

PERSPECTIVES IN PRACTICE

Preadmission nutrition screening: Expanding hospital-based nutrition services by implementing earlier nutrition intervention

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ABSTRACT

The need to screen patients earlier than within the first 24 hours of hospital admission has resulted in the development of preadmission nutrition screening. At Providence Saint Joseph Medical Center (PSJMC), a 455-bed acute-care facility, this procedure has been used since 1994. The preadmission screening method was developed because of the use of critical pathways for patients in specific diagnosis-related groups. Critical pathways specified that registered dietitians must assess these patients within 24 hours of admission at PSJMC. However, at that time there was minimal data in the chart from which to assess the patient's nutritional status and the ability to interview the patient was often limited as a result of intubation or postoperative pain. Family members were not always available at the hospital to discuss a patient's preadmission nutritional status. To address this problem, we developed a system to call people at home before their admission to the hospital to obtain specific nutrition information. To analyze the effectiveness of the procedure, the Food and Nutrition Services Department developed a process to assess this method of screening and to improve the system. Patients were enrolled in a study over a 1-month period, demographics were identified for this sample population, and patient satisfaction was determined via an interview conducted by a dietetic technician after the patient was admitted. Most patients found this to be a very helpful process and an example is presented here on the role of preadmission nutrition screening in improving patient outcome. To better define the population of the case study presented, additional information was gathered on a second study group of patients screened before admission who were admitted for hip and knee surgery, one of the specific diagnosis-related groups with a critical pathway. Our findings indicate that preadmission nutrition screening has the potential to improve patient outcomes by increasing nutrient intake before their hospital admission, reducing hospitalization length, and enhancing patient satisfaction during their hospital stay. *J Am Diet Assoc. 2000;100: 81-87.*

The high frequency of malnutrition in hospitals has been documented in the literature for several decades (4-8). Nutrition deficits can occur before the patient's admission and iatrogenic malnutrition may develop as a result of inadequate nutrient intake while in the hospital. Increased awareness of the detrimental effect malnutrition can have on patient outcomes has caused clinicians at Providence Saint Joseph Medical Center (PSJMC) to identify specific high-risk patient populations. Patients are assigned a level of care by a dietetic technician on the basis of specific nutrition parameters and diagnosis (Table 1). Levels of care provide the criteria by which a patient's nutritional status is assessed to prioritize the timing and frequency of the nutrition intervention required by the clinical nutrition staff. Those patients identified, ideally at admission, at the highest risk level for compromised nutrition receive a more comprehensive nutrition assessment than patients indicated at the lowest risk (9-11). The goal is to prevent malnutrition or improve the person's nutritional status before hospitalization. Preadmission nutrition screening has this potential, if the patient is identified several weeks before being hospitalized. Nutrition screening outside the hospital has been promoted, especially for the elderly population (12-16). To our knowledge, this is the first published article on preadmission nutrition screening by hospital clinicians of patients who are scheduled for hospital admission.

Researchers in various disciplines have approached the topic of early screening and have synchronized their therapies with specific patient populations to enhance patient care (17). For this reason, interdisciplinary teams at health care institutions have developed critical pathways to improve patient outcomes (18-20). These outcomes include decreased length of hospital stay and decreased morbidity and mortality.

The Joint Commission on the Accreditation of Health Care Organizations (JCAHO) has indicated that patients should be screened within 24 hours of admission, but not more than 30 days before admission (21,22). Clinicians at individual facilities are responsible for specifying the exact mechanism for achieving this goal. The need to rely on health professionals other than registered dietitians and dietetic technicians to accomplish components of nutrition screening is becoming an accepted practice (23). At PSJMC, the nursing staff uses criteria called "nutrition triggers" at the time of admission to identify

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Table 1

Nutritional assessment levels of care used by dietetic technicians to determine, on the first day after admission, if a patient is at low risk, at potential risk, or at risk for compromised nutrition or is currently in a state of compromised nutrition^a

Criteria	Level 4—compromised	Level 3—at risk	Level 2—potential risk	Level 1—low risk
Assessment	Within 1 day of admission	Within 3 days of admission	Within 5 days of admission	Assessed upon physician consult or nurse's referral
Admitting diagnosis	Anorexia nervosa Bulimia Cachexia Diabetes ketoacidosis Diabetes out of control Failure to thrive Head trauma Malnutrition	Aspiration pneumonia AIDS Alcoholic liver disease Celiac sprue Dehydration Dermal ulcer, stage II or greater Dysphagia End-stage renal disease Gestational diabetes Hepatic encephalopathy Hyperemesis Hyperemesis of pregnancy Hypoglycemia Inflammatory bowel disease Mandible fracture Multiple trauma New onset diabetes mellitus Pregnancy-induced hypertension	Angina Cancer Cellulitis Cerebral vascular accident Chronic obstructive pulmonary disease Congestive heart failure Coronary artery disease Diabetes mellitus Gastrointestinal disorders Hypertension Liver disease Myocardial infarction Pancreatitis Pneumonia Pregnancy Pulmonary disorders	All others
Diet order	Enteral nutrition Parenteral nutrition	Dysphagia diet Postgastrectomy diet Protein-restricted (40 g or less) Renal diet	Any diet with oral supplements Diabetic diet Fat/cholesterol-restricted diet Mineral restrictions Pureed Residue restricted NPO or clear liquid >4 days	All others
Medical history		End-stage renal disease	Diabetes	All others
Albumin	<21 g/L	21-30 g/L	31-34 g/L	≥35 g/L
Dermal ulcer	Stage IV	Stage II-III		No dermal ulcer
Body weight	≤79% IBW Pediatric patient: <5th Percentile wt/ht	80-89% IBW ≥200% IBW	130%-199% IBW	90%-129% IBW
Unintentional weight loss	≥10% over the past 6 mo			
Creatinine	>176.8 μmol/L ^b			

^aKey: AIDS=acquired immunodeficiency syndrome; NPO=nothing by mouth; IBW=ideal body weight.

^bTo convert μmol/L creatinine to mg/dL, multiply μmol/L by 0.0113. To convert mg/dL creatinine to μmol/L, multiply mg/dL by 88.40. Creatinine of 80 μmol/L=0.90 mg/dL.

those patients at the highest risk for nutrition problems who require intervention by a registered dietitian (Figure 1). A dietetic technician uses this information to assign a nutrition assessment level of care. In an attempt to screen patients earlier than admission, preadmission nutrition screening was developed.

Opportunity Statement

An opportunity statement was initially drafted to identify the reason for developing this method of nutrition screening: "An opportunity exists with the timing of the nutrition assessment to enhance the patient's nutrition status prior to admission and to improve patient satisfaction." The opportunity statement was submitted to the Performance Improvement Council at PSJMC. Opportunity statements represent selection of a process that can be diagnosed, improved, and then measured to optimize outcomes. The screening at admission system resulted in a delay in obtaining food preferences for the initial meals served to patients. Delay in determining the potential for nutrition deficits such as decreased appetite for longer than 2 weeks, weight loss of 10% or more over 6 months, and body weight below 90% of ideal puts the patient at risk for more complications during their hospitalization and increased length of hospital stay.

Identifying Patients for Preadmission Screening

During a 1-month period, data were collected on specific nonemergent patients (ie, planned or scheduled admissions) identified via the admitting department's computer-generated scheduled admission information (Table 2). These data included the patient's scheduled admission date, age, medical record number, name, admitting diagnosis, scheduled surgery, and telephone number and address. The earliest screening possible was preferred to optimize nutrient intake of patients identified as being at nutrition risk. Patients in this group were screened by a dietetic technician an average of 9 days before admission. All patients whose diagnosis required adherence to a critical pathway and patients with a diagnosis anticipated to result in a hospital stay longer than 3 days were screened by a dietetic technician over the telephone. A dietetic technician interviewed each patient and filled out the first portion of the Nutritional Care Plan card (Figure 2). The interview encompassed questions on nutrition risk factors including height, weight, weight changes over a specified time, appetite, nausea or vomiting, diarrhea, constipation, and chewing or swallowing difficulties as well as food allergies and food preferences. The dietetic technician at PSJMC found that the most convenient time of the day for contacting the patient was in the afternoon. If the patient or a relative was not available, a telephone message was left indicating a contact person in the Food and Nutrition Services Department and the department telephone number. When the patient returned the telephone call the dietetic technician responsible for interviewing that patient was available by pager if he or she was not in the office. Those patients who were identified as being at risk for compromised nutrition were instructed by the dietetic technician on methods of increasing their oral intake, including eating small frequent meals and nutrient-dense foods. The patient was also instructed on the hospital procedure for meal service and who to contact for assistance after admission. Dietetic technicians, especially dietetic technicians, registered, are qualified for expanded role responsibilities such as preadmission nutrition screening. Many of the job duties for dietetic technicians that

- Dysphagia
- Oral intake of 50% or less in the past 2 days
- Dermal ulcer (stage II or greater)
- Unintentional weight loss ≥10% body weight within the past 6 months
- History of diabetes
- History renal failure
- Patient appears malnourished

FIG 1. Criteria Providence St Joseph Medical Center nurses use to identify patients at nutrition risk. When one or more of the criteria are identified, nurses send a consultation notice to Nutrition Services via the Clinical Information System.

Table 2
Preadmission nutrition screening demographics (1 month), stratified by nutritional assessment levels of care

Factor	No deficit (n=27)	At risk (n=9)	Compromised (n=3)
	← mean ± SD →		
Age (y)	65 ± 2 ^a	69 ± 5	72 ± 9
Total acute care			
Length of stay ^a (d)	5.6 ± 7 ^b	11.1 ± 3.0	2.7 ± .9
Length of stay in ICU (d)	1.1 ± .4 ^b	4.8 ± 2.9	.7 ± .3
	← n →		
Diagnosis			
Total hip/knee surgery	10	3	1
Major thoracic surgery	6	1	2
Major small/large bowel surgery	5	1	0
Vascular or cardiac surgery	6	4	0
Discharge location			
Home	17	3	2
Extended care	8	5	1
Rehabilitation unit	0	1	0
Expired	2 ^c	0	0

^aLength of stay includes days in intensive care unit (ICU).

^bn=25.

were developed by the Dietetic Technician Task Force (24-26) are performed when assessing a patient over the telephone and counseling them on increasing their nutrient intake.

Optimizing Nutritional Status

A registered dietitian followed up with nutritionally compromised patients at home approximately 1 week after the initial screening telephone call, unless the patient was admitted to the hospital earlier than scheduled. This was done to determine if there had been a change in the patient's eating pattern after the preadmission screening. Was the patient able to consume more food than before the telephone call? Had the patient's weight status improved? Were there any further questions concerning optimizing the patient's intake? If the

patient was found to be severely nutritionally compromised and the impending surgery was elective, contacting the patient's physician before the patient's admission would be warranted. The goal would be to improve the patient's nutritional status before admission and perhaps delay the elective surgery until the patient's nutritional status improved.

Implementing a more aggressive approach to identifying patients at high risk of compromised nutrition before their admission has the potential to improve patient outcomes

Admission Procedure

Generally, there is a delay of a few meals before the Food and Nutrition Services Department obtains the patient's food preferences and allergies. This delay can be prevented by implementing the preadmission screening procedure on the day of admission. A dietetic technician enters each prescreened patient's food preferences and allergies into the computer. Dietetic technicians are also responsible for checking the preadmission screening file each morning for prescreened patients. This needs to occur before breakfast, so that the patient's food allergies and food preferences can be incorporated into the first meal served to the patient. Although some patients do not have a specific room number identified initially because of their surgery, it is still important to enter as much information as possible into the computer, because the patient could start eating later that day.

Patient Survey

A dietetic technician visits patients the first day after admission. At that time, the dietetic technician updates the patient's current status regarding appetite, weight loss, and nausea. After the patient's diet progresses to solid foods, a dietetic technician surveys each patient for comments on the preadmission screening process and meal service satisfaction. Twenty-eight of 32 patients (88%) who were surveyed found the screening helpful, especially in identifying food preferences and understanding how the menu selection process worked. One of the patients surveyed said, "Your food is terrific! The preadmit nutrition screening call in advance was very helpful. It made me feel good that you were aware [that I was] coming [into the hospital]. This is a very organized hospital!"

Patient satisfaction could be decreased if the preadmission nutrition information is not entered into the computer before the meal service starts. Dissatisfaction occurred at PSJMC when patients received meals not in congruency with the diet followed at home, foods disliked, or foods that could cause an

allergic reaction. For example, a compliant patient with diabetes may accidentally be placed on a general diet by his or her physician on admission. By implementing the preadmission nutrition screening procedure, "diabetic precautions" would be entered into the computer on admission. Thus, the patient would not get inappropriate food items on his or her meal trays. A registered dietitian would then be responsible for getting the correct diabetic diet order from the patient's physician, specifying energy level.

Hospital Monitoring

All patients receiving preadmission nutrition screening for the 1-month period (Table 1) were followed up until discharge. Data gathered included medical record number, admission diagnosis/type of surgery, critical pathway, age, sex, length of stay, length of stay in intensive care unit, and nutritional status (ie, nutrition compromise present, at risk of nutrition deficits, no apparent protein or energy deficits). Seven of 46 patients who were identified by a dietetic technician during the data collection period were unable to receive preadmission screening. Incorrect telephone numbers and patients not returning telephone calls were the most frequently identified problems.

Patients who were identified as being at risk for nutrition problems (Table 1) had longer hospital stays than patients with no deficits. However, compromised patients (n=3) had shorter hospital stays compared with the at-risk and no-deficit patient groups. Two compromised patients were admitted for major thoracic surgery and stayed in the hospital for 1 day and 4 days. The mean length of stay for patients in this sample group admitted for hip surgery was 5 ± 4 days (n=9). The third nutritionally compromised patient spent 3 days in the hospital. She was admitted for hip surgery; the specific details of this case are presented later in the article. In the sample population of patients admitted for knee or hip surgery (Table 1), the mean length of stay was 6 ± 4 days (n=14). Nutrition intervention before admission may have resulted in these patients' decreased length of hospital stay.

As an example, improvement in nutritional status before admission after preadmission nutrition screening was identified in a 75-year-old woman scheduled for hip surgery. A dietetic technician contacted her 15 days before admission. Her nutritional status was reported as compromised because of reported decreased food intake and a 10-kg (16%) unintentional weight loss in the previous 4 months, although she remained within 10% of her ideal body weight. During the initial contact with this patient, the dietetic technician suggested ways to optimize intake. These suggestions included eating small, frequent meals and adding supplements as necessary. The patient stated that she was on a general diet at home. This was discussed with a registered dietitian, who contacted the patient by telephone 9 days later. At that time the patient indicated she had gained nearly 1 kg by following the dietary suggestions made by the dietetic technician during the initial screening. At admission, the patient continued to report improved food intake and increased strength. Her serum albumin level at admission was 39 g/L. Her length of stay was 3 days in the acute-care hospital, 3 days less than the mean for the group of patients admitted for knee or hip surgery (data obtained from patients stratified by level of care in Table 1). The patient was transferred to the transitional-care unit for 10 days before discharge.

To gather further information on patients scheduled to be admitted for knee or hip surgery, 30 prospective patients were

Providence Health System Los Angeles Service Area		Nutritional Care Plan				NAME OF PATIENT _____							
		ADMIT DATE _____		ROOM # _____									
		AGE _____	SEX _____	PHYSICIAN _____									
INTERVIEW						DIAGNOSIS _____ _____ _____							
HEIGHT _____	WEIGHT _____ <input type="checkbox"/> Actual <input type="checkbox"/> Stated	APPEARS <input type="checkbox"/> < IBW <input type="checkbox"/> > IBW		% IBW: _____									
UBW <input type="checkbox"/> Gain <input type="checkbox"/> Loss Amt: _____ % Length time: _____													
Reason: _____													
DIET AT HOME _____		DIET INSTRUCTION _____		DATE _____	BY WHOM _____		LIKES		DISLIKES				
APPETITE Before admit: _____ Presently: _____				VITAMIN SUPPLEMENTATION _____				BEVERAGES		BREAKFAST LUNCH DINNER			
<input type="checkbox"/> Constipation <input type="checkbox"/> Chewing		<input type="checkbox"/> Nausea <input type="checkbox"/> Other (Specify): _____											
<input type="checkbox"/> Diarrhea <input type="checkbox"/> Swallowing		<input type="checkbox"/> Vomiting											
NUTRITIONAL SCREEN						ALLERGIES							
<input type="checkbox"/> Dysphagia <input type="checkbox"/> History of DM		<input type="checkbox"/> Dermal ulcer: 1 2 3 4		<input type="checkbox"/> Other: _____									
<input type="checkbox"/> Poor oral intake <input type="checkbox"/> Weight loss of _____ % in 6 mos.		<input type="checkbox"/> Other: _____		<input type="checkbox"/> Other: _____									
<input type="checkbox"/> History of RF <input type="checkbox"/> Patient appears malnourished													
DIET: _____													
MEAL PLAN		B	10:00	L	2:00	D	8:00	DIET TECH CARE PLAN					
Meat													
Vegetable													
Bread													
Fruit													
Fat													
Milk													
NUTRITION CARE ORDER						RECOMMENDED PROTEIN / KCALS _____ Kg ABW IBW ADJ X (.6 .8 1.2 1.5 _____) _____ G protein Stated X (20 25 30 35 _____) _____ Kcal							
						REE RQ / DATE _____							
						PAST MEDICAL HISTORY / MEDICATION PTA _____ _____							
						PRESENT MEDICAL / SURGERY STATUS AL: 4 3 2 1 Date: _____ Initials: _____							
						MEDICATIONS / DATE _____ _____							
						CLINICAL NUTRITIONIST CARE PLAN _____ _____							
70-0530-0498/8320 Front													

FIG 2. Nutritional care plan card used at Providence Saint Joseph Medical Center (front).

Table 3

Preadmission nutrition screened total hip/knee replacement surgery patients (n=30)

Characteristic	Range	Mean±SD ^a
Age (y)	60-85	73±6
Nutrition assessment level of care ^b	1-4	2±1
Total acute length of stay	2-17	5±3
Rehabilitation unit length of stay (d) (n=4)	6-21	12±7
Transitory care unit length of stay (d) (n=23)	1-22	8±5

^aSD=standard deviation.^bSee Figure 1.

studied. Demographics of this group are presented in Table 3. Comparing the case study patient presented above with the sample of preadmission screened knee or hip surgery patients in Table 2 revealed that the case study patient's stay lasted 2 days less than average. She stayed 10 days in the transitory care unit compared with an average of 8 days for the sample in Table 2. Placement of the case study patient after discharge from the transitory care unit was initially a problem because she lived by herself. This may have resulted in a longer stay in the transitory care unit than medically required.

After reviewing the data of the second preadmission screened study group (Table 2), it does not appear that the knee or hip surgery patient population is at high risk for compromised nutrition before admission. This is based on the level-of-care assessment assigned by the dietetic technician. Twenty-nine of 30 patients were initially identified as not at risk for compromised nutrition. In comparison, of the 14 patients admitted for hip surgery (Table 1), one was nutritionally compromised and 2 had unintentional weight loss before admission. Therefore, future preadmission screening should focus on patients who have the greatest potential for nutrition deficits before admission, according to nutrition assessment levels of care rather than diagnosis-related group.

APPLICATIONS

As hospital-based clinicians strive to expand their involvement throughout the continuum of care and focus more on patients as a whole rather than during an isolated acute hospitalization, interaction before and after admission will expand.

- Implementing a more aggressive approach to identifying patients at high risk of compromised nutrition before their admission has the potential to improve patient outcomes. The entire population of nonemergent patients at risk for compromised nutrition, not just those patients on a specific critical pathway, could be screened before their admission. This would provide a more effective system of meeting the JCAHO requirements of nutrition screening within 24 hours.

- Changing the preadmission screening priorities from patients with specific diagnosis-related groups to those patients who are more likely to be nutritionally compromised or at risk

of nutrition deficits has the potential to optimize nutrition care early and therefore decrease patient length of stay. Ongoing evaluation of the preadmission nutrition screening process provides the opportunity to improve outcomes by examining the systems and processes by which care is provided (27).

- Currently, scheduled admissions represent about 20% to 25% of total admissions per day at PSJMC. Defining which of these patients are at the greatest risk for nutrition deficit is essential to deriving the greatest benefit from preadmission nutrition screening.

- A future goal will be for dietetic technicians to enter the screening information directly into the hospital's computer before the patient's admission. This has the potential to increase patient satisfaction by preventing duplication of questions by hospital personnel during the first 24 hours of admission. Improving the nutritional status of compromised patients before admission is a prime clinical goal to improve outcomes and decrease lengths of hospital stays.

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PRACTICE POINTS

Dietetic technicians: Paving new paths

Linda B. MacCorison, DTR, is the food and beverage director at Chancellor Gardens, an assisted-living community in Cape Elizabeth, Me. But that's just one chapter in her professional story. She is also the chair of the Dietetic Technicians in Practice dietetic practice group and the proprietor of a popular Portland, Me, eatery. She has learned that a career in dietetics offers a wider array of opportunities than she ever perceived as a student learning clinical nutrition.

MacCorison urges her fellow dietetic technicians to "learn to market their skills." As the health care system continues to change, dietetics professionals can open their own doors to opportunity by being creative and positive. "It's important to get people to understand what skills you have and what you can do," says MacCorison, who has used her knowledge of nutrition, cost control, quality improvement, and communication to enjoy a variety of traditional and nontraditional roles as a dietetic technician. "Create the vision you want," MacCorison advises. She offers some suggestions from her experience for different avenues that dietetic technicians—and any dietetics professional—can explore:

■ **Multimanagement** In the wake of the downsizing and restructuring wave touching many health care facilities, MacCorison was asked to assume a new position at the long-term-care facility where she worked. Her new title would be director of support services, a job integrating clinical and nonclinical management. In addition to her more traditional clinical functions, MacCorison found herself overseeing the laundry, housekeeping, maintenance, and central purchasing departments. To enhance performance under the new organizational structure, she initiated a cross-training program for the entire staff. Surprisingly, this training innovation opened communications about health and nutrition as employees in different departments began to appreciate each other's jobs. For example, a housekeeper witnessed a resident pouring her dietary supplement down the drain. This information helped nutrition personnel target dietary compliance problems and improve the nutrition of the residents.

■ **Sales** Another way of configuring one's career is by becoming a sales representative for a nutrition products company. MacCorison once worked in this capacity, meeting with

foodservice managers and administrators to discover their needs and help them troubleshoot corrective solutions. This problem-solving role was fulfilling for MacCorison, as was conducting educational in-service programs for staff members at various facilities. MacCorison designed multimedia presentations and hands-on workshops to teach nutrition, cost-effectiveness, and plate presentation.

■ **Entrepreneurial opportunities** A dietetic technician can also look to personal interests and hobbies to create a business of her own. One of MacCorison's colleagues started a gourmet lollipop company; another works under the direction of a registered dietitian as a consultant for a health club, presenting classes in basic nutrition, meal-planning, and heart-healthy cooking. Other consultants are needed to work with architects and designers to plan functional kitchens for health care facilities, which have different requirements and must abide by stricter requirements than do restaurant and hotel kitchens. MacCorison owns and operates a restaurant called Muffins 'n More, Inc, that serves breakfast and lunch. She enjoys creating a menu that features several healthful options for her patrons.

■ **Volunteering** MacCorison encourages all dietetics professionals to become ambassadors of nutrition knowledge in the community through volunteering. Talk to students at local colleges; tell them about your job and why you enjoy it. Offer nutrition education programs to grocery stores and markets. Give time to area shelters, food pantries, and soup kitchens to explain nutrition fundamentals to clients and suggest to staff members strategies for maximizing the use and safe storage and handling of donated foods. Dietetics professionals who help others provide a valuable community service and simultaneously promote their career.

More important than anything else for a dietetic technician is becoming active in the profession of dietetics, according to MacCorison. The science and politics that shape its future are constantly evolving. "I think involvement in our profession, through The American Dietetic Association, practice groups, and local associations, also helps you network with other dietetics professionals and opens tons of doors," she says. It certainly has worked for her.

