Obtaining Food Consumption Data

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Outline of presentation

1. Necessity of estimating dietary intake
2. Collection of food consumption data
3. Key point to notice
4. Data required for estimating consumption of raw commodities
5. Available international food consumption database

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Components of Risk Assessment

- Hazard identification
- Hazard characterization
- Exposure assessment
  - Food consumption data are essential
- Risk characterization

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Method for estimation of dietary intake

- Budget method (food additives)
  - Used for guidance to screen proposals for use of additives
- Theoretical maximum daily intake (pesticides, food additives)
  - Used for appropriateness of maximum level
- Equation of dietary exposure (contaminants)
  - Σ (concentration of chemical in food * food consumption) / (Body weight)

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Necessity of estimation of dietary intake in each country

- Food consumption is different
  - Types of foods eaten vary widely
- Concentration of chemical in foods are different
  - Climate
  - Soil
  - Cultivation
  - Processing

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Collection of food consumption data

- Population based methods
- Household based methods
- Individual based methods
  - Food record
  - 24h dietary recall
  - Food frequency questionnaire(FFQ)
  - Diet history survey

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Population based methods

- Food supply data at national level provide gross annual estimates of the national availability of food commodities
  - Food balance sheets or food disappearance data are used
- These data are used to calculate the average per capita availability of food

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The major limitation of food supply data

- Food supply data reflect food availability rather than food consumption
  - Losses due to cooking or processing, spoilage cannot easily assessed
  - Food supply data do not include water consumption (2 litres per adult may be used as per WHO drinking water guidelines)
  - Food supply data are NOT useful for
    - Evaluating individual intake
    - Food chemical dietary exposure
    - Identifying subgroups of the population at risk

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Household based methods

- Food availability or consumption at the household level may be collected
  - Foodstuffs purchased by a household
  - Consumed foods
  - Changes in food stocks
- Useful for comparing food availability among different communities and geographical areas

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The major limitation of data collected by household based methods

- Data do not provide information on the distribution of food consumption among individual members of the household

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Individual-based methods

- Provide detailed information on food consumption patterns
- Bias
  - Individuals tend to overestimate food amounts when consumption is low and underestimate food amounts when consumption is high
  - Individuals may overestimate consumption of foods perceived as “good foods”

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Individual based method - Food record -

- The respondent report all foods and beverages and the amounts of each consumed during a special period (usually 7 days or less)
- The amounts consumed may be
  - measured with a scale
  - measured with household measures(ex. cups, tablespoons)
  - estimated using models or pictures etc

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The major strength of data collected by food records

- Has potential for providing quantitatively accurate information
- Collects information not only about the types of food consumed but also about the time of the day when and place where foods are consumed
- Obtain information on the distribution of food consumption

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The major limitation of data collected by food records

- The respondent must be trained to describe the foods adequately
  - Name of the foods
  - Preparation methods, recipes
- Bias in the selection of the sample
  - Low socioeconomic status
  - Some elderly groups
- Bias in the measurement of the diet
  - Unintentional omission of foods consumed
  - Incomplete records of foods consumed

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Individual based method - 24h dietary recall -

- The respondent is asked to remember and report all foods and beverages in the preceding 24 hours
- The amount consumed may be estimated using models or pictures
- The recall is typically conducted by personal interview, telephone or internet

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The major strength of data collected by 24h dietary recall

- Collects information not only about the types of food consumed but also about the time of the day when and place where foods are consumed
- Obtain information on the distribution of food consumption
- Do not require literacy of the respondents
- Compared to the food record, there is little burden on the respondents

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The major limitation of data collected by 24h dietary recalls

- Foods and drinks are recalled from memory with the aid of an interviewer

  ⇨ Well-trained interviewers are crucial

- Because most individuals' diets vary greatly from day to day, data from a single 24h recall is not appropriate to characterize an individual's usual diet

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Individual based method - Food frequency questionnaire (FFQ) -

- The FFQ consists of a structured listing of individual foods
- The respondent is asked to estimate the number of times the food is usually consumed per day, week, month, year
- FFQs may be unquantified (only information of a listed foods is collected) or quantified
- For quantified methods, the amount consumed may be
  - estimated with portion size questions
  - estimated with typical portion size

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Example of questionnaire

- Over the <u>past 12 months</u>, how often did you drink **tomato juice** or vegetable juice?
  - NEVER
  - 1 time per month or less
  - 2-3 times per month
  - 1-2 times per week
  - 3-4 times per week
  - 5-6 times per week
  - 1 time per day
  - 2-3 times per day
  - 4-5 times per day
  - 6 or more times per day

Ref. NHANES Food Questionnaire (USA)

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The major strength of data collected by FFQ

- Used in estimating average dietary intake to those chemicals having large day-to-day variability
- Collects information on the respondent's usual intake of foods
- The respondent burden are typically much lower for FFQ than for food record or 24h dietary recall

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The major limitation of data collected by FFQ

- Many details of dietary intake are not measured
- Quantification of intake is as not accurate as with food records or 24h dietary recall
- Serving size of foods consumed is difficult for respondents to evaluate
- Inaccuracies are involved in
  - an incomplete listing of all possible foods
  - errors in frequency questions
  - errors in estimation of usual serving sizes

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Individual based method - Diet history survey -

- Consists of a detailed listing of the types of foods and beverages commonly consumed at each eating occasion over a defined time period
- A trained interviewer asks the respondent's customary pattern of food consumption
- The reference time frame may reflect seasonal differences if the reference time frame is the past year

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The major strength of data collected by diet history survey

- The survey collects information not only about the frequency of intake of various foods but also about the typical make-up of foods
- The survey collects information of usual meal pattern and details of food intake rather than short period of time (as in food records or recalls)
- Details about how foods were prepared can be helpful in better characterizing contaminants intake (e.g. acrylamide)

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The major limitation of data collected by diet history survey

- Respondents are asked to make many judgments both about the usual foods and the amounts of those foods eaten
- The method may not be useful for individuals who have no particular eating pattern
- The method may be of limited use of individuals who eat small bits throughout the day

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Factors that may influence dietary intake

- The population sampled (age, sex, ethnicity, socioeconomic group)
- Body weight
- Day of the week and the season in which the data are collected
- Food consumption pattern for sensitive population (e.g. young children, the elderly)

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Key points to notice
- When the raw data are available -

- The raw data can be used to estimate
  - Dietary intake from multiple foods
  - Dietary intake by specific population subgroups
  - Distribution of food consumption

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Key points to notice
- When only summary data are available -

- It is important to know
  - The type of commodity (e.g. raw juice, juice concentrate)
  - How the raw data are aggregated
  - How a typical consumer is defined (e.g. median or mean consumption)
  - How mean food consumption is calculated (consumers only or the total population)
  - Whether they represent daily consumption or consumption per eating occasion

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Standard recipes

- Food may be consumed as such or as an ingredient as part of a recipe or food mixtures (e.g. Apple may be consumed as a single food item or as a baked apple pie)
- Standard recipes can be broken down into their ingredients. All ingredients can be mapped to the corresponding individual food (e.g. on average 70% of bread is flour)

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Unit weights

- Unit weights represent weights of typical commodity units (e.g. a single apple or a single banana)
- Unit weights are used
  - in the calculation of acute dietary exposure estimates
  - To convert reports of food consumption by single units in an FFQ or 24 h recall survey to gram weights
- Estimates of mean or median unit weights of raw commodities are provided by GEMS/Food

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Standard portion size

- Standard portion sizes are used to assess the consumption of foods and beverages
- Standard weight will be assigned to a banana, a cookie or glass of soft drink

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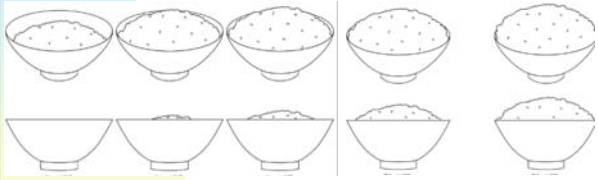
Standard portion size

- Amount eaten are different from how foods are arranged



110 g 140 g 165 g 200 g 230 g

Ref. Book of Food Portion Sizes (Japan)

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Standard portion size

- Size of measuring cups and spoons are differ among countries

Japan
Ref. Book of Food Portion Sizes

USA
Ref. Measuring Guides

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Large portion sizes

- Large portion sizes are
  - based on the 97.5th percentile of food consumption derived from records of individual consumer days
  - used in an acute exposure assessment
- Upper percentile food consumption amounts should be defined based on individual consumer days
  - If the survey includes multiple days per respondent, they should be considered as independent observations (not averaged)

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GEMS/Food consumption database

- Database
  - Based on selected FAO food balance sheets
  - Expected to be updated every 10 years
  - Last revised in 2012
  - Provides average per capita food consumption
- Produced 17 consumption cluster diets
- Countries with similar patterns of consumption of 20 key foods were grouped together
- Users can download full data set from WHO website

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GEMS/Food consumption cluster diets

- Food consumption cluster of ASEAN countries are as follows
  - Group 04: Brunei Darussalam
  - Group 05: Malaysia
  - Group 09: Cambodia, (China), Indonesia, Lao PDR, Myanmar, Philippines, Thailand, Viet Nam
  - Group 10: Japan, (Korea)

* Singapore is not listed in the cluster diet last revised in 2012 since Singapore joined the FAO in 2013.

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Food safety collaborative platform (FOSCOLLAB)

- A platform to share food safety data and information to support risk assessment
- Intagrates elements from following sources;
  - FAO/WHO Chronic individual food consumption database – Summary statistics (CIFOCOss)
  - GEMS/Food Contaminants database
  - JECFA Database
  - JMPR Database
  - Codex Alimentarius Commission

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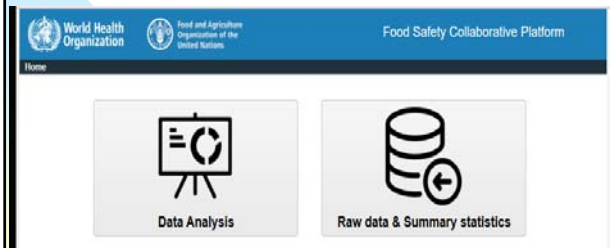
Food safety collaborative platform (FOSCOLLAB)



http://apps.who.int/foscollab/

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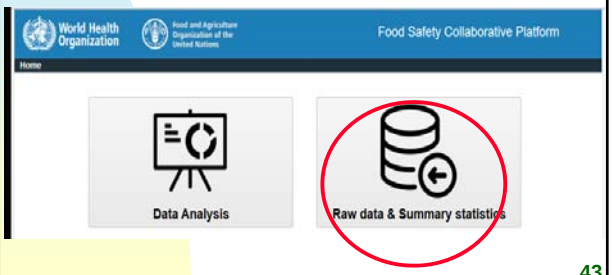
Food safety collaborative platform (FOSCOLLAB)

If you would like to access CIFOCOss,



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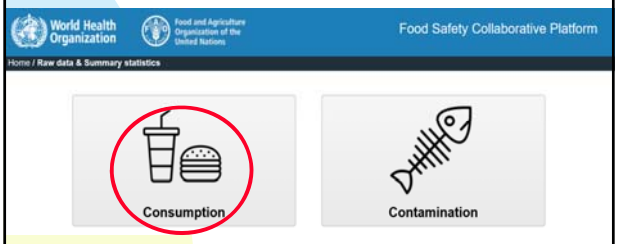

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Food safety collaborative platform (FOSCOLLAB)

If you would like to know how much “Adults and Elderly” consume “Rice grain, mixed” products in Indonesia in 2016, what should we do ?

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Food safety collaborative platform (FOSCOLLAB)

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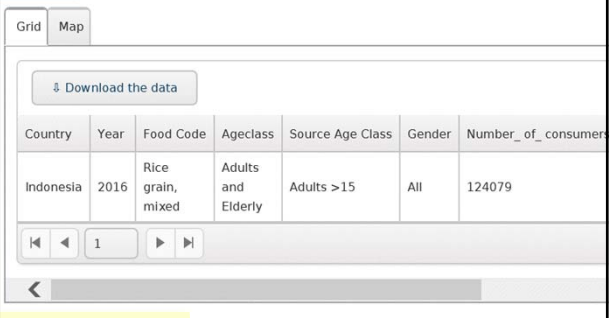
Food safety collaborative platform (FOSCOLLAB)



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Global Individual Food consumption data Tool (FAO/WHO GIFT)

- Background
  - Individual food consumption data are needed to better inform agricultural and food policies
  - Data produced are under-utilized
  - Prevents comparison across periods of time, seasons and geographical locations
- Objectives
  - A publicly available multipurpose database
  - Harmonization of existing data collected within individual food consumption surveys

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Global Individual Food consumption data Tool (FAO/WHO GIFT)

- Four datasets of individual food consumption survey from four countries (including the Philippines) are used to develop the prototype of FAO/WHO GIFT
- Eight surveys from eight countries (including the Philippines and Lao PDR) are available from the database
- FoodEx2 (by EFSA) was used to cover foods consumed globally and served as a harmonization tool

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Global Individual Food consumption data Tool (FAO/WHO GIFT)

http://www.fao.org/gift-individual-food-consumption/en/

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http://www.fao.org/gift-individual-food-consumption/en/

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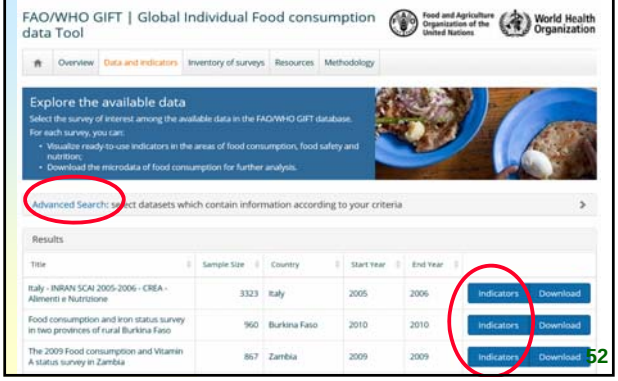

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Global Individual Food consumption data Tool (FAO/WHO GIFT)

If you would like to access food consumption survey from Lao PDR, please click on "Indicators".

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Global Individual Food consumption data Tool (FAO/WHO GIFT)

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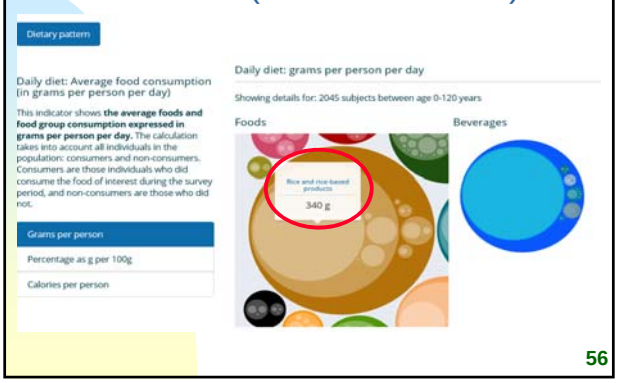

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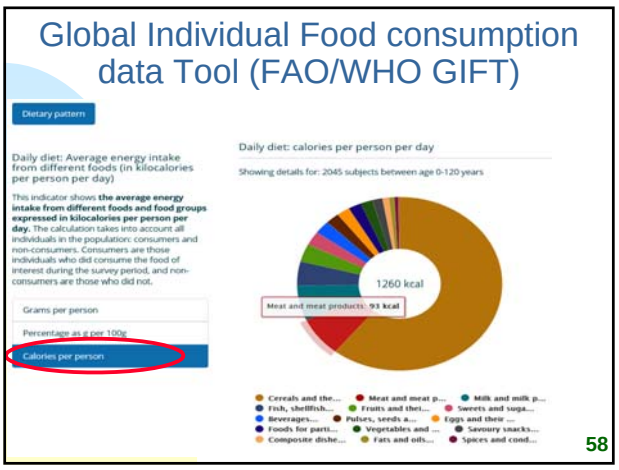

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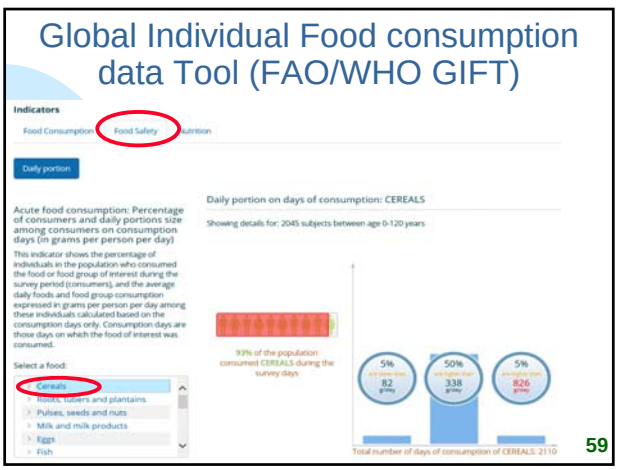

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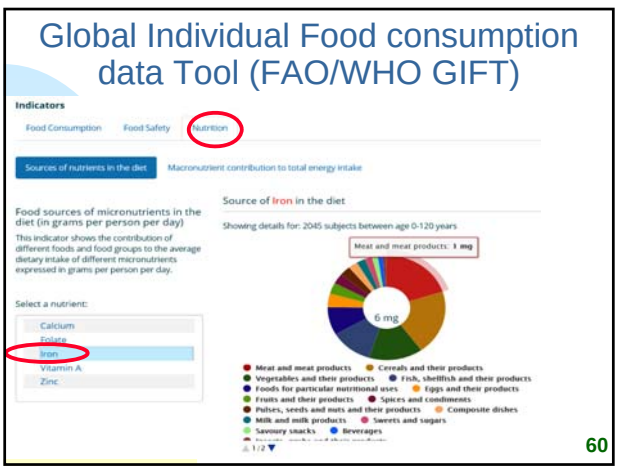

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User Guidelines for FAO/WHO GIFT

http://www.fao.org/fileadmin/user_upload/GIFT/docs/2019-06-07_FAO-WHO-GIFT_User_Guidelines.pdf

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Thank you for your attention !

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