

HOSPITAL APPLICATIONS OF A NUTRIENT DATA BASE

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Children's Hospital Medical Center of Akron is a 253 bed acute care teaching facility providing the full spectrum of services to the pediatric age group, and providing regional services in both neonatal intensive care and burn care.

Approximately 4 years ago, the Department of Food Service and Nutrition of CHMC purchased the HVH-CWRU Nutrient Data Base for use in patient nutritional care. We purchase updates of the data from Case Western Reserve University annually, but have developed our own software due to language incompatibility between the two systems.

DATA BASE SELECTION

The data base was selected primarily because of the flexibility built into the coding system. We utilize the NDB for both inpatients and ambulatory clients. Particularly with diet diary analysis, the availability of flexibility in measuring units allowed for data entry is critical. The HVH-CWRU coding system has arranged foods into 43 groups and all entries are made in the universal 100 gram portion, but with conversion factors that allow the entry to be made in at least 7 and up to 16 household measures or metric equivalents.

INITIAL DIFFICULTIES

The most critical problem was the incompatibility of our computer language, RPG3. CWRU Department of Biometry offered aid in transcription of their programming, but we decided to develop our own.

The other major problem was the need for programming changes from the batch-mode used at CWRU to accommodate online input of data. The first programmer involved had little conception of our needs and failed to make these program changes. Fortunately a new programmer-analyst arrived at this time. Our department also adopted a comprehensive plan for the materials management aspect of The Food Service area incorporating the NDB as an integral part. The new analyst had a background in food service management and time was allotted for him to develop improved programming with an eye to future uses we will make of the NDB.

USES OF THE NDB

Patient Care

There are special needs in our young patient population. Much individualized diet therapy must be provided, since nutritional support of hospitalized children must accommodate their high nutritional needs at a traumatic time of separation from home. We do a great deal of nutrient intake evaluation. The NDB system provides tremendous time savings and leaves the Registered Dietitian more time for medical and patient interaction. We are also able to provide a far greater scope of analysis than hand calculation could ever provide.

Teaching

We also use the NDB system in teaching dietetic and medical students. We are beginning to explore use of the computer in patient education, since the patients who have tested this have been very enthusiastic.

Ambulatory Services

Nutritional assessment includes diet diary analysis at the Physical Fitness Center of a nearby hospital, where the dietetic services are contracted from Children's.

Research

We have submitted 4 grants in 3 years from CHMC of Akron with a nutrition component that incorporated use of the NDB system.

Other Uses

We analyzed all diets in our newly revised 400 page Handbook of Diet Therapies using the NDB. We include a statement of adequacy on each diet. We also analyze all house menus for adequacy whenever our cycle is changed. A popular use has been the posting of kcalorie content of cafeteria food items.

STEPS IN THE DEVELOPMENT OF THE PATIENT CARE USES

The master handbook of all items in the data base was used to code all the items on our 21 day cycle for both patients' and cafeteria items. Thus, we created an efficient and handy "mini code book" personalized for CHMC. We also included all standard write-ins, special dietary products, therapeutic nutritional supplements such as tube feedings and all items available in our nourishment centers. We have then been able to analyze all the items for kcalories, grams of protein, fat and carbohydrate and milligrams of sodium.

Obviously, the subset of an entire code book provides much faster accessibility of the data base. This is essential to make the NDB appealing to the busy professional. This code book is invaluable in the writing of modified diets, and helps allow tremendous variety. Other nutrients are easily available to the dietitian upon request.

One particular problem for a Children's Hospital is the lack of a single standardized portion size. We must offer toddler, child, and adult portion sizes. When we have these worked out we will produce a new mini code book which will reflect these variations in portion size.

Another development needed was efficient coding forms. With the mini code book and these forms, our technician can code and input a patient intake in about 5 minutes. We have coding forms designed for inpatient use and for diet diaries.

Our last critical need was for program outputs which included the summarization of patient intake with a comparison to a standard (the RDA). This form is suitable for inclusion in the Medical Record and is entitled "Nutrient Intake Evaluation."

SPECIAL CONSIDERATIONS FOR THE NUTRIENT INTAKE EVALUATION FORM (attached) In developing the programming for this output we incorporated:

1. Meal by meal analysis. We assume that sometime in the future some nutrients availability (such as Fe) will need to be assessed by meal.
2. Averaging of nutrient intakes. This increases the applicability of the RDA for use in evaluating individual dietary intakes. It is desirable to have 5 days intake.
3. Flagging of incomplete data. This is noted with an asterisk beside the total amount reported. Knowledge of the nutrient content of all foods is far from complete, though growing continually.

Interpretation of these analysis is a critical component for which the dietitian is uniquely qualified. The dietitian must assess foods consumed against nutrient intake, reported particularly when the data is flagged and intake is below two thirds of the Recommended Dietary Allowances (RDA). Other considerations must include the patients health status, medications and other therapies. Without a NDB we could never approach the scope of evaluation we can now provide.

The Materials Management Area

As shown in the schematic, our goal is to have a fully integrated computer system for materials management, with the NDB system at the core. The NDB will be an integrator among food service tasks and between the food service system and the patient care system.

Our Recipe File

The data base has a food group category reserved for recipes. We can use this recipe file to enter "recipes" for vitamin and mineral supplements since individual nutrients are now items in the data base.

We are also working on standardization of recipes as an aspect of materials management.

Future Directions

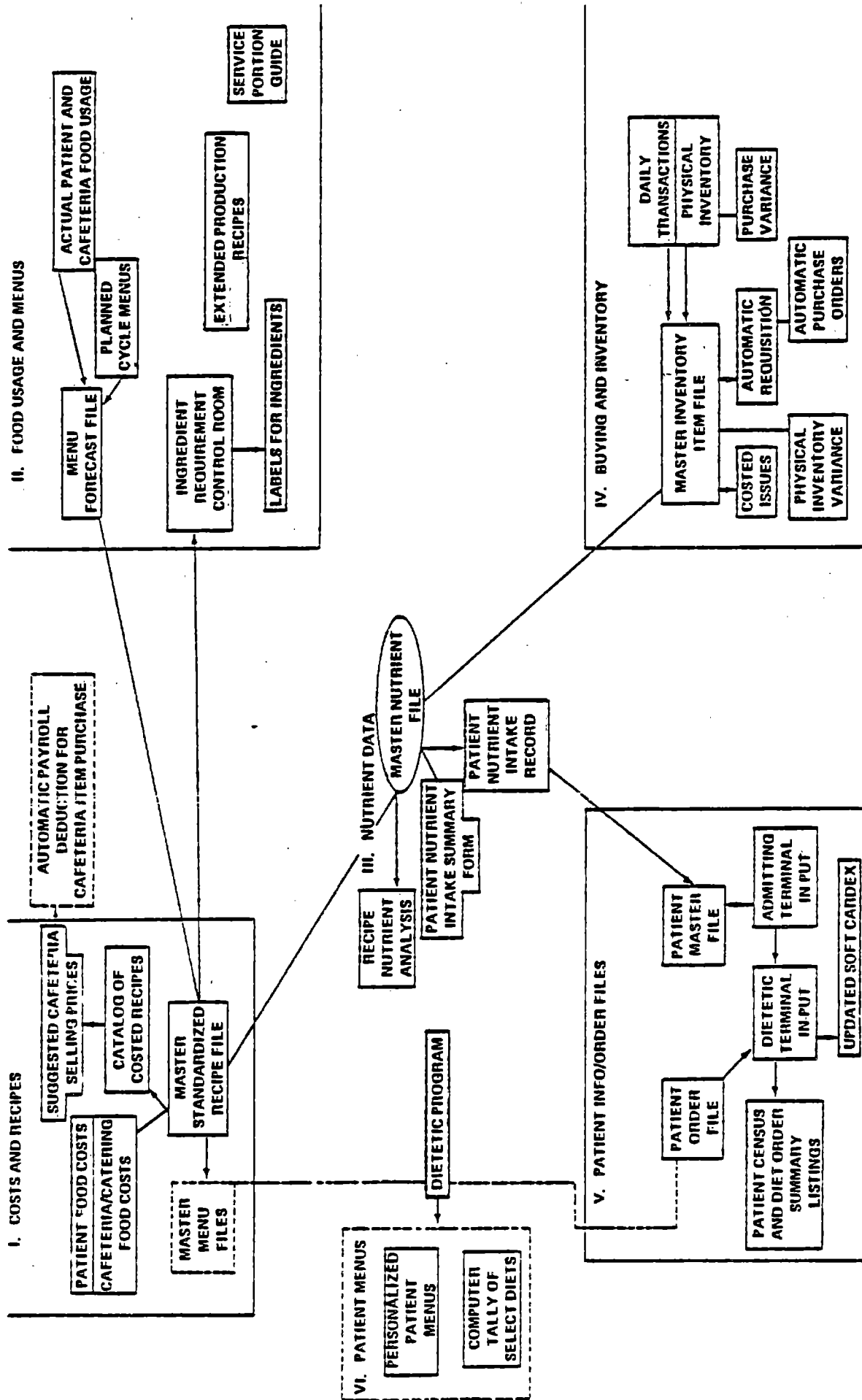
At this time we can summarize all nutrient intake from enteral sources (food, supplements, formulas or tube feedings). We will soon have the capacity to add parenteral fluids, thus we could summarize total nutrient intake from ALL sources!

We are now working on an alternative set of standards to replace the RDA in the evaluating of parenteral nutrient intake.

The Equipment Used at Children's

The hospital system is the IBM 38, which is designed to run efficiently in an online environment. This system has 2 billion bytes of disc storage and an internal memory of 3 million bytes. We use a business communication language RPG3. Our CRT workstation is an IBM Model 5251, and our remote printer is IBM 5256, which has a printing capacity of 300 characters per minute.

MASTER PLAN FOR COMPUTERIZATION OF THE FOOD SERVICE AND NUTRITION DEPARTMENT



1/80
 3/82
 Children's Hospital Medical Center
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NUTRITIONAL INTAKE EVALUATION FORM

1 DAY AVERAGE

DATE- 07/22/83

PATIENT'S NAME- JOHNNY JONES

NUMBER- 09090909

HEIGHT- 106.0 CM 41.8 IN

WEIGHT- 15.40 KG 33.9 LBS

AGE- 4.75 YR

SEX- M

BASED ON RDA FOR AGE (AVERAGE)

FROM NCHS GROWTH CHARTS

PATIENT IS 88.3 % OF AVERAGE HEIGHT.

PATIENT'S HT/AGE: <50 %

PATIENT IS 77.0 % OF AVERAGE WEIGHT.

PATIENT'S WT/AGE: <25 %

PATIENT'S IDEAL WEIGHT IS 16.5 KG 36.3 LBS

PATIENT'S WT/HT: <25 %

BASED ON WEIGHT FOR HEIGHT

NUTRIENT	UNIT	INTAKE AVERAGE	R.D.A. VALUE	PERCENT OF RDA %	NUTRIENT	UNIT	INTAKE AVERAGE	R.D.A. VALUE	PERCENT OF RDA %
ENERGY	KC	960.96	1700.000	56.53 %	THIAMIN	MG	1.44	.900	159.57 %
PROTEIN	G	33.60	30.000	111.99 %	VITAMIN B6	UG	1921.92	1300.000	147.84 %
VITAMIN A	IU	2402.40	2500.000	96.10 %	VITAMIN B12	UG	5.76	2.500	230.21 %
VITAMIN D	IU	191.98	400.000	48.00 %	CALCIUM	MG	479.95	800.000	59.99 %
VITAMIN E	MG	28.80	6.044	476.46 %	PHOSPHOROUS	MG	479.95	800.000	59.99 %
ASCORBIC ACID	MG	143.99	45.000	319.97 %	IODINE	MG	.07	.090	80.00 %
FOLACIN	MG	.19	.200	95.00 %	IRON	MG	8.64	10.000	86.38 %
NIACIN	MG	19.20	11.000	174.53 %	MAGNESIUM	MG	191.98	200.000	95.99 %
RIBOFLAVIN	MG	1.63	1.000	163.15 %	ZINC	MG	14.40	10.000	143.99 %

NUTRIENT	UNIT	INTAKE AVERAGE	STANDARD
CARBOHYDRATE	G	119.96	50-55 % OF KC
FAT	G	38.40	30 % OF KC
ALCOHOL	G	.00	
CHOLESTEROL &	MG	.00	< 300 MG PER DAY
POLYUNSAT FA &	MG	.00*	
SATURATED FA &	MG	.00*	
SODIUM &&	MG	479.95	450-1350 mg/day
POTASSIUM &	MG	599.81	775-2325 mg/day
ENERGY	KC	960.96	1300 - 2300

CALORIE SUMMARY	
CARBOHYDRATE	= 50.06 % OF CALORIES
FAT	= 35.96 % OF CALORIES
ALCOHOL	= .00 % OF CALORIES
PROTEIN	= 13.98 % OF CALORIES

* POSSIBLY AN ADDITIONAL AMOUNT.
 & BASED ON 1980 U.S. DIETARY GOALS.
 && BASED ON 1980 RECOMMENDED DIETARY ALLOWANCES.

SIGNATURE Staff R.D.

S: Pt. admitted to ICU for multiple trauma, fractures.
 O: Adm. Wt: 15.4 kg (10%/age, 15%/ht) Adm. ht: 106 cm (30%/age) Current Wt: 14.1 kg (1 wk. post adm.) Wt. loss of 1.3 kg since adm. Ideal wt: 17.4 kg (Based on wt for ht @ 50%)
 Current nutr. support: Protein Kcals
 Osmolyte @ 60 cc q 3 hr 17.6 502
 D5 @ 30 cc/hr 122
 TOTAL 17.6 624

Estimated nutr. requirement:
 Kcals: BMR x 1.5 = 1087 + 25% for metabolic stress/fractures
 725 kcal x 1.5 = 1087 + 25% = 1358 kcal/day
 Protein: 30 gm/day (based on RDA for age)

A. Current Nutr. support provides inadequate Kca protein, vitamins, minerals, (except Vit E, V C, Niacin, Riboflavin, Thiamin, B6, B12, Zinc to meet estimated requirements. Pt. requires approx. 1280 cc Osmolyte/day (160 cc q 3 hr). This amt. of tubefeed will meet or exceed nut needs according to RDA for age & estimated kc needs based on wt. and increased metabolic needs for stress. Potassium intake will meet lower end of recommended range when intake reaches 620 cc or approx. 80 cc q 3 hr.
 P: (1) Suggest gradual increase in amt. of tube-feed according to pt. tolerance until desired volume is achieved.
 (2) Will post calorie count daily until wt is stable, then 3x weekly. Monitor intake, wt, and tolerance.
 (3) Weekly follow up note to update nutrition status, discuss any current problems, etc.