0.00	0.00	0.19	0.49
	Consumers		678,000	0.48	0.19	0.10	1.48	1.97
43. Clams	All respondents	g	5,383,000	0.38	0.19	0.00	1.33	2.00
	Consumers		2,947,000	0.69	0.29	0.10	2.00	3.33

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Table 13, (contd.). Weighted daily consumption of FFQ items: mean, median, and 5th, 95th and 97.5th percentiles, in g or ml by all respondents and consumers only

Food item*		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
44. Whelk/ conch	All respondents	g	5,367,000	0.14	0.00	0.00	0.48	0.74
	Consumers		1,807,000	0.41	0.14	0.05	1.00	2.86
45. Geoduck clams	All respondents	g	5,375,000	0.16	0.00	0.00	0.50	0.92
	Consumers		2,518,000	0.34	0.14	0.07	0.96	1.48
46. Lobster	All respondents	g	5,387,000	0.83	0.43	0.00	2.59	3.75
	Consumers		3,781,000	1.18	0.86	0.22	3.00	4.44
47a. Freshwater hairy crab (peak season)	All respondents	g	5,383,000	2.25	0.00	0.00	6.53	13.07
	Consumers		1,773,000	6.82	3.27	1.63	20.00	35.00
47b. Freshwater hairy crab (annual)	All respondents	g	5,383,000	0.92	0.00	0.00	2.68	5.37
	Consumers		1,773,000	2.80	1.34	0.67	8.22	14.38
48. Coral fish	All respondents	g	5,374,000	1.22	0.25	0.00	5.71	10.00
	Consumers		2,956,000	2.22	0.77	0.19	7.56	12.60
49. Canned tuna	All respondents	g	5,370,000	1.04	0.00	0.00	3.85	7.71
	Consumers		2,279,000	2.44	0.89	0.18	8.72	15.42
50. Cooked tuna	All respondents	g	5,367,000	0.06	0.00	0.00	0.19	0.49
	Consumers		496,000	0.61	0.19	0.10	1.73	2.86
51. Cooked salmon	All respondents	g	5,385,000	0.90	0.00	0.00	3.73	6.00
	Consumers		1,953,000	2.49	0.86	0.43	7.50	15.00
52. Swordfish	All respondents	g	5,342,000	0.14	0.00	0.00	0.58	1.00
	Consumers		856,000	0.89	0.29	0.29	2.50	5.00
53. Shark meat	All respondents	g	5,380,000	0.07	0.00	0.00	0.00	0.77
	Consumers		221,000	1.59	0.77	0.19	6.67	11.43
54. Rabbit fish	All respondents	g	5,381,000	1.32	0.00	0.00	5.42	10.83
	Consumers		2,084,000	3.41	1.25	0.31	11.22	21.67
55. Turbot	All respondents	g	5,368,000	1.07	0.00	0.00	3.69	6.42
	Consumers		1,977,000	2.92	0.96	0.37	9.49	16.04
56. Bombay duck	All respondents	g	5,374,000	1.53	0.00	0.00	5.83	10.36
	Consumers		2,153,000	3.83	1.34	0.34	11.67	25.20
57. Mackerel	All respondents	g	5,380,000	1.72	0.34	0.00	5.83	11.67
	Consumers		2,937,000	3.15	1.34	0.34	11.67	20.00
58. Sardine	All respondents	g	5,380,000	0.47	0.00	0.00	1.73	2.92
	Consumers		2,045,000	1.24	0.67	0.29	3.50	7.29

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Table 13, (contd.). Weighted daily consumption of FFQ items: mean, median, and 5th, 95th and 97.5th percentiles, in g or ml by all respondents and consumers only

Food item*		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
59. Dried fish	All respondents	g	5,383,000	0.19	0.00	0.00	0.50	1.25
	Consumers		1,977,000	0.51	0.14	0.05	1.25	2.50
60. Shark fin	All respondents	g	5,347,000	0.33	0.19	0.00	1.23	1.67
	Consumers		3,488,000	0.50	0.33	0.08	1.23	1.67
61. Dried shrimps	All respondents	g	5,380,000	0.23	0.05	0.00	0.71	1.25
	Consumers		3,734,000	0.33	0.10	0.02	0.83	1.43
62. Dried cuttlefish/ squid	All respondents	g	5,377,000	0.26	0.00	0.00	0.33	0.56
	Consumers		2,048,000	0.67	0.10	0.02	0.72	1.00
63. Fish maw	All respondents	g	5,381,000	0.76	0.34	0.00	2.92	5.00
	Consumers		3,367,000	1.21	0.50	0.17	4.67	5.83
64. Seaweeds (not including Snack type seaweeds)	All respondents	g	5,370,000	0.62	0.17	0.00	2.92	5.00
	Consumers		3,411,000	0.97	0.34	0.08	2.92	5.00
65. Octopus, cuttlefish, squid ball	All respondents	g	5,373,000	3.56	0.82	0.00	14.17	24.29
	Consumers		3,924,000	4.87	2.10	0.41	18.21	24.29
67. Salmon sashimi	All respondents	g	5,385,000	1.23	0.19	0.00	5.00	8.33
	Consumers		2,991,000	2.22	0.83	0.19	8.33	11.43
68. Tuna sashimi	All respondents	g	5,386,000	0.48	0.00	0.00	2.47	3.33
	Consumers		1,998,000	1.29	0.49	0.19	5.00	6.67
69. Raw shrimp sashimi	All respondents	g	5,386,000	0.27	0.00	0.00	1.25	2.14
	Consumers		1,794,000	0.80	0.37	0.07	3.13	4.29
70. Other seafood sashimi	All respondents	g	5,380,000	0.53	0.00	0.00	2.50	5.00
	Consumers		2,091,000	1.36	0.49	0.19	5.00	8.33
72. Salmon sushi	All respondents	g	5,369,000	2.44	0.72	0.00	10.71	18.75
	Consumers		3,000,000	4.36	1.85	0.36	16.07	21.43
73. Tuna sushi	All respondents	g	5,368,000	1.17	0.00	0.00	6.25	10.00
	Consumers		1,967,000	3.19	1.85	0.36	12.50	18.75
74. Eel sushi	All respondents	g	5,372,000	1.20	0.00	0.00	5.83	10.00
	Consumers		2,227,000	2.90	1.34	0.34	10.00	15.00
75. Other fish sushi	All respondents	g	5,373,000	1.24	0.00	0.00	5.83	10.00
	Consumers		1,988,000	3.36	1.73	0.34	11.67	17.50
76. Other seafood sushi (other than fish sushi)	All respondents	g	5,371,000	1.51	0.00	0.00	5.83	11.67
	Consumers		2,399,000	3.39	1.73	0.34	11.67	17.50
77. Other sushi	All respondents	g	5,370,000	1.40	0.00	0.00	5.83	11.67
	Consumers		2,502,000	3.00	1.34	0.34	11.67	14.58

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Food item*		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
78. Quail eggs	All respondents	g	5,388,000	0.11	0.00	0.00	0.49	0.96
	Consumers		1,169,000	0.50	0.19	0.10	1.67	2.86
79. Yoghurt	All respondents	g	5,388,000	3.38	0.00	0.00	12.50	37.50
	Consumers		1,915,000	9.52	1.44	1.44	42.86	75.00
80. Prawn crackers	All respondents	g	5,378,000	0.67	0.00	0.00	2.86	5.71
	Consumers		2,627,000	1.38	0.38	0.04	5.71	11.43
81. Seaweed (pre-packed, snack type)	All respondents	g	5,378,000	0.04	0.00	0.00	0.16	0.33
	Consumers		2,698,000	0.09	0.02	0.01	0.33	0.63
82. Chewing gums	All respondents	g	5,350,000	0.79	0.03	0.00	4.20	7.00
	Consumers		3,022,000	1.40	0.28	0.03	5.60	8.40
83. Dried fruits	All respondents	g	5,374,000	0.33	0.00	0.00	1.25	2.50
	Consumers		2,496,000	0.71	0.14	0.04	2.50	6.25
84. Chinese preserved fruits	All respondents	g	5,380,000	0.57	0.00	0.00	1.71	4.29
	Consumers		2,345,000	1.30	0.25	0.03	4.29	8.57
85. Glace fruits	All respondents	g	5,382,000	0.42	0.00	0.00	1.23	2.08
	Consumers		1,788,000	1.26	0.24	0.12	3.57	7.14
86. Dried meat	All respondents	g	5,385,000	0.58	0.17	0.00	1.73	2.92
	Consumers		3,042,000	1.03	0.34	0.08	2.92	5.00
87. Squid snack	All respondents	g	5,384,000	0.09	0.00	0.00	0.40	0.69
	Consumers		1,955,000	0.26	0.12	0.03	0.89	1.67
88. Grilled fish snack	All respondents	g	5,383,000	0.20	0.00	0.00	0.99	1.33
	Consumers		1,385,000	0.76	0.38	0.08	2.67	3.95
89. Fermented bean curd	All respondents	g	5,345,000	0.39	0.14	0.00	1.48	2.50
	Consumers		3,786,000	0.54	0.17	0.04	2.14	3.75
90. Fermented red bean curd	All respondents	g	5,307,000	0.11	0.00	0.00	0.49	0.67
	Consumers		2,446,000	0.25	0.10	0.03	0.67	1.67
91. Fermented black soybean	All respondents	g	5,308,000	0.47	0.10	0.00	2.14	3.75
	Consumers		3,825,000	0.65	0.21	0.03	2.14	4.29
92. Soy sauce	All respondents	ml	5,229,000	8.33	7.50	0.25	22.50	30.00
	Consumers		5,142,000	8.48	7.50	0.50	23.57	30.00
93. Oyster sauce	All respondents	g	5,297,000	2.91	0.63	0.00	15.00	20.10
	Consumers		4,165,000	3.70	1.07	0.07	15.00	23.57
94. Honey	All respondents	g	5,363,000	1.21	0.19	0.00	5.71	10.00
	Consumers		3,077,000	2.10	0.49	0.10	10.00	20.00

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Food item*		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
95. Table top (artificial) sweetener	All respondents	g	5,368,000	0.03	0.00	0.00	0.08	0.29
	Consumers		599,000	0.29	0.05	0.01	1.00	2.00
96. Olive oil (table use)	All respondents	g	5,360,000	0.44	0.00	0.00	2.50	5.00
	Consumers		1,264,000	1.88	0.29	0.02	10.00	10.00
97. Dried dates	All respondents	g	5,378,000	0.76	0.00	0.00	4.29	7.86
	Consumers		1,409,000	2.91	1.14	0.10	11.43	20.00
98. Dried bean curd	All respondents	g	5,377,000	0.98	0.00	0.00	4.17	7.14
	Consumers		1,983,000	2.66	0.72	0.24	12.50	16.67
99. Vegetarian foods (wheat gluten)	All respondents	g	5,381,000	0.66	0.00	0.00	2.50	5.00
	Consumers		2,618,000	1.35	0.48	0.19	5.00	8.57
100. Tiramisu	All respondents	g	5,378,000	1.02	0.19	0.00	2.86	6.67
	Consumers		2,710,000	2.02	0.77	0.38	6.67	11.43
101a. Sweetened fruits and vegetables (peak season)	All respondents	g	5,363,000	2.42	0.00	0.00	9.33	20.00
	Consumers		1,813,000	7.14	4.67	1.17	20.00	40.00
101b. Sweetened fruits and vegetables (annual)	All respondents	g	5,363,000	0.20	0.00	0.00	0.77	1.64
	Consumers		1,813,000	0.59	0.38	0.10	1.64	3.29
102a. Melon seeds (peak season)	All respondents	g	5,362,000	4.60	0.30	0.00	17.01	26.46
	Consumers		2,793,000	8.83	2.33	0.40	23.33	40.00
102b. Melon seeds (annual)	All respondents	g	5,362,000	0.38	0.02	0.00	1.40	2.17
	Consumers		2,793,000	0.73	0.19	0.03	1.92	3.29
103a. Crispy triangle (peak season)	All respondents	g	5,381,000	3.14	0.00	0.00	10.50	15.75
	Consumers		2,187,000	7.73	5.25	1.73	21.00	35.36
103b. Crispy triangle (annual)	All respondents	g	5,381,000	0.26	0.00	0.00	0.86	1.29
	Consumers		2,187,000	0.64	0.43	0.14	1.73	2.91
104a. Sesame ball (peak season)	All respondents	g	5,387,000	1.59	0.00	0.00	17.50	17.50
	Consumers		592,000	14.46	10.71	2.98	42.86	52.50
104b. Sesame ball (annual)	All respondents	g	5,387,000	0.13	0.00	0.00	1.44	1.44
	Consumers		592,000	1.19	0.88	0.24	3.52	4.32
105a. Chinese New Year Pudding (peak season)	All respondents	g	5,372,000	18.70	11.73	0.00	59.85	90.00
	Consumers		3,794,000	26.48	17.50	5.78	75.00	117.86
105b. Chinese New Year Pudding (annual)	All respondents	g	5,372,000	1.54	0.96	0.00	4.92	7.40
	Consumers		3,794,000	2.18	1.44	0.47	6.16	9.69
106a. Glutinous rice dumpling (peak season)	All respondents	g	5,342,000	33.76	29.17	0.00	125.00	250.00
	Consumers		4,431,000	40.70	29.17	7.29	125.00	250.00

*Number represents the FFQ food item question number.
Note that values of 0.00 denote an amount less than 0.005 Number of individuals was rounded to the nearest thousand

Table 13, (contd.). Weighted daily consumption of FFQ items: mean, median, and 5th, 95th and 97.5th percentiles, in g or ml by all respondents and consumers only

Food item*		Unit	Number	Mean	Median	5th percentile	95th percentile	97.5th percentile
106b. Glutinous rice dumpling (non-peak season)	All respondents	g	5,347,000	1.48	0.00	0.00	6.72	8.33
	Consumers		1,726,000	4.60	2.61	0.65	11.79	20.83
106c. Glutinous rice dumpling (annual)	All respondents	g	5,300,000	4.14	2.40	0.00	13.81	21.52
	Consumers		4,579,000	4.80	2.40	0.60	19.83	22.95
107a. Traditional mooncake (peak season)	All respondents	g	5,379,000	10.39	3.89	0.00	40.00	50.00
	Consumers		4,371,000	12.79	3.89	2.02	50.00	62.22
107b. Traditional mooncake (annual)	All respondents	g	5,379,000	1.28	0.48	0.00	4.93	6.16
	Consumers		4,371,000	1.58	0.48	0.25	6.16	7.67
108a. Snowy mooncake (peak season)	All respondents	g	5,378,000	4.89	0.00	0.00	14.00	35.36
	Consumers		2,359,000	11.15	6.43	1.82	38.57	51.43
108b. Snowy mooncake (annual)	All respondents	g	5,378,000	0.60	0.00	0.00	1.73	4.36
	Consumers		2,359,000	1.37	0.79	0.22	4.76	6.34
109. Apple juice	All respondents	ml	5,347,000	8.02	0.00	0.00	35.71	71.43
	Consumers		2,554,000	16.79	4.79	1.20	71.43	125.00
110. Yoghurt drink	All respondents	ml	5,348,000	8.64	0.96	0.00	50.00	78.57
	Consumers		3,301,000	13.99	3.33	0.96	76.00	100.00
111. Isotonic sports drinks	All respondents	ml	5,359,000	14.86	0.00	0.00	71.43	142.86
	Consumers		2,145,000	37.11	11.33	2.40	170.00	267.14
112. Energy drink	All respondents	ml	5,347,000	0.62	0.00	0.00	0.96	3.33
	Consumers		337,000	9.87	2.40	0.96	35.71	57.14

*Number represents the FFQ food item question number.
Note that values of 0.00 denote an amount less than 0.005: Number of individuals was rounded to the nearest thousand

(vi) Food behaviors and knowledge data from FBQ

General diet behavior

91. The median and mode duration of the FBQ interview was 15 minutes. About 5% of the FBQ respondents were assisted by others to complete the interview. The results presented in this section focus on some key eating behaviors reflecting the population's food consumption over the past 12 months including the frequency of eating buffet meals, eating meat and poultry fat, taking nutritional supplements and Chinese herbal medicines, reading nutrition labels, consuming fruits and vegetables and washing fruits or vegetables before consumption.

92. About one third of the population (33.2%) enjoyed a buffet meal less than once per year, while the next largest group (23.7%) had a buffet meal 2-3 times per year. About 3.2% had one of these meals at least once per month.

93. Information on the population's habit of consuming meat fat and poultry fat and skin was captured. Concerning the habit of consuming meat fat, overall, 43.5% of Hong Kong adults consumed no meat fat and slightly more (46.9%) consumed 'some' meat fat. Only 8.1% consumed all the meat fat. For the consumption of poultry skin and fat, more than half (54.5%) of the population consumed no skin or fat, while 32.9% consumed some skin and fat and 11.0% consumed all the poultry skin and fat. The women were more likely to consume less of the meat fat and poultry skin and fat than their male counterparts, with more than half of the women and more than one-third of the men not eating meat fat or poultry fat or skin when consuming these meats; and the younger adults were more likely to eat more of these than the elders.

94. Overall, about one-fifth (18.7%) of the population took nutritional supplements at least once a week, with more females consuming these than the males in both the younger and elder groups. Vitamins, taken by 13.2% of the population, and minerals taken by 4.8% of the population, were the most common types taken. The responses included those reporting taking one or more specific vitamins and minerals as well as those responding 'vitamins' or 'minerals' without indicating which nutrients in each category were in the nutrient supplement preparation. Also, a fifth (20.1%) of the population took Chinese or other herbal medicines, most commonly either prescribed by a Chinese herbalist or purchased without a prescription.

95. The Survey also collected the population's habit of looking for nutrition information on food labels when they purchased packaged biscuits, bread, canned food and beverages. For each of these foods, only about 1% of the population did not buy these products. Generally, for each of these foods, about 40% of the population 'never' looked for this information, while about 30% did this often or always.

96. Concerning how often the population has fruits and vegetables washed before consumption, the results showed this practice almost universal, with the vast majority (96%) often or always doing this.

Diet-disease and food-related knowledge

97. Questions on diet-disease and food-related knowledge were queried only to respondents aged 20 through 59 years and thus only reflect the situation for the approximately two-thirds of the population (*n*=4,387,000). These FBQ questions concerned factors important to respondents when food shopping, nutrition label use, recommended numbers of fruit and vegetable servings, and nutrient/disease relationships.

98. Virtually all of the population (95.7%) did buy food at least 'rarely', with more than half of these food shoppers buying food often or always. Women purchased food more frequently than did the males, with more than two-thirds (68.9%) of the women 'often/always' did this, as compared to only less than half (46.3%) of the males.

99. The food shoppers aged 20 to 59 were further asked to rank the importance of six factors (food safety, how well the food keeps, taste, nutrition, price and ease of

preparation) when buying food. Four importance rankings were used, from 'very important' to 'not important at all', and the results are shown in Figures 4 and 5. It was found that 57.7% of the male and 68.7% of the female population considered 'food safety' to be 'very important'. Somewhat fewer, but again more than half of the males and females, also found 'how well the food keeps' to be 'very important'. Less than half of the population found other factors queried, i.e. taste, nutrition, price and ease of preparation, to be "very important". 'Ease of preparation' was considered 'not too important' or 'not at all important' by 34.2% of the population.

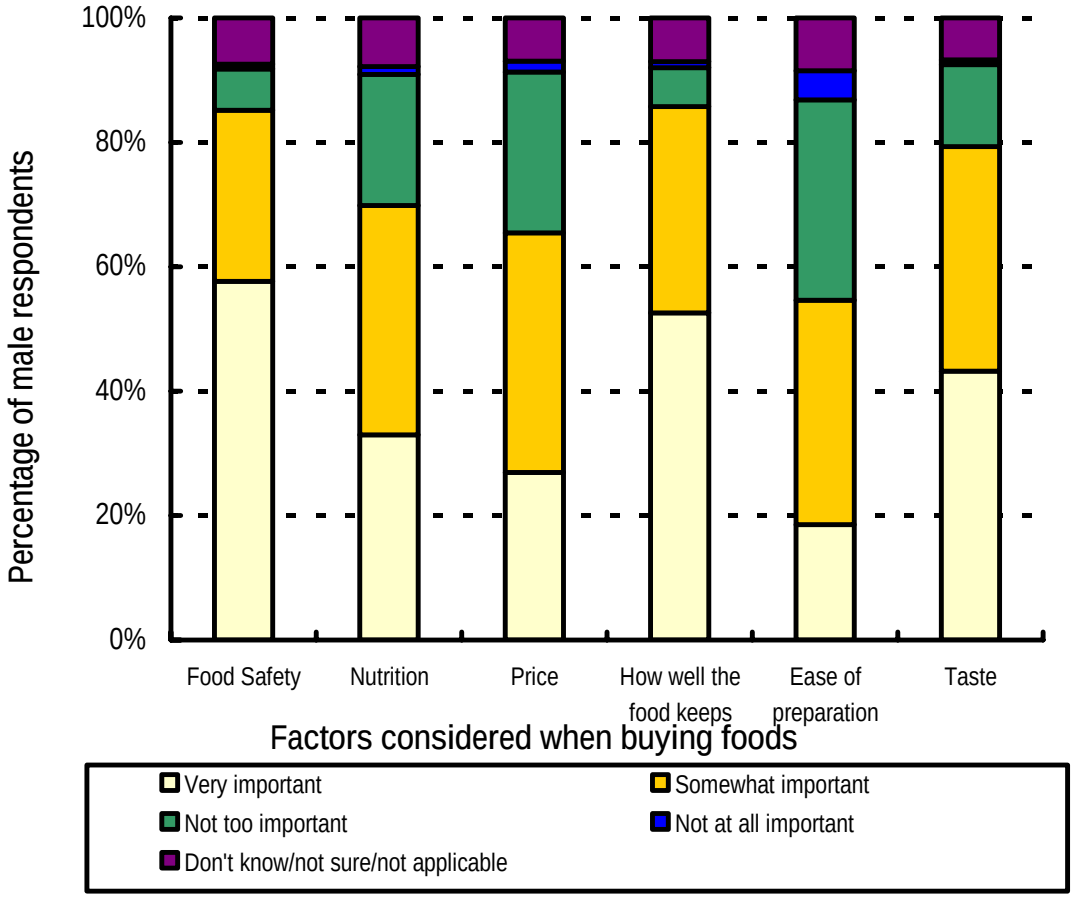

Figure 4. Importance of six factors considered by males aged 20 to 59 when buying food

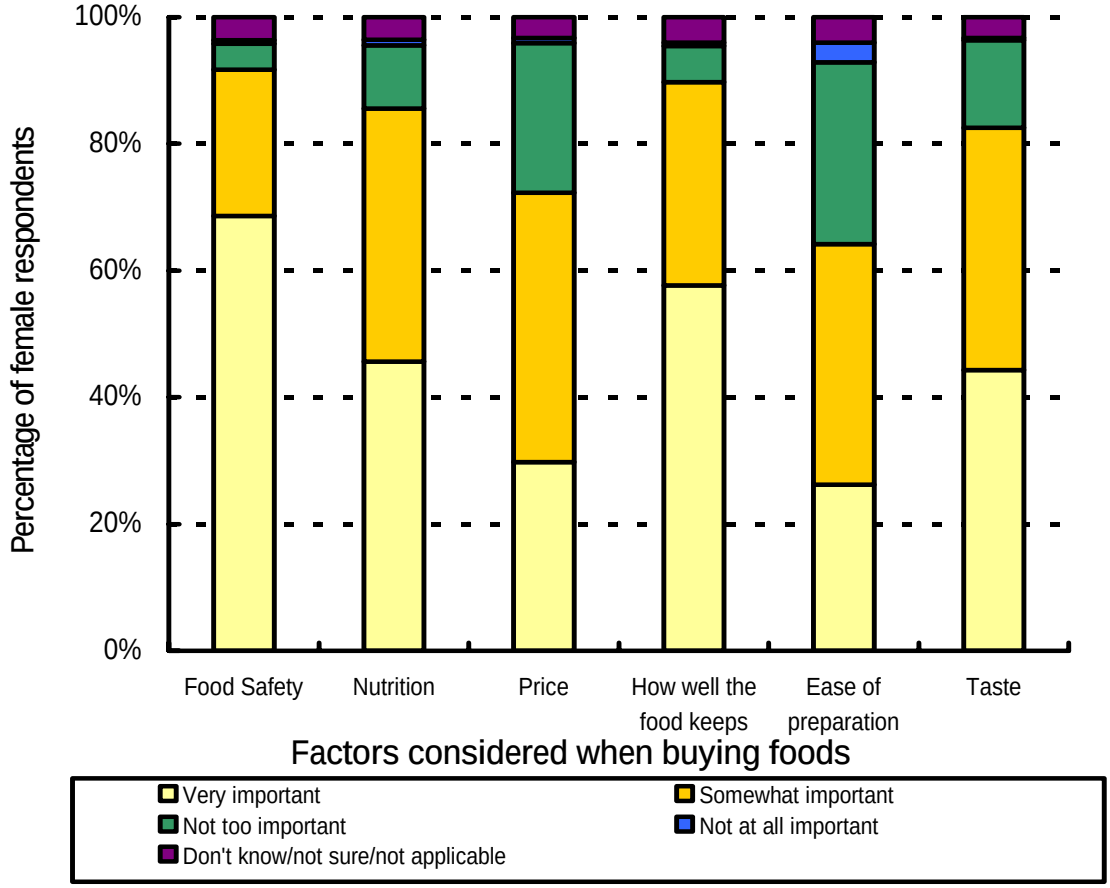

Figure 5. Importance of six factors considered by females aged 20 to 59 when buying food

100. These same food shoppers were also asked how often, if ever, did they read nutrition information in food labels when the information was available. They could choose from never, rarely, sometimes or often/always. However, 38.6% of the population never did this, while 10.3% did this rarely. Only 18.9% population often/always read nutrition information when available, and 27.4% would read it sometimes. Among the population having the habit of reading nutrition information available to them when purchasing food, 69.6%, 68.7% and 69.0% would always or sometimes look for information on cholesterol, energy and sugar respectively. Only 57.4% of them would look for information on carbohydrate, and 54.2% would look for information on salt or sodium.

101. The population's beliefs about the number of servings of fruits (the size of a medium orange or a handful of grapes) and number of servings of vegetables (the size of a medium rice bowlful of cooked vegetables) that should be eaten for good health were also studied. About 10% of the males and about 8% of the females either did not know, were not sure or refused to respond. Among the males, 41.2% believed that 1 serving of fruit was enough, and similarly less than half (48.4%) thought that 2 or more of servings of fruit were needed daily. Similarly, 46.9% of males thought that two or more servings of vegetables were required, while 44.5% of the males thought that only one serving or less of vegetables was needed. Among the females, however, 62.7% believed that 2 or more servings of fruits were required, and a similar proportion (61.1%) thought that 2 or more of these servings of vegetables should be

eaten daily, with only 32.3% believing that only one or less of these servings was needed. According to the Hong Kong Food Pyramid for Adults recommendations, the Department of Health (DH) Behavioral Risk Factor Survey, and the "2+3 campaign", 1 to 1-1/2 bowls of cooked vegetables should be consumed daily, and ½ cup or bowl of vegetables, representing about 80 g of cooked vegetables, is considered one serving of vegetables. The Survey questionnaires were developed, however, before these recommendations were popularized, so the population was not queried about half-bowl increments.

102. Finally, the population's knowledge of the relationship between diseases or health problems and key nutrients (fat, fiber, sodium, calcium, cholesterol, sugar) or by being overweight was studied. The questions concerned were open-ended unaided knowledge questions. The population was most knowledgeable, with more than 50% responding correctly, about calcium and bone problems, sugar and diabetes, and fiber and digestive problems, with just fewer than 50% aware of a relationship between dietary fat and heart problems, being overweight and heart problems, and dietary cholesterol and heart problems. Their knowledge about other significant diet/disease relationships was much more modest. Also, as with many of the FBQ questions, the females generally were able to identify correct diseases or health problems more frequently than the males.

DISCUSSION AND CONCLUSION

Overall achievements and outcomes of the Survey

103. This Survey of 5,008 Hong Kong residents aimed to obtain up-to-date food consumption information, including the types and amounts of food consumed, among individuals in Hong Kong; collect body weight measurements among individuals in Hong Kong; identify common dishes consumed among individuals in Hong Kong; and develop recipes for the common dishes identified. As described, all objectives were achieved through the 24-hr dietary recall, FFQ and FBQ interviews and subsequent data management and analyses. Besides the food consumption objectives, a Food and Recipe Database with 1,429 consumed foods and 1,591 recipes was also developed and compiled.

104. Baseline information on food consumption amounts were collected and analyzed. The main findings are presented in this report. These will be useful in risk assessment work, including total diet studies. This report also summarized findings, including the measured weights of the population and the food behavior and knowledge information. These will be useful for public health policy formulation and for epidemiological and clinical work of a wide variety of professionals.

Key findings

105. Concerning food consumption, the average of total daily consumption of solid food was found to be about 1.12 kg. Liquid food intake was about 1,860 ml per day on average, of which 57.3% (1,065.62 ml) was from water. Fluids intake, which include water and other non-alcoholic beverages, soup, milk and milk beverages, but exclude water used for cooking, was found to be 1,787.11 ml and contributed to about 96% of the total liquid food intake. For the cereals and grain products, 488.75 g/day was consumed with 60.8% of which was from the rice subgroup. However, whole grain consumption was minimal, approximately making up less than 2% of the total grains and cereals consumption. Although there is no quantitative recommendation for these in Hong Kong, there are recommendations promoting more whole grain consumption, with the DH recommending consuming whole grains as the major component of each meal, and the CFS recommending maximizing dietary fiber intake by selecting whole grain products whenever possible(10, 11).

106. Concerning the questions on how many servings of fruits and vegetables were needed for good health, most (62.7%) of the females believed that 2 or more servings of fruits were needed, and a similar proportion (61.1%) thought that 2 or more bowls of vegetables should be eaten daily, while 32.3% thought that one bowl or less of vegetables was adequate. However, only 48.4% of the males believed that 2 or more servings of fruits should be eaten, and similarly only 46.9% thought that 2 or more bowls of vegetables were required, while 44.5% thought that one bowl or less of vegetables was needed. According to the recommendations, two servings of fruits, and 1 to 1-1/2 bowls of vegetables should be eaten per day.

107. These patterns of consumption are associated with a non-communicable disease morbidity and mortality burden, which our society is already bearing (9), as well as some of our respondents. From this Survey, it was found that more than half

(54.2%) of the male population and more than a third (40.6%) of the female population were overweight or obese according to the WHO proposed classification of weight by BMI in adult Asians (5). These findings were consistent with Hong Kong Behavioural Risk Factor Survey April 2007 (12), which revealed that a higher proportion of males (50.3%) than females (28.0%) were also classified as overweight and obese. Hypertension was the most commonly reported diagnosed diet-related disease with 12.5% of the population having this problem, while diabetes was affecting 4.7% of the population, according to self-reported data collected in this Survey.

108. However, it should also be noted that fully one quarter (25.6%) of the women aged 20-29 were underweight. The implications of this with respect to future osteoporosis risk should be considered. The WHO notes that while firm evidence is lacking, maintaining a healthy body weight is prudent and may prove helpful in terms of reducing fracture risk (9), and that excessive leanness, below a BMI threshold of 19 for Europeans, is a risk factor for hip fracture (13). However, it is not yet known if this applies to other populations. Also, as stated by the Centre for Health Protection of the DH, the Hospital Authority (HA) reported that among people aged 65 or older, the number of episodes of in-patient discharges and deaths attributed to hip fractures in HA hospitals increased 18.9% between 2001 and 2006, although increasing incidence has been previously documented as well (14). This underweight, coupled with the low fruit and vegetable consumption found, might together contribute to increased risk of osteoporosis later, as one local study has found that low fruit and vegetable consumption in postmenopausal women was associated with lower bone mineral density (15, 16).

109. Also, 'food safety' and 'how well the food keeps' were considered 'very important' by more than half of males and females when purchasing food. Therefore, products perceived as safe and that will keep well will be those most welcomed by consumers. If they also taste good and are perceived as nutritious, these qualities will be further pluses.

110. However, some other areas of their food knowledge and behavior showed a general lack of awareness and lack of healthy behaviors. In particular, the population lacked awareness of common nutrient/disease relationships and also paid little attention to nutrition labeling. Finally, concerning common diet/nutrient and disease relationships, the population's awareness was only modest. This awareness was, however, consistent with their habit of seeking nutrient information on the labels, which involved some of the same nutrients or other information, e.g., cholesterol, calories and sugar, whose information was most referred to on labels. This indicated a possible association of label reading behavior and higher awareness in general of diet/disease relationships. Although more than half of the population was aware of the relationship between calcium and bone problems, sugar and diabetes and fiber and digestive problems, just under half was aware of heart problems being associated with dietary fat and cholesterol and being overweight. There were only relatively lower levels of awareness of other queried diet/disease relationships.

111. These relationships were perhaps noted because most of the more frequently mentioned ones have received attention in the media environment in advertising, nutrition labels or accompanying food package information or claims, media stories

and other channels of public communications such as government health campaigns. However, other relationships about which the population was less aware, e.g., those for diet and cancers, salt and hypertension should be noted. This information, along with the knowledge that certain segments of the adult population do embrace certain health-driven eating behaviors, such as not eating meat fat or poultry skin, can inform the designers of non-communicable disease prevention campaigns to prioritize messages and target specific subgroups with specific diet/disease information. For example, gender differences were found in all aspects studied, i.e., food consumption, BMI patterns, and food behavior.

Strengths of the Survey

112. The strengths of the methods used in the Survey should be noted. This Survey utilized a sampling method that resulted in territory-wide coverage and the quota sampling enabled enough respondents to be drawn from each age-gender group to enable conclusions to be drawn about their food consumption with desired precision. Additionally, tested, appropriate methods were used to minimize non-response, e.g., the use of advance letters, repeated recruitment visits, callbacks to make missed appointments, and incentives for completing the Survey. Finally, tested methods were also used to minimize and account for errors of measurement that may have arisen from question wording, interview arrangements or other aspects of administration. A pilot test was conducted, and the well-trained and supervised interviewers were able to probe for required information, even among less literate or less interested respondents.

Limitations of the Survey

113. The data in this Survey are subject to a number of limitations, namely (i) low response, (ii) seasonal variations in food intake, (iii) reported food and recipe consumptions, and (iv) body weight measurement.

Low response

114. All surveys fall short of perfection, and it is important to minimize the sources of errors such as a low response rate. The response rate of this Survey (48.1%) was not high due to a number of reasons. First, there was a large survey burden, in that participation required three very detailed interviews, the longest of which was around 45 min in length about a topic not of interest to everyone. This burden also probably affected the responses from the working population. Additionally, there was generally not enough public awareness of the Survey or its importance, in part because this was the first population-based food consumption survey in Hong Kong. However, efforts to publicize it through posters, exhibitions, etc., were made. Third, security issues made private housing owners less cooperative, limiting interviewer access to this group of respondents. Finally, young people, who make up a smaller part of the population, and especially males, were not easy to reach, while there was also a proportionately larger eldest group targeted, which also makes up a small proportion of the population. The lower response rate for certain groups led to the results that the private housing residents were under-represented and homemakers over-represented. Readers should thus bear these points in mind when interpreting the data.

Seasonal variation in food intake

115. Although it would have been ideal to achieve an even distribution of cases throughout the four quarters of the year in order to more completely understand the seasonal variation in food intake, a fairly even distribution was achieved. The distribution of cases ranged from a 22.0% in the winter quarter (December through February) to 27.1% during the summer months (June through August). As a result, the degree of over- or under-sampling should not seriously compromise the quality of information collected for any quarter. It is possible, however, that the break in interviewing for one week during the Lunar New Year holiday caused the consumption of some festival or seasonal foods consumed especially at that time to be underestimated.

Reported food and recipe consumption

116. Respondents often were not expected to and did not know or could not provide recipes for the mixed foods eaten; hence the development and use of recipes, as well as subsequent calculations, are necessarily based on assumptions about the quantities and types of ingredients in the foods. Certain estimates for some items were based on relatively low numbers of consumers of those items and may thus be subject to larger sampling errors. As with all food consumption surveys, the imprecision in quantities of food was affected by respondents' abilities to estimate amounts consumed and imperfect memory. It may also have been subject to self-reporting bias; some studies show underreporting, especially among obese people (17). However, efforts were taken to minimize this imprecision in the use and local adaptations of standard methodology and the training of the food consumption interviewers.

Body weight measurement

117. Although body weights of the respondents were measured weights, the heights were only reported heights which have been shown to be inaccurate in overseas surveys, which may also have affected the BMI calculations. However, notwithstanding, our reported heights and our BMI findings showed similar trends as other local surveys (18, 19). The WHO proposed classification of weight by BMI in adult Asians published in 2000 (5) is no longer the newest WHO recommendations. In 2004 other recommendations were made based on further examination of data from different Asian regions and countries (20). However, the comparisons for this report were based on the earlier suggested cutoffs as these are the cutoffs adapted for use in Hong Kong in studies by DH at the time of the Survey. The adoption of the newer suggestions might enable the use of more finely tuned public health action levels for individuals at different degrees of risk after obtaining more local epidemiological evidence of the health risks at different BMI levels.

Conclusions and recommendations

118. The results of this Survey have strong implications for facilitating and initiating public health food safety and nutrition policy and multilevel action in Hong Kong, such as the facilitation of risk assessment activities, as well as the development of food safety programs, diet-related disease prevention programs and measurement of intervention effects and other epidemiological work. Based on the results, it is

suggested that to give the Hong Kong adults the best chance of a healthy and active life and reduce our non-communicable disease burden, aggressive strategies to promote healthier, more optimal diets will be important. Without efforts that should attempt to normalize the healthy behavior and denormalize the less healthy food behaviors, our increasingly 'health conscious' public will be drawn in less healthy directions by the food misinformation that flourishes in our environment.

119. The nutrition labeling scheme in Hong Kong is a step in the right direction. Nutrition information on food labels is a tool for the public to understand the composition of the food they consume which is an important part of understanding the strong relationship between diets and health and the need to choose a healthier diet. However, from the results of this Survey, people will have to be much more motivated to use the labels, as well as be effectively and appropriately educated in how to use them. Judging by the high prevalence of overweight and obesity, people will need to become aware of the energy densities of the different foods, for which the nutritional labeling will also be helpful.

120. On the other hand, promotion of balanced diet should continue. Specific promotions using effective communications promoting whole grain could be considered, while also continuing to promote the '2 fruits plus 3 vegetables' message.

121. The data provided by this Survey should not only support the development of clear, concise, evidence-based food guidance and its promotion, but also for the development of educational materials, assessments related to food marketing and risk assessment work. For example, mean, median intakes and intake distributions may be helpful in understanding appropriate serving sizes. Any ongoing healthy eating promotions and future labeling programs in restaurants may be helped by the extensive new recipe data base developed as part of this Survey, as these could be a basis for designing healthier recipes/dishes, for example as has been accomplished in Australia, in which nutrition criteria for recipes promoting fruits and vegetables have been established (21).

122. Estimates of food consumption and other food-related parameters are not stable over time. It is suggested that food consumption habits be monitored every five to ten years to elaborate ongoing secular food consumption trends and evaluate any efforts to promote food safety and healthy eating as has been done in countries where such population-based food consumption surveys have been conducted over a period of decades (22). In future, perhaps surveys targeting specific age groups, such as the eldest or youngest groups might be considered to obtain adequate samples of these groups of interest. For example, since children and youth who are more susceptible to food risk have different food consumption behavior than adults, it will be worthwhile to conduct another food consumption survey targeting the younger generation under age 20 to capture their food consumption pattern, which in turn can facilitate risk assessment among this population group. Besides, as eating habits are developed during early childhood and youth, such a survey would enable evidence-based comprehensive life course healthy eating and non-communicable disease prevention strategies to be adopted for all age groups.

123. Special methods of over sampling of these groups could also be considered that might target them more heavily in districts in which higher proportions of these

groups reside. Going forward, the proportions of the elders will increase, so perhaps a future survey effort might be somewhat more successful in obtaining adequate numbers of this group.

124. In conclusion, much multi-disciplinary, multi-sectoral innovative action is needed to improve the food consumption patterns and food safety of the people of Hong Kong through development of effective interventions that can reach all members of society throughout life.

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