香港首個總膳食研究：礦物質
The First Hong Kong Total Diet Study: Minerals

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香港首個總膳食研究
The 1st HKTDS

- 香港首次進行
- 研究期：2010年至 2014年
- 研究目的：
  - 估計整體香港市民和不同人口組別從膳食攝入各種物質(包括污染物和營養素)的分量
  - 評估攝入這些物質對健康帶來的風險

- First time carrying out in HK
- Period: 2010-2014
- Objectives:
  - To estimate the dietary exposures of the HK population and various population subgroups to a range of substances, including contaminants and nutrients
  - To assess any associated health risks

第九號報告：礦物質
The 9th Report: Minerals

- 礦物質是促進身體生長、發育和維持身體正常功能的重要營養素
- 食物是一般人攝入礦物質的主要來源
- 攝入礦物質的分量不足或過多，都會對人體健康造成不良影響，但並不一定會引致臨床徵狀

- Minerals are important nutrients for growth, development and normal body functions
- Diet is the main source of minerals intake of ordinary adult
- Adverse health consequence on the human body can arise from inadequate or excessive intakes of minerals, but it may not lead to clinical symptoms

研究範圍 Scope

1. 硼
2. 鈣
3. 鈷
4. 銅
5. 鐵
6. 鎂
7. 錳
8. 鉬
9. 磷
10. 鉀
11. 硒
12. 鈉
13. 鋅

1. Boron
2. Calcium
3. Cobalt
4. Copper
5. Iron
6. Magnesium
7. Manganese
8. Molybdenum
9. Phosphorus
10. Potassium
11. Selenium
12. Sodium
13. Zinc

研究方法 Methodology

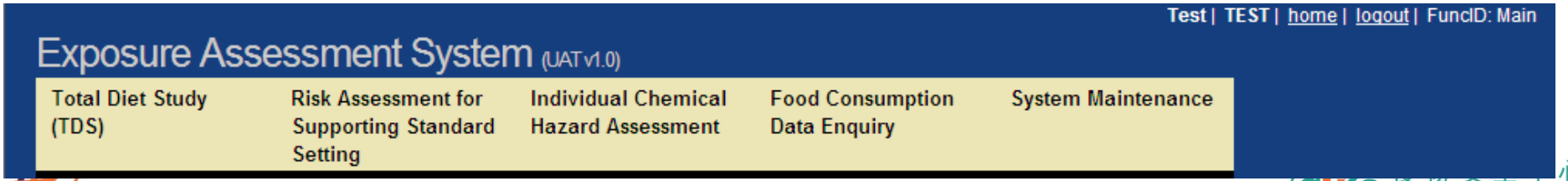
- **食物抽樣和處理**：2010年3月至2011年2月期間分4次進行
  - 抽取樣本，並處理至可食用狀態
  - 合共收集1800個樣本，並合併為600個混合樣本
- **化驗分析**：由食物研究化驗所進行
  - 150種食物的600個混合樣本
- **食物消費量數據來源**
  - 香港市民食物消費量調查

- **Food sampling and preparation:** 4 occasions from March 2010 to February 2011
  - Samples were collected and prepared as consumed
  - A total of 1800 samples were collected and combined into 600 composite samples
- **Laboratory Analysis:** by the Food Research Laboratory (FRL)
  - 600 composite samples of 150 food items
- **Food consumption data source**
  - Population-Based Food Consumption Survey (FCS)

膳食攝入量評估
Dietary exposure estimation

- 採用由內部研發名為攝入量評估系統(Exposure Assessment System)的網絡電腦系統進行
- 涉及食物對應處理和數據加權的工作
- 攝入量一般的市民：攝入量平均值
- 攝入量高的市民：攝入量第95百分位的數值

- Perform with the aid of an in-house developed web-based computer system called "EASY" (Exposure Assessment System)
- Involve food mapping and weighting of data
- Average: mean of intake level
- High consumer: 95th percentile of intake level



膳食營養素參考攝入量
Dietary Reference Intakes of Nutrient

鈣 Calcium

- 功能
  - 具有鞏固骨骼的功能
  - 在神經傳送、肌肉收縮和血液凝結方面扮演重要角色
- 富含鈣的食物
  - 奶類製品
  - 豆類及豆製品（如：豆腐）
  - 深綠色蔬菜

- Function:
  - Provide rigidity to the skeleton
  - Play roles in many metabolic processes such as nerve transmission, muscle contraction and blood clotting
- Food rich in calcium
  - dairy products
  - beans and soya products (e.g. beancurd)
  - dark green vegetables

鈣 Calcium (2)

- 成年市民(20-84歲)攝入量-
  - 一般的市民：每日430毫克
  - 攝入量高的市民：每日840毫克
- Dietary Intake of adult (aged 20-84) –
  - Average consumer: 430 mg/day
  - High consumer: 840 mg/day

鈣攝入量低於推薦攝入量的人口(%)

Population with dietary intake of Calcium below Recommended Nutrient Intake (RNI) (%)

性別 Gender	年齡組別 Age Group	世衛的推薦攝入量 RNI from WHO	人口(%) % of population
男性及女性 Male & Female	20-59	1000毫克/日 mg/day	> 90
	60-84	1300毫克/日 mg/day	

鈣 Calcium (3)

- 超過百分之九十的成年市民從膳食攝入鈣的分量低於推薦攝入量
- 缺乏鈣是引致骨質疏鬆症的其中一個重要因素
- 骨質在30多歲時達至頂峰，並於青壯年期維持在最高的水平。到近40歲，骨質的流失開始變得明顯。
- 成年市民從膳食攝入不足的鈣會增加患骨質疏鬆症的風險

- Dietary intake of calcium of more than 90% per cent of the adult population was below the Recommended Nutrient Intake
- Inadequate dietary intake of calcium is one of the important factors causing osteoporosis
- Bone mass reaches a peak in the mid-30s and the optimal bone mass is maintained during young adulthood. From around age 40, the loss of bone mass becomes obvious
- Inadequate dietary intake of calcium may increase the risk of developing osteoporosis in general adult population

鐵 Iron

- 功能：
  - 製造紅血球的必要元素
  - 是多個不同身體組織中重要酶系統的必要成分
- 富含鐵的食物
  - 深綠色蔬菜
  - 豆類及豆製品
  - 堅果

- Function:
  - essential element for making red blood cells
  - Serves as an integrated part of important enzyme systems in various tissues
- Food rich in iron
  - dark green vegetables
  - beans and soya products
  - nuts

鐵 Iron (2)

- 成年市民(20-84歲)攝入量-
  - 一般的市民：每日8毫克
  - 攝入量高的市民：每日17毫克

- Dietary Intake of adult (aged 20-84) –
  - Average consumer: 8.0 mg/day
  - High consumer: 17 mg/day

鐵攝入量低於推薦攝入量的人口(%)

Population with dietary intake of Iron below Recommended Nutrient Intake (RNI) (%)

性別 Gender	年齡組別 Age Group	中國營養學會的推薦攝入量 RNI from China Nutrition Society (CNS)	人口(%) % of population
男性 Male	20-84	12毫克/日 mg/day	> 80
女性 Female	20-49	20毫克/日 mg/day	
	50-84	12毫克/日 mg/day	

鐵 Iron (3)

- 超過百分之八十的成年市民從膳食攝入鐵的分量低於推薦攝入量
- 有可能引致貧血和免疫系統受損
- 年青女性及孕婦對鐵的需求較一般成年人為高，缺乏鐵的機會亦會較高

- Dietary intake of iron of more than 80% of the adult population was below the Recommended Nutrient Intake
- Pose certain health risks such as anaemia and reduced immune function
- Young women and pregnant women are more vulnerable to iron deficiency as their requirement of iron is much higher

鈉 Sodium

- 功能：
  - 人體內的主要電解質
  - 使細胞外液保持平衡

- Function:
  - major electrolyte in the body
  - helps in maintaining extracellular fluid balance

鈉 Sodium (2)

- 成年市民(20-84歲)攝入量-
  - 一般的市民：每日2.6克
  - 攝入量高的市民：每日4.9克

  (鈉的攝入量有可能被低估)

- 超過百分之六十的成年市民從膳食攝入鈉的分量超出世衛建議的攝入最高限量(每日2克)

- 攝入過量鈉可能會增加患高血壓的機會，從而增加患上中風及冠心病的風險。

- Dietary Intake of adult (aged 20-84) –
  - Average consumer: 2.6g/day
  - High consumer: 4.9g/day

  (Dietary intake of sodium may be under-estimated)

- Dietary intake of sodium of more than 60% of the adult population was above the recommended maximum intake level (2g/day) of the WHO

- Excessive intake of sodium might increase the chance of developing high blood pressure, which might increase the risk of developing stroke and coronary heart

鉀 Potassium

- 功能：
  - 人體必需的元素，負責保持人體內的電解質平衡和細胞功能正常

- Function:
  - essential in maintaining the body's electrolyte balance and normal cellular function.

- 富含鉀的食物
  - 蔬果
  - 豆類及豆製品
  - 堅果

- Food rich in potassium
  - vegetables and fruits
  - beans and soya products
  - nuts

鉀 Potassium (2)

- 成年市民(20-84歲)攝入量-
  - 一般的市民: 每日1.9克
  - 攝入量高的市民: 每日3.2克
- 約百分之六十的成年市民從膳食攝入鉀的分量低於中國營養學會的適宜攝入量(每日2克)
- 攝入不足的鉀可能會增加患高血壓的機會，從而增加患上中風及冠心病的風險。

- Dietary Intake of adult (aged 20-84) –
  - Average consumer: 1.9g/day
  - High consumer: 3.2g/day
- Dietary intake of potassium of about 60% of the adult population was below the Adequate Intake (2g/day) from CNS
- Inadequate intake of potassium might increase the chances of developing high blood pressure, which might increase the risk of developing stroke and coronary heart

其他礦物質
Other minerals

- 超過百分之二十的成年市民從膳食攝入不足的礦物質
  - 銅、鎂、錳、鉬及磷

  → 對人體健康構成不良影響的情況並不常見

- 一般成年市民從膳食攝入分量與建議攝入量相符的礦物質
  - 硼、鈷、硒和鋅

- Inadequate dietary intakes of more than 20% of the general adult population
  - copper, magnesium, manganese, molybdenum and phosphorus

  → development of adverse health effect is very uncommon

- Dietary intakes of the general adult population within the recommended intakes
  - boron, cobalt, selenium and zinc

結論 Conclusions

- 一般成年市民因為從膳食中攝入鈣、鐵和鉀的分量不足及攝入過量的鈉而可能對健康造成不良影響

- Local general adult population might experience certain health risks due to inadequate dietary intakes of calcium, iron and potassium, and excessive dietary intake of sodium.

研究局限 Limitations

- 由於研究方法的局限性，是次研究的礦物質攝入量可能會被低估
- 研究並沒有考慮膳食補充劑的攝入量

- Due to limitations of the research methodologies, the dietary intake of minerals of the population may be under-estimated
- Dietary supplement of mineral is not taken into account

給公眾的建議
Recommendations - Advice to the Public

- 實現均衡及多元化的飲食，以免攝入的礦物質不足或過量
- Achieve a balanced and varied diet so as to prevent inadequate or excessive intakes of minerals

- 增加鈣的膳食攝入量，奶類製品、豆類和深綠色蔬菜均含有豐富的鈣質
- Increase dietary intake of calcium. Dairy products, beans and dark green vegetables are rich in calcium

- 增加鐵的膳食攝入量，豆類和深綠色蔬菜及堅果均含有豐富的鐵
- Increase dietary intake of iron. Dark green vegetables, beans and nuts are rich in iron

- 增加鉀的膳食攝入量，蔬果、豆類及堅果均含有豐富的鉀
- Increase dietary intakes of potassium. Vegetables, fruits, beans and nuts are rich in potassium

給公眾的建議 (2)
Recommendations - Advice to the Public (2)

- 減少鈉的膳食攝入量。烹調食物時宜減少使用調味料和醬油，外出用餐時點選少鹽的菜餚，並於購買預先包裝食物時閱讀營養標籤，選擇鈉含量低的預先包裝食物

- Reduce dietary intake of sodium. Consumers are recommended to reduce the use of condiments and sauces such as salt, soy sauce and oyster sauce during cooking, order food with less salt when eating out and choose prepackaged food with low sodium content by reading nutrition label

- 孕婦可就所需的營養素（包括鈣和鐵等礦物質），徵詢醫護人員的意見

- Pregnant women may consult medical professionals on their requirement of nutrients including minerals (such as calcium and iron)

給業界的建議
Recommendations - Advice to the Trade

- 在預先包裝食物的營養標籤上清楚標示營養資料，而所有營養資料不得有誤導成分
- The nutrition information should be clearly declared on the nutrition label for prepackaged foods and should not be misleading.

- 在富含礦物質的預先包裝食物的營養標籤上標示出該礦物質的含量
- Declare the content of individual mineral on the nutrition label for prepackaged foods that are rich in minerals.

- 食物製造商應降低食物中的鈉含量，參考中心編製的《降低食物中鈉含量的業界指引》，研製鈉含量較低的食物
- Reduce sodium level in foods. Food manufacturers can make reference to the CFS's Trade Guidelines for Reducing Sodium in Foods to formulate foods with lower sodium content.

~完~

- The End -