Application of the INMUCAL-Nutrients® Program on Food-Based Consumption Pattern

Orapin Banjong, Uraiporn Chittchang, Chayanist Wanijjakul
Institute of Nutrition, Mahidol University, Nakhon Pathom, Thailand

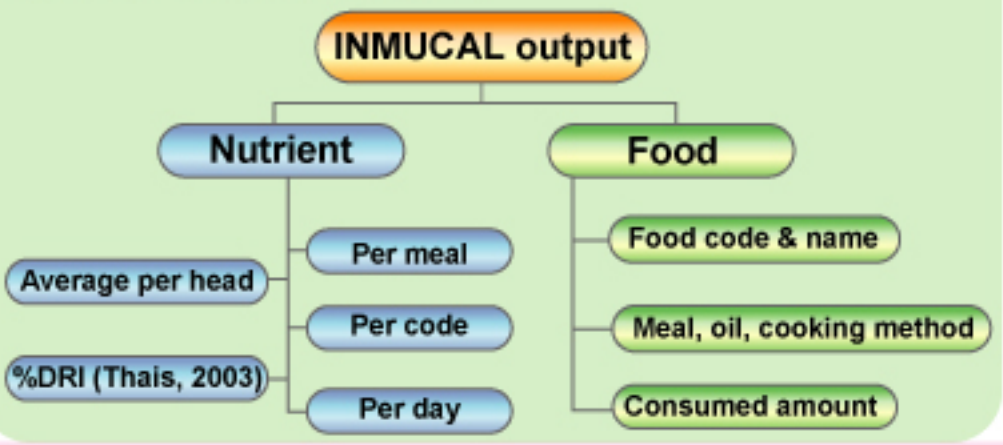
Aim: To develop and apply analytical guidelines for INMUCAL-Nutrients®outputs on nutrient and food-based consumption pattern.

Method: Outputs obtained from the INMUCAL-Nutrients®, a Thai dietary computer program, (Nutrient: nutrients per day, per meal, and per food-code; Amount of Food: standard food measurement unit, cooked and raw weight) were used to apply and analyze for nutrients and food-based consumption pattern with SPSS.

Results: Various applications of the INMUCAL-Nutrients® outputs were demonstrated. Average nutrients intake, as % DRI, was computed from nutrients per day. The nutrients per meal provided information on nutrients contribution of any specific meal. The nutrients by food-code presented nutritive proportion derived from each food group. Food output provided average portion-size of food consumed, amount of target food intake per day or per meal. List of popular food eaten and amount consumed could be computed and ranked from amount of foods as raw weight.

Conclusion: Several variables from the INMUCAL-Nutrients®outputs provided greater options in nutrient and food-based statistical analyses. Data obtained would be relevant and useful in epidemiological studies on diet-related diseases, eating pattern, and behavioral changes. Moreover, average portion size consumed for popular food items would be useful in setting dietary guidelines for specific target population.

INMUCAL-Nutrients is the program to calculate nutritive value of Thai food.
2 types of output: nutrient and food data

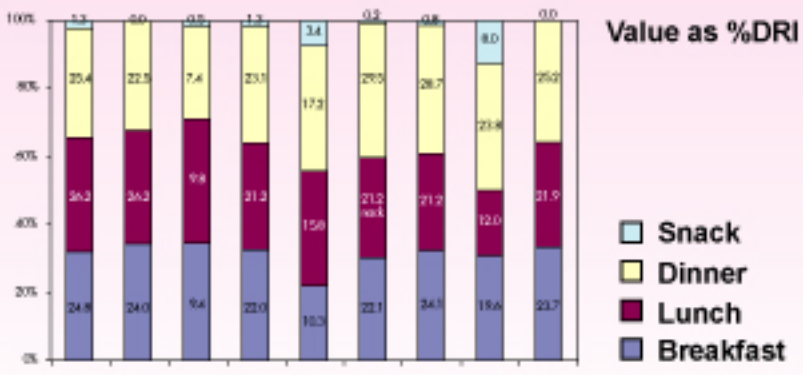


Applications of Nutrient output

Nutrient output	Applications Analysis
(1) Nutrient by Meals	Proportion of nutrient separated by meal; breakfast, lunch, dinner and snack (Figure 1*)
(2) Nutrient by Code	Proportion of nutrient intake from various food groups (Figure 2-5 *)
(3) Nutrient per day	An average nutrient intake per day compare with %DRI according to gender, country, season etc. (Figure 6*)

Distribution of Nutrient Intake by Meals

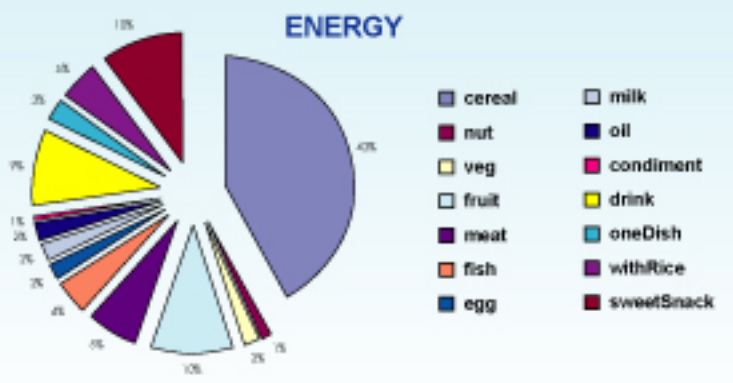
Figure 1



Energy and protein distribution of each meal for elderly is similar, but get vitamin C highest on dinner(24 %DRI). Moreover, elderly like to have fruit as snack which provide vitamin C about 8 %DRI.

Proportion of Energy (Kcal) by Food group

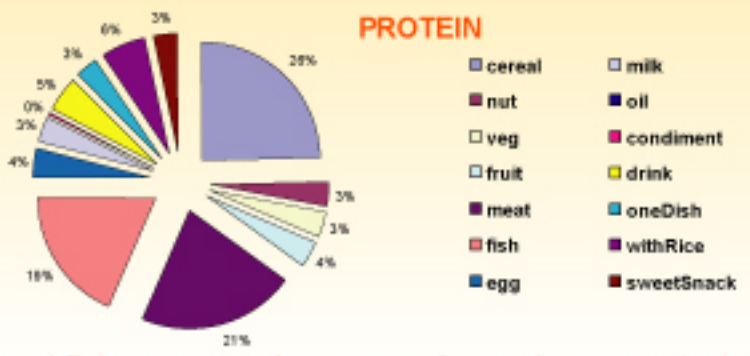
Figure 2



Cereal group is the main source of energy (43%) and followed by fruit, drink, and sweet snack group (29 %)

Proportion of Protein (g) by Food group

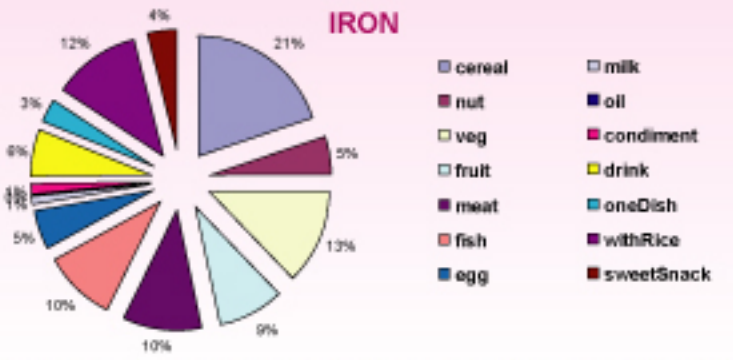
Figure 3



Cereal, meat, and fish group are the source of protein, respectively.

Proportion of Iron (mg) by Food group

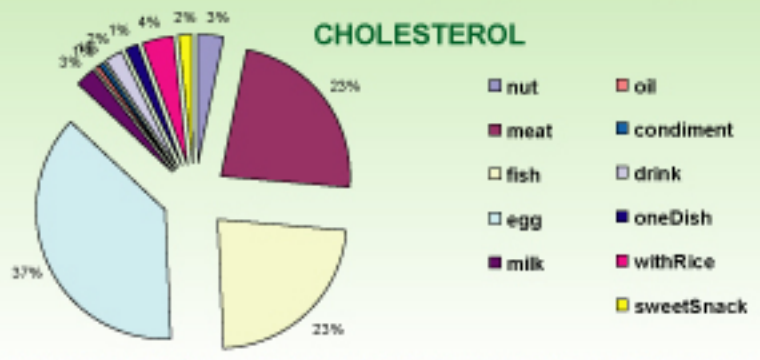
Figure 4



Cereal, vegetables, side-dish(with-Rice) meat, and fish group are the source of iron, respectively

Proportion of cholesterol (mg) by Food group

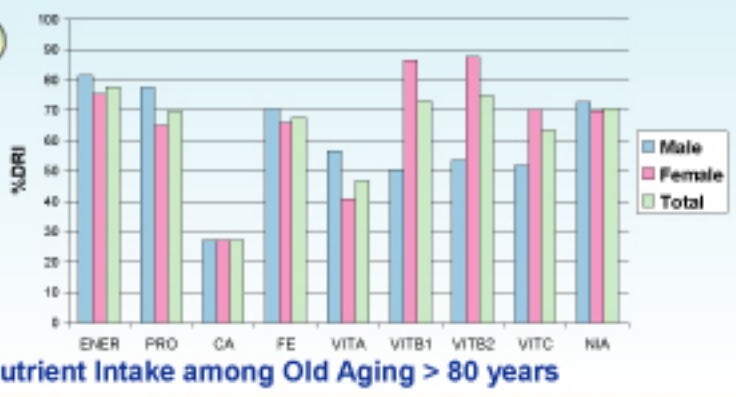
Figure 5



Egg, fish, and meat group are the source of cholesterol, respectively.

Nutritive value and % DRI

Figure 6



Mean of Nutrient Intake among Old Aging > 80 years

Food Output; name & code, meal, cooking method, and amount of consumed food for 4 variables (amount, unit, Unit g and Raw g)

code	Food name	cooking method	1 amount	2 unit	3 Unit g	4 Raw g
01015	Rice, polished, steamed	RE (ready to eat)	90	GR	90	90
18053	Lod chong	RA (raw)	1	CU	213	213
06068	Pork, loin	SF (stired fry)	1	TB	10	11.8
14056	Instant coffee (3 in 1)	RE	1	MI	18	18

1&2] amount of unit = The amount of food as unit label {cup (CU), table spoon (TB), gram (GR) or number of pieces (MI=median size)}
These value is proving for correction of inputting

3] Unit g = The conversion value of amount-unit which calculate as gram according to method and unit
Weight of food in gram according to cooking method

4] Raw g = The conversion value of Unit g which calculate as gram according to food name which may be raw food (RA) or cooked food as ready to eat (RE)
Weight of food in gram of each food code for calculation

Applications for food output

(1) Variable of each food code calculated as weight (Raw g) of average portion consumed size (Table 1)*
(2) Able to arrange popular food base on amount and frequency of consumption (Table 1)*
(3) Able to compute sum of totally weight per day of each interested food code per person (Table 2)*

* An example of 24-hr recall for "The study of eating behavior for elderly with an average age more than 80 years at Nakhonpathom, Thailand, 2006"

Table 1 List of popular vegetable that elderly often have and an average portion size (g)

vegetable	Mean (g)	Min (g)	Max (g)
Egg plant	40	19	71
Mungbean sprout	24	2	83
Swamp cabbage, Chinese	27	8	70
Cabbage, Chinese, white	26	9	67
Radish	37	16	53
Yard long bean, green, fresh	15	8	24
Yard long bean, green, cooked	31	7	60

Table 2 Average total amount of polished rice, brown rice, and sugar per day per person

Food name	# consumed persons	Mean (g)	Min (g)	Max (g)
Rice, polished, steamed	58	304	27	720
Rice, polished, boiled	15	423	102	1028
Rice, whole grain, milled by machine, steamed	5	156	42	540
Sugar	17	14	2	68

Usefulness of Nutrient & Food Output Application

- To follow up food pattern: food items, consumption size and nutrient intake for epidemic studying of food related disease
- To monitoring trend of eating behavior for each population on each period and time for setting health encouragement policy
- An amount of consumed food per time and popular food list are important data to assign recommendations of food guide among each target population

Limitations of food data analysis

Setting of food code not cover the special characteristic for sub group such as cereal products (01) mostly have as dessert such as sponge cake, cake, and cookies when assign as snack, mean error might be occur and take time for adjustment

Suggestion

Should have a software for transferring to re-adjustment code of food group. A re-adjustment code should correlation between the special characteristic of sub group and food group for convenient of inclusion of food that have the association with many characteristics

Poster available for download at www.inmu.mahidol.ac.th