DESIGNING A NUTRIENT DATABASE FOR GOVERNMENT RESEARCH APPLICATIONS

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The Grand Forks Human Nutrition Research Center (GFHNRC) is one of five USDA Human Nutrition Research Centers. The mission of the GFHNRC is to study the nutritional importance of trace elements. Scientists from a variety of disciplines are involved in the research at the Center: disciplines represented include biochemistry, chemistry, immunology, exercise physiology, psychology, and dietetics. Some of the scientists work with animal models; others are involved in clinical research.

Outpatient nutrition studies are continually conducted at the Center. These studies may last only a few days or several months. Research subjects are not limited to any specific group or age range. Examples of subject groups used in past and current studies include college students, pregnant women, and elderly residents of Grand Forks.

Inpatient studies are done in the fourteen bed metabolic unit at the Center. Volunteers live in the unit while they participate in nutrition studies which usually last from four to six months. The diets used in these studies consist of conventional foods which are prepared on-site in the metabolic kitchen by dietary staff members. Duplicate diets are analyzed in the clinical laboratory so that accurate estimates of the volunteers' trace metal intakes may be obtained.

A nutrient database system was needed to support the wide variety of research done at the Center. A system was needed that could not only be used to assess the dietary intakes of large groups of free-living subjects, but could also be used to plan menus and recipes for inpatient studies. The dietary staff and the data processing staff worked together to outline the major design considerations and to develop a system that would meet these research needs.

Some of our design criteria, for example, ease of use, are not unique to a research facility. Originally we used an in-house developed, batch system (GRAND), that required a large amount of programmer assistance to use. With the installation of new computer hardware and software, it became possible to rewrite the system to make it more "user-friendly". The new system is menu-driven, which eliminates the need to remember program names. One can move between related files by simply hitting a function key on the terminal. Help screens can be invoked if assistance is needed when entering data or generating reports (figure 1). Now, minimal programmer assistance is needed for the daily operation of the system.

Because the system is used for outpatient studies, a large database must be supported. Each food is identified by a six-digit food code; therefore, one million items can theoretically be stored in the database. Presently, the database contains approximately 5,000 foods. Extensive descriptions are allowed for each food (figure 2). The first of the ten allowed lines of description is an abbreviated explanation of the food item, and can be used on reports and displayed on related screens. Detailed descriptions of each food increase the likelihood of obtaining accurate food composition estimates. Three flags have been included to assist coders in selecting items from the database. A food is flagged as preferred for coding if it is known to have good, complete nutrient information. A second flag designates foods used on the metabolic unit. A third flag distinguishes between active and inactive foods. Food descriptions which have become outdated, and foods that cannot be obtained or are not commonly eaten in the Grand Forks area are marked inactive. For example, raw reindeer meat is an inactive food. Inactive foods may be omitted when printing coding manuals; this substantially reduces the number of items a user has to search through when coding intakes.

When planning diets for the metabolic unit, nutrient calculations utilize values obtained from in-house laboratory analyses. However, within the Center, trace mineral analyses are performed on only those brands of foods served in the metabolic unit; these analyses would not provide

Grand Food Description Master

PF1 - Display this help screen.
PF2 - If the currently displayed food is a recipe, the Recipe Master screen will be displayed, otherwise the Nutrient Value Master screen is displayed.
PF3 - Return to Main Menu.
PF4 - Search for a particular food by food-code. An exact food-code is not necessary as the closest food will be displayed.
PF5 - Browse the Nutrient Conversion Table entries for this food.
PF6 - Delete the current food from the Food Description Master. A password is required to delete. If you delete this record any corresponding Recipe Master/Nutrient Values Master entries are also deleted.
PF7 - Display the previous food.
PF8 - Display the next food.
PF9 - Add a new food to the Food Description Master.
PF12 - Edit the contents of the entry.

(Press enter to return to the Food Description Master)

Figure 1. Example of help screen. PF refers to program functions keys on the terminal.

```
Food Code    0196.100        Food Description Master
Food Desc  1  BEANS SNAP YELLOW OR WAX CKD WO SALT ADD  Nat.Nutr.DB Numb  11724
Food Desc  2  BEANS SNAP                                Preferred (P/ )  _
Food Desc  3   YELLOW OR WAX                            Metabolic (M/ )  _
Food Desc  4    COOKED BOILED DRAINED                   Recipe    (R/ )  _
Food Desc  5     WITHOUT SALT ADDED                     Active/Inactive
                                                                 (A/I)  A
Food Desc  6  ____________________________________      Group            5
Food Desc  7  ____________________________________      Subgroup         E
Food Desc  8  ____________________________________
Food Desc  9  ____________________________________
Food Desc 10  ____________________________________
      Stnd.Serv.Desc.  1/2 CUP                          Stnd.Serv.Amt.  0062.50
Meas.#    Description          Gram Equ.  Meas.#   Description        Gram Equ.
  02    TABLESPOON               0007.81    03    OUNCE                0028.35
  04    CUP                      0125.00    05    POUND                0453.59
  06    ____________________     _______    07    ____________________ _______
  08    ____________________     _______    09    ____________________ _______
  10    ____________________     _______    11    ____________________ _______
  12    ____________________     _______    13    ____________________ _______
  14    ____________________     _______    15    ____________________ _______
PF1 = Help          PF2 = Switch files  PF3 = Main menu     PF4 = Search by FC
PF5 = NCTs          PF6 = Delete        PF7 = Prev. food    PF8 = Next food
PF9 = Add           PF10= * * * * * * * PF11= * * * * * * * PF12= Edit
```

Figure 2. Example of screen for entering and viewing food descriptions and household measures and their gram weight equivalents

adequate information for outpatient studies. For free-living subjects, USDA Handbooks 8 (1) and 456 (2) might be the preferred sources of food composition data. To provide the Center with this needed flexibility, the database was designed to store data from multiple sources of nutrient information.

The multiple source design allows values for eighty food components from up to 100 sources of information to be stored in the master database. A working database is then created by extracting values from these sources using a priority scheme provided by the user. A single source or a combination of several sources may be selected (figure 3). The user specifies the order in which the sources are to be searched for a given range of nutrients; if a nutrient value is blank in one source, the next source listed is searched. If a different subset of the master database would be more appropriate for another study, then a new priority scheme is submitted and a new working database created. Because new sources of data can be added to the master database without replacing existing values, different subsets can be created that meet the specific needs of each research project without altering the original master database.

The master database currently contains information from 35 different sources, including USDA handbooks and provisional tables, selected refereed journal articles, and GFHNRC analyses. Fairly complete information is available for 21 of the 80 food components (figure 4). A quality indicator is stored with each nutrient value to distinguish between values that are published or analyzed, and those imputed by our staff. Blank or missing values are left blank, whereas values reported as zero are coded as zeroes.

Several features have been implemented to assist in maintaining the quality and accuracy of the database. A check digit is incorporated into each food code to reduce transcription errors. The national nutrient database number is stored with each record to eliminate manual entry of data from new USDA handbooks. A special password is required to delete a record from the database. An audit trail is provided for all transactions against the database. The audit records are stored in a file which can be printed or browsed at any time by the database manager. All audit records include the time and date of the transaction and the name of the account in which the transaction occurred. Along with this information is stored a copy of the record affected by the transaction. For example, whenever an update transaction is performed, the old record and the updated record are stored in the audit file.

The system has the capability to process and store several types of dietary intake records, including multiple-day food records, 24-hour recalls, food frequency questionnaires, and records of usual dietary intakes. The nutrient composition of menus can also be calculated by the system, a feature that is used when developing and testing menus for future inpatient studies.
Currently the dietitian must manually locate the food item in a coding manual when entering a new intake record, but we will soon be adding interactive coding capabilities to the system. When this feature is implemented, the user will be able to search through the database to find the correct food item by specifying key words and phrases. Food amounts may either be entered as gram weights or as multiples of common household measures.

A special file has been designed for recipes. Each recipe is assigned a unique food code. For every ingredient in the recipe there is stored a food code, an amount, and a retention code. The retention code refers to a separate file which contains retention factors for selected vitamins and minerals. The nutrient composition of the recipe is calculated when the working subset of the master database is created using the selected sources of data. Because the nutrient composition is calculated dynamically, changing a nutrient value for an ingredient in the master database automatically incorporates that quantity into the nutrient totals for all recipes containing that ingredient.

Once intake records have been entered into the system and an appropriate working subset of the database has been created, two reports can be generated. These reports provide varying levels of detail, but both are selected by specifying a subject, study, intake record type, and

```
                    Nutrient  Conversion  Table      Screen One
  Food Code  0196.100  NCT 1  Desc  BEANS SNAP YELLOW OR WAX CKD WO SALT ADD
Nutr     Value     QI  Src   Nutr     Value     QI  Src   Nutr     Value     QI  Src
H20      00089.220  A  002   Na       00003.000  A  002   Caro
Kcal     00035.000  A  002   Zn       00000.360  A  002   VitD     00000.000  I  031
Pro      00001.890  A  002   Cu       00000.103  A  002   E-AT     00000.200  I  031
Fat      00000.280  A  002   Mn       00000.294  A  002   E-TT     00000.350  I  031
Cho      00007.890  A  002   Cr       _________  -  ---
CFib     00001.430  A  002   Se       _________  -  ---   TSFA     00000.064  A  002
DFib     00001.800  A  002                                4:0      _________  -  ---
Sucr                          Asc      00009.700  A  002   6:0      _________  -  ---
ETOH     00000.000  I  004   Thia     00000.074  A  002   8:0      _________  -  ---
Ash      00000.730  A  002   Ribo     00000.097  A  002   10:0     _________  -  ---
                             Niac     00000.614  A  002   12:0
Ca       00046.000  A  002   Pant     00000.074  A  002   14:0     00000.000  A  002
Fe       00001.280  A  002   B6       00000.056  A  002   16:0     00000.053  A  002
Mg       00025.000  A  002   Fola     00033.300  A  002   18:0     00000.009  A  002
P        00039.000  A  002   B12      00000.000  A  002
K        00299.000  A  002   A-RE     00008.000  A  002
                             A-IU     00081.000  A  002

PF1 = Help          PF2 = To FDM      PF3 = Main Menu     PF4 = Search by FC
PF5 = Switch Screen PF6 = Delete      PF7 = Prev. Food    PF8 = Next Food
PF9 = NCT 1         PF10= NCT 2       PF11= NCT 3         PF12= * * * * * * *
```

```
                    Nutrient  Conversion  Table      Screen Two
  Food Code  0196.100  NCT 1  Desc  BEANS SNAP YELLOW OR WAX CKD WO SALT ADD
Nutr     Value     QI  Src   Nutr     Value     QI  Src   Nutr     Value     QI  Src
MUFA     00000.011  A  002   Chol     00000.000  A  002   Arg      00000.076  A  002
16:1     00000.001  A  002   Phys                          His      00000.035  A  002
18:1     00000.011  A  002   Trp      00000.020  A  002   Ala      00000.087  A  002
20:1     _________  -  ---   Thr      00000.082  A  002   Asp      00000.265  A  002
22:1     _________  -  ---   Ile      00000.069  A  002   Gle      00000.194  A  002
                              Leu      00000.116  A  002   Gly      00000.068  A  002
PUFA     00000.145  A  002   Lys      00000.091  A  002   Prol     00000.070  A  002
18:2     00000.056  A  002   Met      00000.023  A  002   Ser      00000.103  A  002
18:3     00000.089  A  002   Cys      00000.018  A  002
18:4     _________  -  ---   Phe      00000.069  A  002   Caff     _________  -  ---
20:4     _________  -  ---   Tyr      00000.044  A  002   Oxal     _________  -  ---
20:5     _________  -  ---   Val      00000.093  A  002   Phyt     _________  -  ---
22:5     _________  -  ---
22:6     _________  -  ---

PF1 = Help          PF2 = To FDM      PF3 = Main Menu     PF4 = Search by FC
PF5 = Switch Screen PF6 = Delete      PF7 = Prev. Food    PF8 = Next Food
PF9 = NCT 1         PF10= NCT 2       PF11= NCT 3         PF12= * * * * * * *
```

Figure 3. Two screens are used for viewing each record in the working database. The Scr column lists the source from which the values were obtained according to the user specified scheme.

Nutrient Value Master Screen One

Food Code 0196.100 Source 002 Desc BEANS SNAP YELLOW OR WAX CKD WO SALT ADD

Nutr	Value	QI	Nutr	Value	QI	Nutr	Value	QI
H2O	00089.220	A	Na	00003.000	A	Caro	_____	_
Kcal	00035.000	A	Zn	00000.360	A	VitD	_____	_
Pro	00001.890	A	Cu	00000.103	A	E-AT	_____	_
Fat	00000.280	A	Mn	00000.294	A	E-TT	_____	_
Cho	00007.890	A	Cr	_____	_			
CFib	00001.430	A	Se	_____	_	TSFA	00000.064	A
DFib	00001.800	A				4:0	_____	_
Sucr	_____	_	Asc	00009.700	A	6:0	_____	_
ETOH	_____	_	Thia	00000.074	A	8:0	_____	_
Ash	00000.730	A	Ribo	00000.097	A	10:0	_____	_
			Niac	00000.614	A	12:0	_____	_
Ca	00046.000	A	Pant	00000.074	A	14:0	00000.000	A
Fe	00001.280	A	B6	00000.056	A	16:0	00000.053	A
Mg	00025.000	A	Fola	00033.300	A	18:0	00000.009	A
P	00039.000	A	B12	00000.000	A			
K	00299.000	A	A-RE	00008.000	A			
			A-IU	00081.000	A			

PF1 = Help PF2 = To FDM PF3 = Main Menu PF4 = Search by FC
PF5 = Switch Screen PF6 = Delete PF7 = Prev. Food PF8 = Next Food
PF9 = Add Source PF10= Prev. source PF11= Next source PF12= Edit this src

Nutrient Value Master Screen Two

Food Code 0196.100 Source 002 Desc BEANS SNAP YELLOW OR WAX CKD WO SALT ADD

Nutr	Value	QI	Nutr	Value	QI	Nutr	Value	QI
MUFA	00000.011	A	Chol	00000.000	A	Arg	00000.076	A
16:1	00000.001	A	Phys	_____	_	His	00000.035	A
18:1	00000.011	A	Trp	00000.020	A	Ala	00000.087	A
20:1	_____	_	Thr	00000.082	A	Asp	00000.265	A
22:1	_____	_	Ile	00000.069	A	Glu	00000.194	A
			Leu	00000.116	A	Gly	00000.068	A
PUFA	00000.145	A	Lys	00000.091	A	Prol	00000.070	A
18:2	00000.056	A	Met	00000.023	A	Ser	00000.103	A
18:3	00000.089	A	Cys	00000.018	A			
18:4	_____	_	Phe	00000.069	A	Caff	_____	_
20:4	_____	_	Tyr	00000.044	A	Oxal	_____	_
20:5	_____	_	Val	00000.093	A	Phyt	_____	_
22:5	_____	_						
22:6	_____	_						

PF1 = Help PF2 = To FDM PF3 = Main Menu PF4 = Search by FC
PF5 = Switch Screen PF6 = Delete PF7 = Prev. Food PF8 = Next Food
PF9 = Add Source PF10= Prev. source PF11= Next source PF12= Edit this src

Figure 4. Two screens are used for entering and viewing nutrient values from a single source in the master database. QI is the quality indicator. (A=Actual, I-Imputed value)

range of dates. The Food and Nutrient report (figure 5) lists individual values for a maximum of six user-selected food components. Total amounts of the selected nutrients are reported for each meal for every subject. The Subject Intake Summary (figure 6) reports the daily average intake for any number of food components. The average may be calculated for one day or a range of days. Separate averages are reported for the diet and for any supplements consumed, along with a total daily average. If a supplement was consumed in an unknown amount, then the corresponding total daily average is simply flagged. Daily averages which exceed a given threshold value are also flagged. For example, the researcher is alerted if daily protein consumption exceeded 200 grams. This report uses information from an abbreviated subject history to select appropriate nutrient standards based on the subject's age and sex. The report lists intake totals expressed as a percentage of the RDA (3) or other nutrient standard and as a percentage of the subject's actual weight. The percentage of blank items and imputed items are calculated to help the researcher determine the validity of the reported values; both percentages are based on the total number of food items analyzed.

Subsequent to generating the Subject Intake Summary reports, the user is given the option of storing the calculated values for statistical analyses. Summary files can be created which contain, for every nutrient, the daily average for the diet, the amount in supplements consumed, and a nutrient standard. The summary files were designed to contain the information necessary for the types of studies that might be done at the GFHNRC. Some studies compare the intakes of several groups, so a group identifier is needed. Other studies may be interested in the changes in a person's intake over time, the effects of various diets, or estimating inter- and intra-subject variability. Thus, multiple records are allowed per person with a date and treatment code stored in each record. The design of this system also supports methodological research studies. For example, because several types of records are allowed, various dietary assessment methods can be compared. The multiple source feature allows published values to be compared to data obtained from in-house laboratory analyses.

If the summary records do not give the level of detail needed by the researcher, the original intake records can be recalled. Reports can then be generated which, for example, summarize intakes of different classifications of foods for various population groups.

In conclusion, one must consider the types of research that the nutrient database must support when designing or selecting a system. Different areas of research may have distinct requirements of a system. With the design I have just described, we have tried to develop a system which supports the types of inpatient and outpatient studies and methodological research done at the GFHNRC.

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REFERENCES

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2. USDA Consumer Nutrition Center Data Set 456-3, Hyattsville, MD: US Department of Agriculture, 1977.
3. Committee on Dietary Allowances, Food and Nutrition Board. Recommended Dietary Allowances. Washington, DC: National Academy of Sciences, 1980.

FOOD AND NUTRIENT INTAKE REPORT
PREPARED: 03/13/87

STUDY NUMBER: 999 USE: FOOD RECORD
SUBJECT NUMBER: 9999 SEX: M AGE: 31.8
INTAKE DATE: 10/24/86 INTERVIEWER: 31
HISTORY DATE: 10/23/86 HEIGHT: 173.00 CM WEIGHT: 72.70 KG IDEAL WEIGHT: 67.50 KG WEIGHT DIFF: 5.20 KG TREATMENT:

MEAL 001

FOOD CODE	FOOD DESCRIPTION	GRAM AMOUNT	CALORIES KCAL	CHO GM	PROTEIN GM	FAT GM	VIT A IU	VIT C MG
440.507	BRAN CHEX READY-TO-EAT CEREAL	85.75	273.543	68.343	8.832	2.401	187.793	45.448
1322.206	MILK COW FLUID PAST RAW SKIM W VIT A & D	367.50	128.302	17.824	12.532	0.662	749.700	3.602
141.003	BANANAS RAW COMMON	95.20	87.584	22.305	0.981	0.457	77.112	8.663
	MEAL TOTALS	548.45	489.429	108.472	22.345	3.520	1014.605	57.713

MEAL 002

FOOD CODE	FOOD DESCRIPTION	GRAM AMOUNT	CALORIES KCAL	CHO GM	PROTEIN GM	FAT GM	VIT A IU	VIT C MG
1899.805	ROLL & BUN COMM RDY-T-SRV HAMB/HOTDOG EN	40.00	114.400	20.096	3.428	2.092	0.000*	0.000*
370.207	BEEF RETAIL GROUND LEAN 21% FAT WEL DONE	85.50	273.600	0.000	23.171	19.409	34.200	0.000
653.306	CHEESE PASTEURIZED PROCESSED AMERICAN	21.00	78.846	0.336	4.652	6.563	254.016	0.000
1258.001	LETTUCE RAW CRISP ICEBRG NW YORK GR LAKE	5.00	0.650	0.105	0.051	0.010	16.500	0.195
2282.101	TOMATOES RIPE RAW YEAR ROUND AVERAGE	7.11	1.351	0.309	0.063	0.015	80.556	1.251
1558.005	PICKLES CUCUMBER DILL	30.00	3.300	0.660	0.210	0.060	30.000	1.800
1806.408	POTAT FRZ FR FRY REST PREP ANIM VEG OIL	100.00	315.000	39.560	4.030	16.570	0.000	10.300
	MEAL TOTALS	288.61	787.147	61.066	35.605	44.719	415.272	13.546

(Continued)

Figure 5. Food and Nutrient Intake report.

(Figure 5, continued)

MEAL 003

FOOD CODE	FOOD DESCRIPTION	GRAM AMOUNT	CALORIES KCAL	CHO GM	PROTEIN GM	FAT GM	VIT A IU	VIT C MG
2159.007	SPAGHETTI ENRCHD COOKED TENDER 14-20 MIN	420.00	466.200	96.600	14.280	1.680	0.000	0.000
1976.664	SAUCE SPAGHETTI WITH MEAT	83.45	80.112	6.509	3.755	4.256	1261.764	0.000
446.009	BREADS FRENCH OR VIENNA ENRICHED	50.00	140.000	25.295	4.750	1.940	0.000	0.000
1317.334	MARG REG HARD STK CORN & CORN HYDRO SALT	4.70	33.779	0.042	0.042	3.784	155.429	0.008
922.005	CRANBERRY JCE COCKTL BTLED APPOX 33% JCE	379.20	219.936	56.425	0.114	0.190	7.584	161.539
1258.001	LETTUCE RAW CRISP ICEBRG NW YORK GR LAKE	55.00	7.150	1.150	0.556	0.105	181.500	2.145
1932.101	SALAD DRESSING COMM FRENCH REG W SALT	32.00	137.504	5.600	0.192	13.120	21.440	0.000
	MEAL TOTALS	1024.35	1084.681	191.621	23.689	25.075	1627.717	163.692
	DAY TOTALS	1861.41	2361.257	361.159	81.639	73.314	3057.594	234.951

PERCENT EXTERNAL DEVIATIONS: 0.0

* INDICATES BLANK VALUE

Figure 5. Food and Nutrient Intake report.

SUBJECT INTAKE REPORT
PREPARED: 03/12/87

STUDY NUMBER: 999
SUBJECT NUMBER: 9999
PERIOD COVERED: 10/23/86 TO 10/29/86
RECORD TYPE: FOOD RECORD
MEAL: 001 - 006

HISTORY DATE: 86/10/23
TREATMENT: 99
SEX: M
AGE: 31.8
HEIGHT: 173.00 CM
WEIGHT ACTUAL: 72.70 KG
IDEAL: 67.50 KG
DIFF: 5.20 KG

INTERVIEWER: 31
BASAL ENERGY ESTIMATE (HARRIS & BENEDICT): 1710.8
BEE PLUS 50% FOR ACTIVITY: 2566.2

AVERAGE DAILY WEIGHT OF FOOD: 2295.33 GM
NUMBER OF ITEMS: 99
PERCENT EXTERNAL DEVIATIONS: 6.4
STANDARD USED: 80RDA

NUTRIENT SUMMARY

LINOLEIC/TSFA : 0.32

NUTRIENT	UNIT	DIET DAILY AVERAGE	SUPPLEMENT DAILY AVERAGE	TOTAL DAILY AVERAGE	NUTRIENT STANDARD	DIET % STD	DIET INQ	DIET NUTR/ 1000 KCAL	DIET NUTR/ ACTUAL WGT	% ITEMS BLANK	% ITEMS IMPUTED	% TOTAL KCAL
CALORIES	KCAL	2176.040		2176.040	2700.000	81	1.00	1000.00	29.93	0	3	
CHO	GM	291.423		291.423	0.000	0		133.92	4.01	0	3	54
PROTEIN	GM	82.725		82.725	56.000	148	1.83	38.02	1.14	0	3	15
FAT	GM	78.547		78.547	0.000	0		36.10	1.08	0	3	32
VIT A	IU	2402.462	10000.000	12402.462	5000.000	48	0.60	1104.05	33.05	4	3	
VIT C	MG	208.696	200.000	408.696	60.000	348	4.32	95.91	2.87	5	3	
FOLACIN	MCG	219.829		219.829	400.000	55	0.68	101.02	3.02	29	0	
NIACIN	MG	27.695	100.000	127.695	18.000	154	1.91	12.73	0.38	2	1	
RIBOFLAV	MG	2.724	10.000	12.724	1.600	170	2.11	1.25	0.04	2	1	
THIAMIN	MG	2.337	10.300	12.637	1.400	167	2.07	1.07	0.03	2	1	
VIT B6	MG	1.820	4.100	5.920	2.200	83	1.03	0.84	0.03	12	0	
VIT B12	MCG	4.620	5.000	9.620	3.000	154	1.91	2.12	0.06	12	0	
CALCIUM	MG	1199.971		1199.971S	800.000	150	1.86	551.45	16.51	0	3	
PHOSPHRS	MG	1761.593		1761.593	800.000	220	2.73	809.54	24.23	2	1	
IRON	MG	21.956	12.000	21.956	10.000	220	2.72	10.09	0.30	2	14	
MGNESIUM	MG	317.996	65.000	382.996	350.000	91	1.13	146.14	4.37	3	4	
ZINC	MG	12.579	1.500	14.079	15.000	84	1.04	5.78	0.17	0	9	
COPPER	MG	1.586	2.000	3.586	2.000	79	0.98	0.73	0.02	10	3	
SODIUM	MG	3122.079		3122.079	1100.000	284	3.52	1434.75	42.94	2	3	
POTASIUM	MG	2908.257		2908.257	1875.000	155	1.92	1336.49	40.00	3	2	
WATER	GM	1713.730		1713.730	0.000	0		787.55	23.57	5	0	
TSFA	GM	25.636		25.636	0.000	0		11.78	0.35	14	0	
OLEIC	GM	28.606		28.606	0.000	0		13.15	0.39	14	0	
LINOLEIC	GM	8.315		8.315	0.000	0		3.82	0.11	14	0	
CRUD FIB	GM	4.246		4.246	0.000	0		1.95	0.06	6	1	
CHOL	MG	184.007		184.007	0.000	0		84.56	2.53	11	0	

** DAILY AVERAGE EXCEEDS THRESHOLD VALUE
* MGS. D-ALPHA-TOCOPHEROL X 1.2 = MGS. ALPHA-TOCOPHEROL EQUIVALENTS, WHICH ARE THEN COMPARED TO NUTRIENT STANDARD
S UNKNOWN QUANTITY OF SUPPLEMENTS FOR THIS NUTRIENT HAVE BEEN TAKEN.

Figure 6. Subject Intake Report. This example summarizes information from food records collected for seven consecutive days.