THE CANADIAN USE OF NUTRIENT DATABASES

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Historically, the first "Table of food Values Recommended for Canadian Use" was produced by the Department of Pensions and National Health in 1944. The second edition of this publication stated that" There is scarcely one single food for which complete analyses made in a Canadian laboratory are available. Where Canadian values were available in sufficient range they have been used". The situation is somewhat better today and is improving, but we still do not have as complete Canadian data on any one food as is provided by the USDA tables.

The source of the data was then, as now, USDA Handbook No. 8. In the late 1960's the data were computerized, utilizing USDA codes, to be used for the Nutrition Canada Survey which took place from 1971-72. It was a survey similar to NHANES and included a 24-hour recall. Food-shaped models were designed to represent portion sizes and the appropriate weights for each food were entered into the data base for calculation of portion weights in relation to the models. Some 200 "Canadian only" foods were added and some of the nutrient values in other foods were changed to conform with Canadian food regulations. After the survey, various nutrients were added to meet our bureau's needs and the data were made available to persons with main-frame computers able to use them. By 1978, no more foods or nutrients could be added and it was decided to reformat the data into a more flexible and accessible form to be called the Canadian Nutrient file.

A three-subfile format was chosen to facilitate easy access and manipulation of the data. They were the food Name Subfile, Nutrient Name Subfile and Nutrient Amount Subfile. As USDA was in the process of updating Handbook No. 8 it was decided to use the same codes with an extra digit to indicate changes made in the food. The food Name Subfile was made up of the new nutrient code, the food description, the old Nutrition Canada code (to help users relate to the Nutrition Canada food models), the year in which the data were added to the base, four conversion factors and an editorial flag. The four conversion factors, by which the 100g portions may be multiplied, provide a 100ml volumetric measure, two described portion sizes and a factor for 1kg as purchased from which the percent refuse may be calculated. We are a bilingual country so all descriptions and instructions are in English and in French. The Nutrient Name Subfile, besides including the nutrient code, nutrient description and measure, also includes a listing of the number and percentage of foods that contain each nutrient. This is useful information in planning research studies as not all foods have complete data and principal sources of some of the nutrients are missing. The Nutrient Amount Subfile contains a nutrient flag for each nutrient as well as the data. These flags indicate the source of the data.

It was felt to be important for users to be able to tell if the data were from USDA or other sources and to provide a code by which the user could make some judgement about the reliability of the data. As you can appreciate, data from the label are used and are less precise than government analyzed data. Imputations are also flagged.

USDA is the main source of data but some considerable editing is necessary. Canada has "gone metric" which means that all portion sizes have to be "metrified". This step has certain hazards for the unwary as the Canadian or Imperial fluid ounce is smaller than the U.S. though the quart is larger (Table 1). However, Canadians all use the U. S. measuring cups when they cook so one has to be very sure of the conversions. It is also a hazard for our manufacturers and some strange dilution instructions appear on our soup and gravy mixes where the cup has been equated to 8 Imperial ounces, 227ml, rather than to the

236.6ml of the U.S. cup. When we "went metric" there was great argument as to whether the 29g/ounce portion should be rounded up to 30g or down to 25g. The Diabetic Association was for smaller portion sizes to reduce caloric intake, but Canada's Food Guide writers recommended 30g to meet nutrient density requirements so serving sizes of cheeses and meats became 90g rather than the U.S. 85 g. Portion descriptions had to be changed from inches to centimeters, rounded and volumetric weights recalculated. Names of foods were changed for Canadian usage. For example Frankfurters became Wieners and American cheese became cheddar cheese. Even spelling changes in unexpected ways. This became apparent in computer programs that search by food name. Maple syrup was impossible to find until it was realized that in the U. S. it was spelt with an "i" rather than a "y". "Canadian only" foods were added. An example of the type of changes required happened just last week when a reporter from Time magazine wanted to convert an article on a "no diet diet" for Canadian publication. Percentages of fat in hamburgers had to meet Canadian regulations, names of beef and pork cuts had to be changed, the term "Canadian bacon'" became back bacon, the calorie content of a bottle of beer and light beer were calculated for 341ml and 90 proof bourbon changed to 80 proof scotch. The editor also insisted that we change the portion size of 1/12 angel food cake, which she thought didn't sound very metric, to a 9cm wedge.

The data themselves must be examined for each food group to see if they are applicable to the Canadian situation. As each food group book is issued, Agriculture Canada is consulted as are the appropriate manufacturers, marketing boards and university research centres to acquire any Canadian data that may exist and identify differences in the Canadian products. For example, breakfast cereals are more highly fortified in the U.S. and "all Canadian" values were used from both the manufacturers and Canadian research. Canadian meat cuts and grades are quite different and Agriculture Canada provided analytical data on 21 cuts of beef and 7 of pork, both raw and cooked and lean and lean plus fat. Babyfoods are less highly fortified and Canadian manufacturer's data were entered. Canola (rapeseed) oil is used extensively in salad dressings, cooking oils and margarines. flour is fortified to different levels and corrections have to be made for all baked products. Certain other food fortification comes under our regulations where different nutrients are added. for example evaporated milk has vitamin C added and flour sold in Newfoundland and in the north has added calcium. Nutrient values are changed to meet these requirements and Canadian data used wherever available. Health and Welfare is also involved in a Total Diet Study which is providing data on many nutrients. Although most of our data is incomplete for any one food, the nutrient flags serve to indicate the source with U.S. data provided for nutrients not analyzed in the Canadian studies. No attempt is made to impute missing values unless the foods are essentially the same. An example of this would be the imputation of USDA zinc and copper values, which are not fortified in the U.S., to Kellogg's Corn Flakes.

The Canadian Nutrient file is available for sale as is a condensed version containing some 670 foods and 21 nutrients. The condensed version is also for sale in hard copy in household portions as is a book containing some 1100 foods with both household and 100g portions, produced privately. Agriculture Canada used the file in an "'in house" software program, AGNAP, which links the data to food cost, food disappearance data, population statistics and apparent nutrient intakes for nutritious food-basket calculations and apparent per capita food consumption. Several companies in Canada and the U.S. have written software programs for the file or incorporated it into their existing programs. An attempt has been and is being made to persuade Canadians to use the file so that research results may be comparable between the provinces.

We in the Bureau of Nutritional Sciences have been preparing the data for possible food consumption surveys and have developed a software program to this end. A program has

been developed, called CANDI, which enables entries in diet recalls to be calculated, collated and stored with minimum effort. The program has a vocabulary of over 3000 words and it can match descriptions entered by the user with foods in its database automatically and almost instantaneously. Thus the user has no need to look up food codes or acquire a detailed knowledge of the structure of the database. The program also provides detailed information on portion sizes for each food and allows rapid entry of quantities. Presently, the CANDI database includes 3200 "basic" foods and 2000 "recipes". The recipes have been calculated from the basic foods using the guidelines developed by USDA and include corrections for retention of nutrients during cooking and gain or loss of fat and water. The program permits substitutions to the fat in recipes and will display a list of ingredients in a recipe to assist in making changes. New recipes can be easily created using the basic foods and the USDA table of retention factors and Canadian recipes are now being added. An added benefit is instant access to the data for "query" responses to phone calls with the alternate language available at the touch of a key. We plan to use this same system to recalculate all the data using Canadian ingredients (such as flour) for all composite foods when the baked products section is issued. As data become available, we also hope to develop a database for northern residents with Indian and Inuit foods.

The Canadian Nutrient file will be incorporated into the NOAFOODS database in the INFOODS network and the food names are presently being factored at NCI for entry into the FDA factored food Vocabulary. Another, somewhat specialized, use that has been developed in Canada, using the Canadian Nutrient file, is software for a regional hospital services group that has a completely computerized operation from the provision of recipes and location of ingredients to the quick-frozen final product complete with nutrient content for each item. They provide all the food for 11 hospitals.

We are most appreciative of the data provided by USDA and the help freely given in the exchange of data. I must add that some of our research data also appear in Handbook No.8. for example, Canadian values for folacin, biotin and pantothenic acid for cereals are from our bureau. So, together, we should be able to provide better and better answers for future food consumption studies.

TABLE 1 METRIC SYSTEM EQUIVALENTS

Measure	Metric Equivalent
1 fluid ounce (U.S.)	29.57 mL
1 fluid ounce (Imperial)	28.41 mL
1 quart (U.S.) 32 ounces	946.4 mL
1 quart (Imp.) 40 ounces	1,136.5 mL
1 cubic inch	16.39 mL
1 2.5 cm cube	15.63 mL