Food Safety Risk Assessment in Hong Kong

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Presentation Outline
- Food Safety Risk Assessment
  - Approach
  - Risk Assessment Section
  - Food Incidents Monitoring
- Use of risk assessment results
  - Support risk management and communication
  - Formulate of food safety standards
  - Devise food safety information to public

Risk Assessment (1)
- Forms the scientific basis of risk management and communication
- Four components:
  - Hazard identification
  - Hazard characterisation
  - Exposure assessment
  - Risk characterisation

Risk Assessment (2)
- Through risk assessment processes:
  - Hazards associated with food or food ingredients are evaluated
  - Potential risk to the population is assessed
  - Formulation of appropriate risk management actions and risk communication messages to protect public health

Risk Assessment Section
- Centre for Food Safety of Food & Environmental Hygiene Department

Food Incidents Monitoring
- Consultant
- Food Safety Officer
- Senior Medical Officer
- Nutrition Information Inquiry System
- Food Consumption Survey
- Risk Assessment Studies
- Packaging Material
- Total Diet Study
- Veterinary Drug Residues
- Standards Setting
- Standard Setting
- Nutritional Information Inquiry System
- Public Health Doctors,
- Health Inspectors,
- Specialists in Nutrition,
- Toxicology,
- Biotechnology,
- Food Science,
- Microbiology, etc.
- Organic Food
- Environmental
- Packaging Materials
- Consumer Council
- Labeling
- Nutrition Labeling
- Standard Setting & Public
- Public Health Doctors,
- Health Inspectors,
- Specialists in Nutrition,
- Toxicology,
- Biotechnology,
- Food Science,
- Microbiology, etc.

Food Incidents Monitoring
Food Incidents Monitoring (1)
- Free port
- Little local food production
- Over 95% of food consumed is imported
- Large volume and variety of food from around the world

Food Incidents Monitoring (2)
- Effective food incident management demands timely responses
- Close monitoring of food incidents occurred locally and overseas is vital
- Purpose
  - Identify food incidents occurred locally or overseas
  - Assess local impact, if any
  - Provide timely response to minimise adverse impact on public health

Food Incidents Identification
- Screening for food incidents from a defined list of websites
  - Food Safety Authorities (33 websites)
  - Local and overseas media agencies (5 websites)
  - Other non-governmental organisations (2 websites)

Summary of Food Incidents
- Prepare summary report:
  - Incident summary
  - Sources of information
  - Details of the affected product
  - Distribution of the affected products
  - Hazards involved
  - Local and international regulations

Conduct Preliminary Risk Assessment
Hazard Identification and Characterisation
- Nature (e.g. chemical, microbiological etc.)
- Application (e.g. food additive, pesticides etc.)
- Health effects
  - Acute toxicity
  - Chronic toxicity
  - Genotoxicity and carcinogenicity
  - Safety reference values

Exposure Assessment
- Food consumption data
- Substance level in food

Exposure
Food Consumption Survey

- To collect population-base food consumption information
  - e.g. type and amount of food consumed
- Provide data for risk assessment and dietary assessment—
  - allow quantitative evaluation of the population’s exposure to the hazard concerned via consumption of the food involved
  - nutrient intake of the population could be estimated in combination with food composition data

Food Consumption Data

- Hong Kong Population-Based Food Consumption Survey (FCS 2005-2007)
  - Surveyed 5008 Hong Kong people
  - aged 20 - 94
  - Two non-consecutive days of 24-hour dietary intake records (24-hr recall)
  - Over 1400 different food items

Exposure Assessment

- Estimate dietary exposure
  - Substance Level X Food Consumption Amount
  - Average & high consumers of Hong Kong population
  - Various population subgroups, if appropriate
- Assess the associated health risk
  - Compare the exposure estimated with the relevant safety reference values

Disseminate Food Incident Report

- Disseminate food incident surveillance reports to relevant officers in Risk Management and Risk Communication Teams for follow-up actions and formulation of risk management options

An Example
How to Make Use of Risk Assessment Result

Plasticiser Incident in Taiwan

- Identified through food incidents monitoring on 24 May 2011
- Phthalates were found to be added intentionally to foods
  - Industrial chemicals used as plasticiser to improve flexibility and durability of plastic materials
  - Common phthalates include DEHP, DINP, DIDP, DBP, etc.
- Phthalates in food was not covered in routine food surveillance programme
- No specific regulation governing the level of phthalates in food
DEHP Exposure Assessment

- Estimate exposure with the aid of an in-house developed web-based computer system called "EASY" (Exposure Assessment System).
- TDI will be reached if a 60 kg adult intake of 1.5 mg DEHP a day.
- Provided scientific basis to set DEHP limit in food.

Action level of DEHP

- DEHP
  - Adopted EU’s deterministic model by assuming that a person consumes daily 1 kg of packaged food.
  - If a maximum limit of 1.5 mg/kg for DEHP in food is set, the exposure to DEHP of a 60-kg adult will be 0.025 mg/kg bw/day.
  - The WHO’s TDI (0.025 mg/kg bw) would not be exceeded.

Action Levels of Other Phthalates

- DINP & DBP
  - No TDI established by WHO or JECFA.
  - Reference made to TDIs of European Food Safety Authority (EFSA).
  - Similar approach to DEHP.
- Action levels in food
  - 9 mg/kg for DINP/DIDP (as the sum of the substances).
  - 0.3 mg/kg for DBP.

Support to Risk Management

- Advice on action levels
  - Based on TDI from international and national authorities.
  - Seek endorsement from Expert Committee on Food Safety.
- Technical briefs on different phthalates
  - Health information and regulatory control.
- Conduct risk assessment on non-compliant products of daily surveillance.

Form Basis of Standard Setting

- Regular review on food standards
  - To protect public health and keep the local food standards in line with International development (e.g., Codex) and advancement of food science and technology.
- Factors to be considered in review
  - Public health concern.
  - Local food standards.
  - International standards.
  - Stakeholder concern.

Local Food Standard Setting

- Regular review on food standards
  - To protect public health and keep the local food standards in line with International development (e.g., Codex) and advancement of food science and technology.
- Factors to be considered in review
  - Public health concern.
  - Local food standards.
  - International standards.
  - Stakeholder concern.
RA in Standard Setting

- Scientifically assess the dietary exposure to the hazard of concern and possible adverse health effects on the local community, taking local food consumption into consideration
- Local standards set without compromising public health

Food Standard Exercises under Review

- Pesticide Residues
- Veterinary Drug Residues
- Natural Toxins (Shellfish toxins and mycotoxins)
- Heavy Metals in Food
- Microbiological Guidelines for Ready-to-eat food

Pesticide Residues in Food

- Proposed Approach
  - Proposed two-step approach to set the standards for Hong Kong
  - **First step**
    - Proposed to adopt the standards of individual pesticides recommended by Codex as the backbone
    - Supplemented by related standards of the Mainland and other major exporting countries, notably Thailand and the USA
  - **Second step**
    - Evaluate the proposed standards by conducting risk assessment
    - Assess adequacy to protect public health in the local setting

Provide Food Safety Information to Public

RA Study -- Mercury in Fish and Food Safety (2008)

- **Study objectives**
  - To examine the total mercury (tHg) and methylmercury (MeHg) levels in fish commonly consumed in Hong Kong
  - To estimate the dietary MeHg intake
- **tHg, MeHg and fatty acids levels in fish**
  - Covered 89 fish species (whole fish for species identification), each with 3 samples unless otherwise stated
  - Analysed as sold
- **Dietary MeHg Intake Estimation**
  - **Consumption data**
    - From the Food Consumption Survey conducted in 2000
  - **Summation**
    - Amount of fish consumed x Median MeHg content in fish
  - **Results**
    - an average secondary student intake MeHg of 0.50 (lower bound) to 0.66 (upper bound) μg/kg bw/week (31 to 41% of PTWI of 1.6 μg/kg bw/week )
    - High consumers intake 1.51 to 1.69 μg/kg bw/week
**Risk Benefit of Fish Intake**

- Main source of long chain omega-3 fatty acids, especially EPA and DHA
- Cannot obtain from edible plant oils
- Selection of fish with healthier choices
  - Fish contain comparatively high level of long chain omega-3 fatty acids
  - Fish contain relatively low level of MeHg

**Plot of (EPA+DHA) vs MeHg**

- [Graph showing relationship between EPA+DHA and MeHg](#)

**RA Study -- Dietary Iodine Intake in Hong Kong Adults (2011)**

- Study objectives
  - To examine the iodine levels in selected foods in Hong Kong
  - To estimate the dietary iodine intake in adults
- Iodine levels in food
  - Covered 92 food items, each with 3 samples unless otherwise stated
  - Analysed in foods as sold

**Dietary Iodine Intake Estimation**

- Consumption data
  - From the Hong Kong Population-based Food Consumption Survey 2005-2007
- Summation
  - Amount of food consumed x Mean iodine content in each food
- Results
  - a median iodine intake of 44 µg/day
  - 93% of the adult population with intake below WHO’s recommendation

**Message to Public**

- [Image showing message](#)

**Other RA Studies**

- Nitrate and Nitrite in Vegetables Available in Hong Kong (Jul 2010)
- Dietary Exposure to Acrylamide of Hong Kong Adult Population (Dec 2010)
- Hepatitis E Virus in Fresh Pig Livers (Dec 2010)
- Microbiological Quality of Non-prepackaged Beverages Mixed or Topped with Solid Ingredients in Hong Kong (Sep 2011)
Expert Committee on Food Safety

- Consists of academics, professionals, food experts, members of the trade, consumer group, and other experts.
- The current membership includes four experts from the Mainland and overseas.

Terms of Reference

- To advise the Director of Food and Environmental Hygiene on:
  - existing or new food safety operational strategies and measures to protect public health
  - standards/guidelines relating to food safety and food composition and their suitable adoption in Hong Kong having regard to international practices, trends and developments
  - the strategies for risk communication to promote food safety and how best to implement relevant risk communication or public education programmes
  - any new directions for any research to be commissioned by the Centre for Food Safety