THE INTEGRATION OF THE NUTRITION SCREENING TOOL WITH THE INTERDISCIPLINARY PLAN OF CARE FORM

by

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ABSTRACT

The Integration of the Nutrition Screening Tool with
The Interdisciplinary Plan of Care Form

by

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Literature Review Undernutrition in the hospital setting has been shown to cause adverse outcomes. Screening for nutritional risk assists in the detection of undernutrition with subsequent early intervention to prevent further decline. While many nutrition screening tools exist, none are proven to detect undernutrition. Furthermore, many barriers exist for utilizing nurses as primarily responsible for screening patients for nutritional risk. Background A hospital reviewed the nutrition screening process and found that the form used and screening factors were insufficient to adequately detect undernutrition and appropriate referrals for dietitians. Objectives 1) Determine if nursing compliance improved when the nutrition screening form was integrated with the Interdisciplinary Care Plan form. 2) Improve the relevance of the nutrition screening risk factors used and the overall screening tool. Methods The Interdisciplinary Plan of Care form was updated to include the nutrition screening tool and used on the Medical/Surgical unit. Data was also collected on the Intensive Care Unit which
continued to use the original screening tool. **Results** Screening completion did not improve with the implementation of the new screening process, however the quality and quantity of referrals from the new screening form did improve. Total compliance for nurses responsibility also improved with the new form. **Conclusion** Integrating nutrition screening factors into an interdisciplinary plan of care can improve the rate of dietitian referrals. Nutritional screening procedures must be continually reevaluated for effectiveness in detecting undernutrition in the hospitalized patient. Further studies must be conducted to evaluate the validity and specificity of all nutrition screening tools.
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CHAPTER I
INTRODUCTION

It is well known that undernutrition is prevalent in many patients admitted to the hospital. Additionally, the nutritional status of patients can quickly deteriorate during their hospital stay. Undernutrition has been shown to increase hospital costs, length of stay, and complications associated with disease state (1). Undernutrition often dictates poor clinical outcomes, reduces functional status and causes a decrease in quality of life (2, 3). Because of these consequences of undernutrition, early detection is imperative.

Unfortunately, universally accepted undernutrition parameters and definitions do not exist (2, 4, 5). Although objective and subjective data have been proposed to indicate nutritional status, a “gold standard” for these parameters has yet to be derived and validated through multivariate analysis with respect to clinical outcomes (6). This inconsistency creates a disparity between caregivers for appropriate diagnosis and subsequent referral for intervention, causing under-diagnosis for patients who are at nutritional risk.

Despite this lack of definition for undernutrition, patients admitted to the hospital must be screened for nutritional risk factors and appropriately referred to a nutrition professional (7). In 2002, a report to the US Senate Committee on Education and Labor indicated that 85% of individuals ≥ 65 years of age would benefit from nutritional intervention for having at least one documented chronic illness related to nutrition issues (8). With the initiation of nutrition referrals, nutrition professionals will be able to address associated implications and consequently, improve outcomes (1, 7, 9, 10).
Without nutrition referrals, timely interventions may be delayed. Such interventions may include initiation of nutrition support, dietary modifications for texture and food tolerance, further oral supplementation, and meeting educational needs.

Because a universally accepted screening tool does not exist for use in any one population, individual hospitals and organizations have been left to define their own parameters or use existing resource materials for screening. Globally, countless screening tools have been developed and used in multiple care settings, although no one tool has been shown to correctly identify all patients who are undernourished or at risk for undernourishment (5).

The strengths and weaknesses vary among the different nutrition screening tools. Examples of tool strengths include ease of tool use, limited training needed for tool utilization, and nutritional risk classification. Weaknesses may include limited access to relevant information, subjective interpretation of screening factors, and inadequate validity or reliability of the tool. Many of the listed strengths can be considered weaknesses for different tools and visa versa. These issues will be discussed in further detail in the subsequent review.

The underutilization of the nutrition screening form in the care giver setting prevents recognition of undernutrition. Obviously without screening for undernutrition, it will not be acknowledged or addressed. Several reasons exist for this incomplete screening process. Nurses and other health care professionals may not view it as a priority, have limited time to complete screening or referral, or may lack adequate training in the identification of the risk factors defined (11).
CHAPTER II

REVIEW OF LITERATURE

Undernutrition

Malnutrition can be presented as undernutrition (intake of nutrients insufficient to meet body requirements) or overnutrition (intake of nutrients in excess of body requirements) (12). For the purposes of this literature review, the focus will remain on undernutrition. Several rates of undernutrition in the hospital have been reported (2, 5, 7, 12). Difference in these ranges may be due to population basis, definition of undernutrition, and method of detecting nutritional depletion. Most studies demonstrate an undernutrition rate ranging from 30-50% (2, 5). Because of this large range, methods for detection should be highly specific. For whatever rate of undernutrition, plans for subsequent referral and intervention should be in place.

Upon admission to the hospital, patients can present with signs and symptoms of undernutrition or become at risk for nutritional deterioration during their stay (1). One study completed in the United Kingdom found that 40% of patients of an acute hospital were undernourished upon admission and 75% were considered undernourished at the time of discharge (12). Although these dramatic rate increases have not been confirmed or reproduced, other studies have confirmed a significant increased risk during hospital stay (11, 13, 14).

Epidemiologists define ‘common disease’ as having a prevalence above 10% (15). With the prevalence of reported poor nutrition rates, undernutrition is, by an epidemiologic perspective, a ‘common disease.’ The patient’s nutritional status and
disease state assist in determining patient outcomes. Because of this, the best approach for positive outcomes is to treat the disease and nourish the patient (15, 3).

**Causes and Consequences**

Patients may present with undernutrition prior to admission to the hospital (16). This may be due to lack of daily living skills (cooking and shopping), low income, long-term illness, changes in appetite due to medications, and depression. When combined, these factors take an even greater effect. One study demonstrated that social status and life habits also have an impact on a patient's risk for becoming undernourished (17). Conclusions of this study showed that patients are at greater risk for malnutrition who are older, present with multiple diseases, and live alone (17).

In addition to preexisting undernutrition, patients frequently become more malnourished during their hospital stay. This can be a result of limited meal choices, disruption of meal times, poor presentation of food (11), course of disease or illness, depressed appetite, alteration of normal swallowing, malabsorption or maldigestion, and loss of ability to feed self (8). One study revealed that patients assessed upon admission were found to be at less nutritional risk than patients assessed during the hospital stay (13). This suggests that undernutrition can progress during hospitalization further supporting the need for reevaluating patients for nutrition risk.

The complexity of undernutrition is diverse and significant. One study showed that length of hospital stay was increased from an average of 10.1 days for the well-nourished to 16.7 days for the undernourished patient (15). This contributed to a 65% increase in hospital cost. An even larger impact was seen in undernourished patients with
respiratory infections. When costs of medications and tests were added, undernourished patient care costed 308.9% more than the well-nourished patient’s costs (15).

In another study, the implementation of an intense nutrition screening program resulted in a 1-day reduction of length of stay and consequent hospital cost savings. The Short Nutritional Assessment Questionnaire (SNAQ) was used as a screening tool. Intervention included additional in-between meals and energy- and protein-enriched meals for patients classified as moderately undernourished. This provided an additional 600 kcal and 12 g protein/day. The program cost per day was estimated to be $91.20 for the 98 total malnourished patients ($0.93 cost per patient). The study estimated the mean cost of a 1-day stay in the hospital to be $404.40 (18). The cost effectiveness of this program is significant considering the savings with such a low cost-per-patient and subsequent savings for reduction of stay.

Consequences of undernutrition amount to more than the economical effects associated with increased hospital cost and length of hospital stay (1). The consequences of poor nutrition can be severe. Under-nutrition can result in the increased risk of morbidity and death, impaired mental and physical function, self-neglect, depression, apathy, increased complication risk, increased risk of pressure ulcers, delayed wound healing, depressed immune response, and reduced quality of life (8, 11). These complications further the cyclical motion of causes and effects associated with undernutrition. One study found a complication rate increase from 16.8% in the well-nourished to 27% in moderately and severely undernourished patients combined (15). When severely undernourished patients were further separated, complications were seen in 42.8% of the population (15).
Mortality rate in this same study was observed at 12.4% in the undernourished patient compared to 4.7% in the well-nourished patient (15). This 12.4% was higher than the rate of mortality associated with infection (10.8%) suggesting that poor nutritional status is a greater risk factor for mortality than infections (15).

In 1936, Studley was one of the first physicians to demonstrate a significantly higher rate of post-operative mortality associated with a >20% weight loss following surgery (15). The negative implications of undernutrition has been well established and historically confirmed. By identifying the undernourished patient, early medical nutrition therapy intervention can resolve poor nutrition, reduce nutrition-related complications and prevent further decline.

**Nutrition Screening**

Clinically-relevant undernutrition has been defined as "the state of altered nutritional status that is associated with an increased risk of adverse clinical events such as complications or death (5)." This broad definition fails to provide support for determining what conditions are classified risk factors. It is through the nutrition screening process that these patients can be further identified.

Screening for nutritional risk can be completed by identifying factors that contribute to nutritional problems. The screening process does not diagnose undernutrition, but rather classifies individuals as at risk for undernutrition (4). In most hospital settings this classification is further stratified into low, moderate or high nutritional risk by way of the nutrition screening tool or a more comprehensive
nutritional assessment. The nutrition assessment is usually completed by a trained nutrition professional, often a registered dietitian.

The nutrition assessment includes a plan of care related to nutritional intervention which might include: dietary counseling, educational brochures, verbal diet instruction, oral nutritional supplements, meal planning, diet texture modification, both enteral and parenteral nutrition support, a combination of these, and many other strategies. Failure to identify the undernourished with a screening tool would deprive these patients of the benefits of intervention. These nutrition assessments significantly reduce incidence of patients returning to the hospital after discharge, decreased length of stay and hospital costs, and also increase Medicare reimbursement (10).

When considering the advantage of a nutrition screening tool, it is important to make certain that the tool will recognize signs and symptoms of undernutrition that might otherwise go unnoticed. If conditions of undernutrition are recognized without the tool, it would be of a limited value. However, by utilizing a nutrition screen, early identification of undernutrition permit more timely intervention.

Failure to recognize undernourished hospital inpatients was reported at a rate of 60-85% in UK hospitals (19). Another study found that of the many unrecognized, undernourished outpatients, 90% were deemed treatable (19). By identifying these associated issues through the screening process, referrals and subsequent nutrition intervention has been shown to improve clinical outcomes and improve nutrition status (1, 9).
Screening Tools

In order to be effective, the nutrition screening tool must be simple, feasible, inexpensive and completed within a limited time frame (2, 6, 7, 12). Because several factors play a role in undernutrition, different variables are usually grouped together to assist in the detection of undernutrition risk. These nutrition variables are typically chosen based on clinical judgment or published works (31).

In an increasingly evidenced-based practice, variables must be justified and referenced as potential risk factors. However, it is also important to recognize that the “absence of evidence in some areas does not mean evidence of absence” (19). For this reason, screening must encompass multiple influencing factors that affect nutritional status.

Variable Screening Factors

One study reviewed several screening tools and identified common risk factors used among them (12). These variables are often weighted and numerically scored to determine a level of risk. By combining these risk factors with a multidimensional screening tool, a “nutrition profile” is generated (20). This nutrition profile can then identify people at risk for undernutrition, perhaps earlier than changes in albumin or even weight loss alone.

Nutrition risk factors can be classified into four categories: increased nutritional requirements (i.e. sepsis), reduced status at the time of measurement (i.e. weight change), altered intake/absorption (i.e. change in appetite), and predisposing factors (i.e. age) (20). Common risk factors include (12):
- Age
- Weight and weight changes (% of weight)
- Weight for height (often expressed as BMI)
- Factors associated with ingestion (ability to feed self, swallowing/chewing problems, dentition)
- Aspects of digestion (diseases affecting absorption)
- Limited types of food consumed
- Changes in appetite
- History of requiring a therapeutic diet
- History of alcohol intake
- Alterations in taste
- Co-morbidities such as diabetes, short bowel syndrome, chronic renal insufficiency, or coronary artery disease
- Reduced mental condition
- Compromised skin condition
- Decreased mobility and ability to prepare own meals
- Previous admission to a hospital
- Desire to speak to a dietitian

At a minimum, the British Association for Parenteral and Enteral Nutrition recommends that “all protocols should include weight and weight change, height, appetite, ability to eat, altered physical or mental function, and risk factors associated with the illness or its treatment (20).”

Regrettably, there is little consensus or conformity that states which risk factors or combination of risk factors can effectively determine nutritional status (16). Because of this lack of a universally accepted screening policy, undernutrition may not be diagnosed. One study reported that one of the major reasons for not initiating nutrition support was the lack of a proper screening tool (21).

One review recommended that, at a minimum, patients should be asked the following questions: 1) Have you unintentionally lost weight recently; 2) Have you been eating less than usual; 3) What is your normal weight; and 4) How tall are you? (5). Based on the answer to these questions, patients are then referred for further evaluation.
Another review suggested that weight loss was the single most important indicator of nutritional status (14).

**Multivariable Screening**

Screening tools vary between organizations, although they are generally found in a questionnaire format (12). Often these tools are adapted and modified from an existing tool and are generally used in populations for which the tool was intended (12). Table 1 is an example of a nutrition screening tool used in the community to detect nutritional risk in the elderly.
Table 1. Initial Screening in Mini Nutritional Assessment (MNA) for the elderly (22)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Score</th>
</tr>
</thead>
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<tr>
<td>A</td>
<td>Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?</td>
<td>0 = severe loss of appetite, 1 = moderate loss of appetite, 2 = no loss of appetite</td>
</tr>
<tr>
<td>B</td>
<td>Weight loss during last months?</td>
<td>0 = weight loss greater than 3 kg, 1 = does not know, 2 = weight loss between 1 and 3 kg, 3 = no weight loss</td>
</tr>
<tr>
<td>C</td>
<td>Mobility?</td>
<td>0 = bed or chair bound, 1 = able to be out of bed/chair but does not go out, 2 = goes out</td>
</tr>
<tr>
<td>D</td>
<td>Has suffered physical stress or acute disease in the past 3 months?</td>
<td>0 = yes, 2 = no</td>
</tr>
<tr>
<td>E</td>
<td>Neuropsychological problems?</td>
<td>0 = severe dementia or depression, 1 = mild dementia, 2 = no psychological problems</td>
</tr>
<tr>
<td>F</td>
<td>Body Mass Index (BMI)</td>
<td>0 = BMI less than 19, 1 = BMI 19-21, 2 = BMI 21-23, 3 = BMI 23 or greater</td>
</tr>
</tbody>
</table>

**Screening Score** (add points from each category, total max 14 points) =

**Nutrition rating:**
- 12 points or greater = normal, not at risk → no need to complement assessment
- 11 points or below = Possible malnutrition → continue assessment

Other examples of nutrition screening tools include the Prognostic Nutritional Index (PNI), the Subjective Global Assessment (SGA) and the Nutritional Risk Index (NRI) (23). The PNI combines anthropometric and laboratory measurements for a numeric score. The higher the PNI score, the higher the risk for undernutrition. The PNI correlates well with poor outcomes, but has not been validated in critically ill adults (23).
The SGA focuses on history and physical examination to include weight loss, dietary intake, ability to take and absorb food, degree of stress from comorbidity, and functional status. SGA classifies patients into three categories: normally nourished and unlikely to progress to a undernourished state, normally-nourished but likely to progress to a undernourished state, or undernourished and progressing to increasing undernutrition (23). The SGA was able to identify high-risk/undernourished patients with 100% sensitivity and 69% specificity, however 15% of the patients were misclassified for nutrition risk. Despite these misclassifications, the SGA was determined to be a good predictor of LOS and higher hospital costs in the undernourished patient (14).

The NRI screening tool stratifies patients into the following risk categories: not malnourished, mildly malnourished, moderately malnourished, and severely malnourished. This is accomplished by using a formula to calculate the degree of undernutrition: NRI = (15.9 x plasma albumin in g/dL) + 41.7 x (present weight/usual weight) (23). The NRI was significantly associated with increased LOS for moderate or severe nutrition risk (13). For ability to classify undernutrition, the NRI yielded similar results to SGA for impaired body composition and plasma albumin compared to well-nourished patients. However the NRI failed to recognize many other cases of undernutrition and may not be specific enough for the diagnosis of undernutrition in all hospitalized patients (14).

Biochemical Indicators

Nutrition-related information is often limited during the first 24 hours of a hospital stay. The patient may be incoherent with family unavailable to give a clear
nutrition history, severity of illness may prevent obtaining a weight or height measurement, or complications associated with admission, such as dehydration, may distort clinical information. In an ideal world, clinicians would have the capability of ordering one laboratory value for every patient that would clearly classify the patients nutritional status. Unfortunately, such an definitive indicator does not exist.

One study endeavored to identify clinical markers that were easily obtained on admission which could appropriately identify nutritional risk (24). The three markers examined included body mass index (BMI), serum albumin, and total lymphocyte count (TLC). The study revealed that data for all three parameters were available for only 28 (17%) of the 167 patients referred to the hospital nutrition department. Furthermore, the reliability of serum albumin and TLC are questionable as nutritional indicators (24, 20).

Serum albumin has been known to be a better indicator for mortality rather than nutrition status. Serum albumin reflects the liver’s ability to synthesize plasma proteins and is often used to indicate protein status of the patient (8). Acute changes in albumin are not likely due to acute changes in protein status because of a 20-day half-life, which reflects the protein status from approximately 20 days prior (10). Other factors such as metabolic state, hydration status, inflammatory response and degree of illness will more likely be reflected in the acute changes in serum albumin levels (24, 3, 10). In fact, research has demonstrated that in a starvation state, serum albumin will show little change despite significant weight loss (24). Because of these conflicting studies, serum albumin is best used as a nutrition indicator only with consideration to the patient condition and in conjunction with other markers.
One study suggested that C-reactive protein (CRP) be used in conjunction with serum albumin to better indicate protein status. The reason behind this is related to the inflammatory response. During an active inflammation reaction, albumin will be low and CRP will also be high, not necessarily indicating undernutrition. Conversely, with a low albumin and a regular CRP level, the patient would be considered nutritionally depleted (24).

Visceral protein laboratory indicators should meet the following criteria: 1) have a short biological half life, a rapid rate of synthesis, a constant catabolic rate, and be responsive only to protein and energy restrictions; 2) reflect protein status by measurable concentration changes in serum; and 3) represent a small total amount of the protein(s) in the body pool (10). Of all visceral protein laboratory values, pre-albumin meets this criteria the best. Pre-albumin remains the most sensitive indicator of changes in nutrition status because of a short half-life of approximately 2-3 days, represents a small amount of total protein in the body pool, and is not affected by hydration status (10). In another study, pre-albumin was found to be a statistically significant predictor for nutrition referral need and subsequent risk classification when compared to albumin, which missed 44% of patients rated to be at nutritional risk (25). Despite this information, there are some limitations in the use of pre-albumin. Pre-albumin can be falsely elevated in patients receiving corticosteroids or dialysis and can be affected by acute stress, and colloid administration (23, 25). In light of the limitations discussed, prealbumin should be used to assess response to treatment rather than as a strong predictor of malnutrition (10).
A study published in 2004 disputed the reliability of all hepatic proteins (albumin, prealbumin, and transferrin) as singular nutritional indicators. The study stated that hepatic proteins are not directly linked to nutritional deprivation, rather, an indirect relationship exists and is associated with the inflammation process as it contributes to the net protein loss caused by catabolism (26). The study concluded that hepatic proteins are best used as indicators of morbidity and mortality and recovery from acute and chronic illness and be used to help identify those who are at risk for becoming clinically unstable and require close monitoring (26).

Historically, total lymphocyte count (TLC) has been used as an indicator of nutritional status. While some studies have discounted the usefulness of TLC as an indicator of disease (20), other studies have verified its value. A study completed in 2005 demonstrated the ability of TLC to detect undernutrition in the elderly with 77% sensitivity and 68% specificity (2). Other studied parameters such as serum albumin, prealbumin, mid-arm muscle circumference, triceps skinfold, BMI and unintended weight loss could not identify undernutrition with this statistical validity (2). Another study examined whether or not TLC was a suitable marker for malnutrition in the elderly. When patients were categorized by anthropometric measurements, serum albumin, total cholesterol levels or mini-nutrition assessment scores, there was not significant difference among severely low, low or normal TLC lab values (27). TLC was negatively correlated with age in this study, while the other markers were not. Therefore, it may be reasonable to presume that in the first study, TLC was low because of the aged population base. Furthermore, when TLC was further stratified into levels of severity, this significance
was not apparent, indicating that TLC is not a suitable marker for undernutrition in the elderly.

Biochemical indicators have some usefulness, and certainly contribute to the multidimensional analysis of undernutrition. However, when used alone they do not exhibit sufficient differences between risk categories of low, moderate and high risk (20).

**Diagnosis and Severity of Disease**

Other screening tools utilize the patients’ diagnosis and severity of disease to further stratify nutrition risk. This type of screening involves more time and training on the part of the nurse to accurately rate the risk factors. By using this system, undernutrition is assumed to be a result from disease (21). Table 2 represents an example of the Nutrition Risk Screen (NRS) that quantifies severity of disease associated with nutritional risk (21). These disease risk categories are adaptable to patient populations. Based on the selected criteria (impaired nutritional status and severity of disease), a patient is considered nutritionally at risk with a score of three or greater out of a maximum score of six. This rating was designed to identify patients that would most likely benefit from nutrition support (21).

A nutritional care plan is created for all patients who are rated at a score of three or greater. Patients classified as needing a nutritional care plan include:

- severely undernourished (score = 3)
- severely ill (score = 3)
- moderately undernourished (score = 2) and ≥ mildly ill (score = 1-2)
- mildly undernourished (score = 1) and ≥ moderately ill (score = 2-3).
### Table 2. Screening for Nutrition Risk (30)

<table>
<thead>
<tr>
<th>Impaired nutritional status</th>
<th>Severity of disease (stress metabolism)</th>
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<tr>
<td>Absent</td>
<td>Normal nutritional status</td>
</tr>
<tr>
<td>Score = 0</td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>Wt loss $&gt; 5%$ in 3 months or Food intake below 50-75% of normal requirement in preceding week</td>
</tr>
<tr>
<td>Score = 1</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>Wt loss $&gt; 5%$ in 2 months or BMI 18.5-20.5 + impaired general condition or Food intake 25-50% of normal requirement in preceding week</td>
</tr>
<tr>
<td>Score = 2</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>Wt loss $&gt; 5%$ in 1 month ($&gt; 15%$ in 3 months) or BMI $&lt; 18.5$ + impaired general condition or Food intake 0-25% of normal requirement in preceding week.</td>
</tr>
<tr>
<td>Score = 3</td>
<td></td>
</tr>
</tbody>
</table>

**Score =** **Score =**

**Age Adjusted Score:** if $\geq 70$ years: add 1 to the total score to correct for frailty of elderly

**TOTAL SCORE =**

Find score (0-3) for Impaired nutritional status and Severity of disease. Choose only the variable with highest score. Add the two scores and adjust for age if applicable.

This same study acknowledged that an intense screening may not be necessary for clinical areas with few at-risk patients. They recommended that the following questions be asked first: 1) Is BMI $< 20$; 2) Has intake been reduced during the last week; 3) Has there been a recent weight loss; and 4) Is the patient severely ill? (21). If any answer was in the affirmative, the screening form from Table 2 would then be used (21).

The limitations of this screening tool include reliability of clinical judgment and limited randomized trials studying the consequential effects of the screening tool.

Furthermore, another earlier study completed for patients with chronic obstructive
pulmonary disease (COPD), revealed that screening methods for disease specific indicators should be verified through different patient groups, as screening tools may not be sensitive enough to identify undernourished individuals in disease states (2, 28).

Disease state is one of the most significant factors causing hospital undernutrition. However, the cause of this interaction is confounded. The disease may cause undernutrition, or the underlying poor nutrition may be a factor in causing the disease. Because of this, it is difficult to conclude that undernutrition alone would lead to the worst outcome, despite any given disease state (15).

Medically Related Complications

Similar to disease related risk, a nutrition screening tool was developed based on variable risk for medically related complications (MRC). Fundamentally, this design is founded on the effect that early nutrition intervention and restorative medical nutrition therapy will have in preventing MRC (29). The parameters chosen can quickly and routinely be obtained at admission, assuming that nurses will be able to assess the patients ability to eat, rate the medical conditions affecting nutrition, determine recent weight loss, and measure height and weight (29). Based on this rating, the patient nutrition risk is then classified into no, mild, moderate, or high nutrition risk. The following comorbidities/complications listed were selected because they were consistently well-known conditions.

- Sepsis
- Wound dehiscence
- Pneumonia
- Acute renal failure with need for dialysis therapy
- Chronic renal failure with creatinine clearance < 50 m/min
- Respiratory failure with vent support > 24 hrs
- High output fistula
- Need for re-operation
- Peritonitis
- Gastrointestinal obstruction
- Decubiti Stage 3 or 4

When variables were analyzed in relation to MRC, wound occurrence, poor oral intake, malnutrition-related admission diagnosis, serum albumin, hemoglobin, and TLC correlated best (29). Although other studies have suggested that many of these biochemical markers were not indicators of nutrition-related risk, in this study they were shown to predict medically related complications. This study did not evaluate the correlation between MRC and nutrition risk, however other research has shown the increase of complications associated with undernutrition (29). A follow-up randomized study would be required to determine the validity of this screening tool to further associate MRC with undernutrition.

Malnutrition Universal Screening Tool

The Malnutrition Universal Screening Tool (MUST) is based on a philosophy of an undernutrition “journey.” By evaluating the past (weight loss), the present (BMI), and the future (effect of disease that will likely produce no nutritional intake within 5 days), a score of undernutrition can be determined (28). Depending on clinical circumstances, these individual components have been shown to independently predict undernutrition. Therefore, by combining these risk factors, a better prediction of undernutrition will be determined. Figure 1 displays a copy of the MUST screening form.
Figure 1. Malnutrition Universal Screening Tool (MUST) (30)

**BMI Score**
- BMI >20.0 = 0
- BMI 18.5-20.0 = 1
- BMI < 18.5 = 2

**Weight Loss Score**
- Wt loss < 5% = 0
- Wt loss 5-10% = 1
- Wt loss > 10% = 2

**Acute Disease Effect Score**
Add a score of 2 if there has been or is likely to be no nutritional intake for >5 d

Add All Scores

**Overall Risk of Malnutrition and Management Guidelines**

0 = Low Risk → Routine Clinical Care
- Repeat Screening – Hospital: weekly, Care Homes: monthly, Community: annually for special groups (e.g. those > 75 years old)

1 = Medium Risk → Observe
- Document dietary intake for 3 d if subject in hospital or care home
- If improved or adequate intake, little clinical concern; if no improvement, clinical concern: follow local policy
- Repeat screening – Hospital: weekly, Care home: at least monthly, Community: at least every 2-3 months

2 = High Risk → Treat
- Refer to dietitian, nutrition support team or implement local policy
- Improve and increase overall nutritional intake
- Monitor and review care plan – Hospital: weekly, Care home: monthly, Community: monthly

The MUST has been shown to have content validity, face validity, predictive validity, internal consistency, and is reproducible. Stratton and colleagues studied the presence of concurrent validity. They confirmed that this tool has “fair-good” to “excellent” concurrent validity with most other tools tested. Additionally, the MUST
demonstrated agreement with what is often considered the gold standard for undernutrition evaluation, a dietitian assessment (28). A hospital version of the MUST was developed and performed with the same agreement between nurses and dietitian assessments (28).

In addition to the validity of the MUST, the tool was rated as "easy" or "very easy" to complete, compared to five other tools rated as very easy to difficult. Furthermore, time spent completing the screening process was averaged to be 3-5 minutes compared to 3-10 minute ratings of the other five tools rated (28).

A review of recent literature indicates that the MUST is a simple screening tool that identifies patients who require more in-depth nutrition assessment and additional monitoring (14).

Screening Tool Reliability, Validity, Sensitivity and Specificity

In order to assure that a high percentage of undernourished patients are being detected, it is recommended that the screening tools be tested for reliability, validity, sensitivity and specificity before being widely used (12). One study completed by Jones found that of forty-four published screening tools, only 39% of those tools had been tested for both reliability and validity (31). Additionally, only two of the forty-four studies were developed using multivariate techniques and only one used appropriate applied statistical methods with a sample size large enough to suggest that the tested validity and reliability was legitimate (31). This study was completed on published screening tools, therefore it is significant to recognize that many screening tools currently used in organizations have not been published and remain unstudied or validated.
Because of these study findings, future studies must be designed to isolate factors of undernutrition with further analysis using reliable statistical techniques. Other studies have expressed Jones's same appeal for more comprehensive testing for the screening tools' effectiveness (12, 31, 16).

It is not possible to establish exact predictive values of a screening tool because of the lack of an undernutrition definition (19). With a variable undernutrition prevalence rate as demonstrated in several studies, the specificity and sensitivity of any screening tool will differ considerably based on the population. For example, given the same specificity and sensitivity rate for two populations (with different undernutrition prevalence rates), the positive predictive value will decrease with the population with decreased undernutrition prevalence (19). As a result, false positive results will mistakenly receive more attention and further evaluation, causing a displacement of resources. (19).

No one screening tool has been published that can accurately screen for undernutrition with a validated approach (32). Because of this, the American Society for Parenteral and Enteral Nutrition board of directors stated that a combination of biochemical and clinical parameters should be used to screen for the presence of undernutrition (32).

**Referrals for Nutrition Intervention**

Nutrition referrals generally increase with the initiation of a nutrition screening program. One study introduced a simple screening tool consisting of three questions related to weight changes, appetite changes, and use of oral supplements. The responses
to these inquiries were the basis for referrals for dietitian intervention. With this screening tool, 76% of undernourished patients were referred to a dietitian compared to 46% of the control group which did not use a screening tool. Furthermore, the mean LOS was observed to be 2.6 days (± SD 2.1 d) compared to 5.8 days (± SD 6.7 d) in the control group (18).

With a higher referral rate, one may suspect a higher use and cost of supplements and nutrition support supplies. However, in the study discussed above, the use of enteral and parenteral nutrition support was not significantly different between the intervention and control group (18). In spite of this increased cost, the benefits and cost savings associated with reduced complications and shorter length of stay outweigh the cost of any increased use (19). Another study has reported that referral rates did not change by starting a nutrition screening process (19). Perhaps even if rates did not change, the quality of referrals improved to reflect more appropriate cases for nutrition intervention.

With the establishment of a nutrition screening procedure in one study, time required for initial evaluation was reduced from 25 to 5 minutes resulting in 1.5 hours conserved per day per clinical dietitian (19). With an efficient referral system, this substantial savings allows for better distribution of nutrition resources.

One dietetic department found that of the referrals received, 60% were for the initiation of nutrition support (24). Despite several missing height and weight measurements, the remaining 40% of the patients referred were supposedly referred based on more subjective measures such as weight loss, weight history or observation of poor food intake along with clinical judgment (24). It was because of this review, that
Another study suggested an alternate solution for immediate nutrition referrals (24). They proposed that action plans be created to refine the referral process. Such an example would include the offering of a nutrition supplement for patients consistently eating less than 50% of meals. Without improvement within a few days, a referral would then be made (24). This would heighten the awareness of nutrition related issues. However, the limitations must be accounted for. Without the timely intervention of the nutrition professional, appropriate solutions to issues may be delayed. It would also be necessary to monitor the system of action plans, follow-up and documentation.

**Nursing Involvement**

The Joint Commission of Accredited Hospitals and Organizations mandates that all patients admitted to the hospital have a nutrition screening completed within 24 hours of admission (29). Nurses are ideally situated to complete this screening because of their close contact with the patients and their families (12, 16). As a key component in the collaborative process, nurses allocate resources, make appropriate referrals, develop and implement nutritional care plans, and evaluate the effectiveness of those plans (8).

Despite this unique positioning, nursing staff frequently do not recognize the symptoms of undernutrition (11). One study demonstrated that staff did not recognize 70% of the patients admitted to the hospital as having protein-energy malnutrition (11). Another report suggested that of the 25% undernutrition prevalence, only 47% of those patients were identified by nursing and medical staff (18). Clinical and nursing staff are
often not trained to look for existing signs of undernutrition (5). Clinical observation of undernutrition such as dehydration, muscle wasting, and loss of subcutaneous fat requires well-trained nurses (16).

**Nursing Subjective Judgment**

One study published in 2004 explored the difference between nurses’ judgment and the use of a nutrition risk tool. When asked their opinion, nurses thought that the majority of patients were not at risk for undernutrition with 56% having no risk, 23% having some risk and 21% having definite risk. When this data was judged against a pre-established criteria for nutritional risk, results demonstrated that 18 (16%) of the 112 patients classified as ‘at risk’ were not. More significantly, 27 (29%) of the 112 patients who were at risk were not identified according to the criteria. Furthermore, when later assessed by a dietitian, these undernourished patients were found to have overt symptoms such as marked weight loss, refusal to eat and muscle wasting (11). This discrepancy between a nurses subjective view and an objective screening tool signifies the importance of having established criteria for nurses to reference.

Although this study did reveal a disagreement between judgment and an established criteria, the author points out that prior to this survey undernutrition data was not collected on admission documentation and was largely overlooked (11). This idea reaffirms the problem of findings consistent with under-diagnosis; undernutrition is often overlooked because it is not looked for.
Nursing Screening vs. Dietitian Assessment

A study published in 2003 sought to identify a nutrition screening form that would detect undernutrition risk factors and be easily used by the nursing staff (16). Nurses scored the patients the day of admission using a screening form consisting of five nutrition risk factors. Patients with moderate or severe nutrition risk were then referred to the dietitian for more comprehensive assessment. When this tool was used, analysis revealed good agreement between nursing staff and dietitians for most items, but less agreement between other clinicians and nursing staff. During the second phase of the study, one of the risk factors was changed from ‘stress factors’ to ‘seriousness of illness, treatment or intervention’ leading to further agreement between care providers (16).

Of significance, this study reported that during phase I, 65% of patients were screened by nursing staff, 13% were excluded from reporting because their length of stay was less than five days, and 22% were not screened, although they were eligible for screening (16). This equates to 68 patients that were not screened during the first phase and nineteen patients in the second phase. One hundred and fifty-four patients were classified into the low risk category and as a result did not receive further evaluation by a dietitian (16). Results for phase II were comparable (16). The study design did not further evaluate this low risk group population of 222 patients to determine the under-diagnosis of the screening tool.

Using a dietitian assessment as the gold standard, results of phase I indicated that 23% of the 200 patients screened were referred to a dietitian. Thirteen of these patients were expected consultations, nine patients were referred earlier than expected, and twenty-four patients were referred only as a result of the nutrition screening tool. Of
these forty-six patients assessed by the dietitian, 23 were potentially at risk for undernutrition, 15 were actually undernourished, and 8 were neither at risk nor malnourished (16). When applied to the study population, these data indicate that 19% of the patients were categorized as potentially undernourished (11%) or actually undernourished (8%). Phase II confirmed similar results (16). This overall percentage of undernutrition is significantly less than the average undernutrition prevalence as reported in the literature perhaps because of the presumed under-diagnosis. By using the nutrition screening tool, these patients were seen within a timeframe that prompted appropriate nutritional intervention.

According to one evaluation, when nurses were asked to record patients’ food intake, their documentation was similar to the dietitian estimations (21). However, another study found that dietary intake was overestimated by 22%, contributing to potential misjudgments about undernutrition.

Another study evaluated the differences between a nursing nutrition screening tool and a more comprehensive screening tool completed by the dietitian (7). These were completed within 24 hrs and 48 hrs respectively. The nutrition risk score classification was as follows: malnourished, >15; moderate risk of malnutrition, 10-14; and minimal risk, 7-9. Results indicated that 8% of the patients were misclassified for nutrition risk. However, there was 95% agreement of the nutrition risk scores obtained between nurse and dietitian, plus or minus a score of 3. Further evaluation of this reliability was not discussed, however statistical analysis did reveal low sensitivity for scores 10 and greater. Additionally, this tool overestimated patients who were malnourished or at moderate risk.
for malnutrition. The tool also lacked sensitivity for this population during assessment, meaning that it did not identify all patients classified as at risk or malnourished (7).

Consistent disagreement between nurses and other professionals was observed in another study. Three aspects were addressed as causing this dissidence: the subjectivity of the wording used allowed for caregiver interpretation, inconsistent training for screening tool utilization, and the fundamental difference in nutrition background between nurses and dietitians (20). Because of these results, it may appear that it is not the reliability of the screening tool, but rather the reliability of the nurse that affirms whether undernourished patients are detected. Other studies have confirmed the dependability of nurses as the screening tool’s primary executer (7). Overall screening tools have demonstrated reliable results between nurses and dietitians (7).

**Nursing Evaluation of Screening Tools**

According to a follow-up questionnaire completed following the initiation of the previously discussed 5-question screening tool, nurses reported their response to the screening tool (16). The average time to complete was 4 minutes which surveyed nurses rated as acceptable. Two-thirds of the nurses surveyed thought the tool was a good reflection of the patients nutrition status. Three-fourths of the nurses thought that the task was appropriate for nursing staff. Nurses rated the usefulness of the tool as a 6, on a scale from 0 to 10. Seventy-seven percent of the nurses indicated that the screening tool was useful, the remaining 23% of nurses felt that their own clinical experience would be able to establish undernutrition independent of the screening tool (16). Based on the results of the study, this nursing opinion of their own reliability of clinical experience
could not be validated considering the misclassified nutritional risk patients (17%) and the potential under-diagnosis. Although agreement between nursing staff and dietitians existed, that was found with the use of the screening tool, rather than with the use of nursing clinical experience. Other studies have clearly demonstrated that nurses were unable to accurately classify undernutrition subjectively (11).

**Nursing Attitude**

When nursing attitudes about nutrition screening was investigated, results indicated that nurses were bothered with the added documentation and did not find the nutrition screening process necessary (11). Another survey found that most nurses and doctors failed to obtain height and weight measurements because they regarded it as unimportant (5). One survey found that 46% of junior physicians felt that weighing the patients was not important (24). When asked if nutritional support would prevent complications during hospitalization during one survey, most nurses and doctors agreed that it would, however only 20% of them performed routine nutrition screening and assessment (33).

Several other studies have demonstrated similar findings among nursing and medical staff (11, 5). These attitudes suggest that undernutrition is not viewed as critical to the care of patients admitted to the hospital. However, medical staff also report other reasons for incomplete nutrition screenings. These reasons include insufficient knowledge, unclear assignment of responsibility and lack of guidelines or procedures (33).
In order to fight the impression that nurses have related to undernutrition, it is essential to offer the needed training, teach the consequences of undernutrition and supply the nurses with adequate resources to perform their responsibilities. By doing so, nurses will be better empowered to make nutrition and the diagnosis of undernutrition a priority in patient care.

**Nursing Implications**

Kondrup et al. completed a study that evaluated the potential causes of inadequate nutrition care in hospitals (33). The study focused primarily on nurses and the reasons for incomplete nutrition screening and referrals. Nurses were interviewed by an investigator to answer questions testing their basic knowledge and ability to apply practice of nutritional care. Nurses were asked if a nutrition screening had been performed and whether or not the patient was at nutritional risk. The investigator then requested documentation of the nutrition plan. With the failure to comply to the correct procedure, the nurse was then asked to give reasons for any incomplete information. At the conclusion of the interview, the nurse was asked to answer 20 questions related to nutrition care. Investigators then classified the nutritional risk of patients according to a predetermined categorization approach (33).

Upon completion, the results of this study indicated that only 59% of the patients admitted to the hospital were screened for nutrition risk (33). Furthermore, only 47% of these patients had a nutrition care plan written with dietary intake and body weight only monitored by 33% and 39% respectively (33). Of the patients admitted, this equates to
only 9.2-10.8% of the patients that received appropriate screening, care planning, and monitoring.

As shown in Table 3, during interviews, nurses reported the main reason for not completing the screening to be the lack of instruction to do so. Secondly, they reported forgetting to complete the screening. Additionally, nurses reported two main reasons for patients not classified as “at risk” but were later found to be at nutritionally compromised. These reasons include a short expected length of stay and lack of guidelines.

Table 3. Reasons for not screening patients or classifying as at risk (33)

<table>
<thead>
<tr>
<th>Question</th>
<th>Reason</th>
<th>N</th>
<th>% of responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why was the patient not screened for nutritional risk at admission?</td>
<td>There are no instructions to do it</td>
<td>232</td>
<td>74%</td>
</tr>
<tr>
<td></td>
<td>We just forgot in this case</td>
<td>78</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>We do not know how to do it</td>
<td>5</td>
<td>1%</td>
</tr>
<tr>
<td>Why was this patient not classified as at risk patient?</td>
<td>We do not have guidelines to define at risk patients</td>
<td>35</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>The patient is going to stay here for a long time</td>
<td>21</td>
<td>34%</td>
</tr>
<tr>
<td></td>
<td>We disagree; nutrition has no importance for the clinical course of this patient</td>
<td>6</td>
<td>10%</td>
</tr>
</tbody>
</table>

Reasons for not completing a nutrition care plan were sorted into five general categories. Nurses were allowed to give only one excuse for not competing the nutrition care plan. Table 4 lists the most frequently given reasons for each category.
Table 4. Primary reasons for not making a plan for nutritional care (33)

<table>
<thead>
<tr>
<th>Category</th>
<th>Answer</th>
<th>N</th>
<th>% response for category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>We are not trained in estimating requirement</td>
<td>29</td>
<td>71%</td>
</tr>
<tr>
<td>Care</td>
<td>In this situation, we usually just observe the patient</td>
<td>45</td>
<td>92%</td>
</tr>
<tr>
<td>Food</td>
<td>It is impossible due to difficulties in chewing, swallowing, nausea or vomiting</td>
<td>12</td>
<td>63%</td>
</tr>
<tr>
<td>Support</td>
<td>The patient is not motivated</td>
<td>10</td>
<td>66%</td>
</tr>
<tr>
<td>Terminal</td>
<td>The patient is terminally ill</td>
<td>9</td>
<td>100%</td>
</tr>
</tbody>
</table>

These results indicate potential focus areas for further education and action plans. First, the responsibility for completing the nutrition screening tool completion must be emphasized. Nurses should then be trained on guidelines for using the nutrition screening tool. Secondly, subsequent nutrition therapy options should be defined. These might include rules for appropriate timeframes acceptable for observing inadequate intake. Lastly, priorities should include improving patient-oriented aspects of care such as tolerance for chewing and swallowing and suitability of hospital food (33).

**Nursing Limitations**

Nurses need adequate equipment to complete the nutrition screening. A study surveyed hospital units to find that only 86% of them had weight scales on hand (5). Often weights and heights are not completed unless a physician has ordered it, but this does not negate the need for maintained, calibrated equipment (5).
To further study the causes of inadequate nutritional care in hospitals, Kondrup et al. studied the nutritional knowledge of nurses (33). Study investigators discussed the reasons with nurses for which they did not screening or inaccurately classified risk. With this failure to comply with the prescribed procedure, nurses were asked 20 questions related to nutrition care. These questions ranged from the specifics of classification to the average protein requirements per day. Of the questions asked, 47.5% responses were answered correctly and 27% were answered as unknown to the nurse (33). The last question asked if the questions were relevant with a 89% response in the affirmative (33). With a response of less than half of correct answers, and a majority of the respondents finding the information relevant, it appears that offering education for basic nutrition knowledge would be beneficial for nurses and the nutritional care they give to patients.

Education is a key for improving the compliance of nursing completion for nutrition screening. One study showed that by offering four informal nutritional classes, resistance to the screening implementation was improved resulting in 100% completion rates (12). By providing insight to the importance of the nutritional care process and data collection, nutrition screening compliance will improve.

**Suggestion for Improving Nursing Compliance**

One review of nutrition screening tools suggested that in order to improve nursing compliance for tool completion, the nutrition risk factors should be incorporated alongside other sections of routine nursing care (12). The review specified a care plan as a potential placement for the nutrition screen (12). A separate review also suggested that the nutrition screening be linked to the care plan with an adequate framework for
implementation (19). Although the nutritional screening could be downplayed with this method, this incorporation could prompt nutrition screening to becoming part of mainstream nursing practice to ensure it is not forgotten. These recommendations are further evaluated in the following pilot study.
Background

Hospital credentialing requirements necessitate that all hospitalized patients be screened for nutrition risk. Because of this standard, typically hospitals utilize a nutrition screening tool that is quick and easily completed by nursing staff. One hospital chose to review this process and adjust the procedure to improve outcomes.

The original form used as the nutrition screening tool was identified as the Patient History form. This questionnaire was completed by the patient and included several questions related to past medical history, medication reconciliation, allergies, social issues, discharge needs, religious preference, and special considerations. The form was designed to trigger ancillary services for referral such as case management, physical therapy, social worker, pastoral care and nutrition services. A copy of the Patient History form is included in Appendix B.

The listed factors intended to trigger nutrition services included:

- Diabetes
- Hypoglycemia (low blood sugar)
- Blood clots, transfusion problems, or bleeding tendency (hemophilia, etc.)
- Liver problems (Jaundice, Hepatitis, etc.)
- Kidney, bladder or prostate problems (infections, etc.)
- Bowel problems (irritable bowel, diverticulosis, etc.)
- Cancer
- Skin problems (eczema, fragile, sores, breakdown, etc.)
- Breastfeeding (for women)
- Unintentional weight loss/gain
- Loss of appetite
- Special diet or anything the patient can not eat
- Difficulty chewing, swallowing or problems with digestion
- Constipation / Diarrhea
Although some of these listed issues seem to be significantly related to nutritional risk, other factors did not have a high correlation with significant nutrition risk. This was determined based on a review of published literature and clinical judgment. By reviewing the Patient History form as an intended nutrition screening tool, it was apparent that these factors needed to be improved for better relevancy.

In addition to inappropriate screening factors, the full purpose of the tool was not appreciated or employed. Nurses inserted the patient-completed two-page form into the bedside chart without reviewing the responses or referring accordingly. It could be argued that the nurses did not know this was their responsibility, however the form clearly instructed them to do so and when asked, most nurses acknowledged that they knew to refer patients based on the Patient History form.

Overall nurses did not screen patients appropriately or refer them to the Registered Dietitian for nutritional intervention. The screening tool consisted of a patient-completed questionnaire and did not appropriately reflect relevant screening factors for nutritional risk.

Objectives

The objective of this pilot study was to determine if nursing compliance improved when the nutrition screening form was integrated with the Interdisciplinary Plan of Care form. The secondary objective of this study was to improve the overall screening tool and increase the relevance of the nutrition related screening factors, as judged by the clinical nutrition staff.
Materials and Methods

Study Population

The target population included patients admitted to the Medical/Surgical unit. Pediatric patients were not admitted to this unit, therefore all ages above 18 were included in the study. Because all patients admitted were required to have a nutrition screen completed within 24 hours, patient age was not a factor of nursing compliance for completing the nutrition screen. As a comparison group, data was collected from the Intensive Care Unit which continued to use the original screening tool. Data for rehabilitation and women’s services units were excluded from the study due to a low nutrition risk population on both units and the presence of automatic referrals on the rehab unit.

Design

Because of the data collected over the first four months of the study period, clinical leadership staff (consisting of unit directors and ancillary discipline representatives) agreed that a change in the nutrition screening process would improve quality and quantity of appropriate nutrition referrals. With the introduction of a new care plan, nursing leadership and the clinical dietitian staff agreed that the best way to improve completion compliance was to include the nutrition screening tool into a form used daily by nurses. The Interdisciplinary Plan of Care (IDPC) form was in the process of revision and lent itself well to such a merge. A collaborative effort revised and approved the new form with plans for a pilot study on the Medical/Surgical unit to begin May of 2005 using the protocol as outlined in Figure 2.
The IDPC form was updated to include specific nutrition-related screening factors related to increased nutritional risk. These risk factors were comprised of commonly used triggers for nutritional assessment found in the literature as previously discussed. The new risk factors were designed to trigger high risk patients that needed to be seen by a registered dietitian within 48 hours for nutrition intervention. They were also chosen based on availability of information to nursing staff. Risk factors chosen could be obtained through nursing assessment of patient, asking the patient questions, knowing the usual course of disease, and knowledge of plan for nutrition support. These factors were approved by the three members of the clinical dietitian staff and are listed under "Problem(s)" in Figure 3.
The IDPC form was used as an continuing care plan for the duration of the patient’s hospital stay. All disciplines were expected to add related information in order to communicate the plan of care associated with their services. Figure 3 is the nutrition section found on the first page of the IDPC form. A complete copy of the IDPC form can be found in Appendix C. This form was also used to document and track subsequent interventions as indicated with specified expected outcomes. With each follow up, the outcome status was to be reevaluated as improved, resolved or unchanged.

The IDPC form was introduced in both am and pm staff meetings for an implementation date of May 3, 2005. Follow-up and monitoring ensured that all staff was aware that the nutrition screening risk factors were to be completed by nursing staff.

<table>
<thead>
<tr>
<th>Date</th>
<th>Discipline</th>
<th>Initials</th>
<th>Problem(s)</th>
<th>Intervention</th>
<th>Expected Outcome</th>
<th>Outcome Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nursing Screening Factors → identified for Nutrition Risk:</td>
<td></td>
<td></td>
<td>Order Dietitian Referral for risk factors identified</td>
<td>PFSO verbalizes understanding of diet instructions and/or food/drug interaction</td>
<td>Date, Initials</td>
</tr>
<tr>
<td></td>
<td>Requires enteral and/or parenteral support</td>
<td></td>
<td></td>
<td>Give Supplements and/or snacks</td>
<td>Improved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diagnosis of Failure To Thrive</td>
<td></td>
<td></td>
<td>Provide consultation/recommendations</td>
<td>Resolved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>New diagnosis End Stage Renal Disease/Failure</td>
<td></td>
<td></td>
<td>Provide education/counseling</td>
<td>Unchanged</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pregnant/Lactating Mother (not admitted to Women Center)</td>
<td></td>
<td></td>
<td>Calorie count</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Albumin less than 2.1 mg/dL</td>
<td></td>
<td></td>
<td>Swallowing evaluation/precautions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wound/non-healing ulcer (stage III or greater)</td>
<td></td>
<td></td>
<td>Restrict fluids</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nausea/Vomiting/Diarrhea over 72 hrs prior to admission</td>
<td></td>
<td></td>
<td>Encourage fluids/p.o. intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Problems Swallowing/Chewing</td>
<td></td>
<td></td>
<td>Offer alternative choices when food is refused</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Unplanned wt loss over 5% in 1 mo.</td>
<td></td>
<td></td>
<td>Assess/ Monitor</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Patient eating less than 50% over 72 hrs prior to admission</td>
<td></td>
<td></td>
<td>Tolerance to diet/enteral feeding/TPN</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
<td></td>
<td>Labs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>WNL, no risk factors identified</td>
<td></td>
<td></td>
<td>Weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>New Onset/Preexisting Diabetes →</td>
<td></td>
<td></td>
<td>% meals eaten</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I &amp; O</td>
<td></td>
<td></td>
<td>Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
<td></td>
<td>Order Diabetes Educator Referral</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 3. Interdisciplinary Plan of Care Form, Nutrition Section
Nursing was responsible for marking identified nutrition risk factors and order a Dietitian Referral. If no risk factors were identified, they were required to mark within normal limits (WNL). The hospital also had a Diabetes Education program, therefore for new onset or preexisting diabetes patients, nursing was expected to order a Diabetes Educator Referral.

Data and Instrumentation

Data collected included: 1) a completed nutrition screening tool (yes or no) and 2) if indicated, a referral was made (yes, no, or not applicable). Data from the nutrition screening tool was collected over a ten month period on randomly assigned days.

Prior to the implementation of the new screening process, data was collected on both the Intensive Care Unit (ICU) and the Medical/Surgical unit (Med/Surg). It was because of this data that the pilot study was initiated. ICU data was collected for each of the ten months to use as a control population because they continued to use the Patient History form as the nutrition screening tool.

The clinical dietitian staff collected data for all ten months with the exception of July. During this month the Joint Commission of Accredited Hospitals and Organizations reviewed and audited the hospital policies and resulting compliance. For this reason, the hospital’s quality risk team requested that various clinical staff be required to complete daily and weekly concurrent chart audits for all patients. The staff who completed these audits were trained on the correct procedures for chart reviews. However, over 50% of the ICU and Med/Surg chart audits were excluded from the study because “not applicable” was selected for the nutrition screen completion within 24 hours.
of admission. This data was not used because all patients must have the nutrition screen completed.

**Results and Analysis**

Statistical analysis was used to observe the difference in nutritional screen completion rates, the difference in nutrition referrals, and total compliance before and after the implementation of the new IDPC form. A $P$ value less than 0.05 was considered to be statistically significant.

Comparative groups included the completion rates for the first four months (Jan-April 2005) before the implementation of the IDPC screening form, compared to the last six months of the study (May-October 2005). Using a univariate analysis, $t$ test results, assuming unequal variance, indicated an increased mean from 37.6% (SD ± 7.9%) overall completed screens to 66.8% (SD ± 23.8%) for the ICU with statistical significance ($P = 0.03$). Med/Surg completion rates increased from an average of 32.0% (SD ± 5.7%) to 56.5% (SD ± 20.4%) with statistical significance ($P = 0.03$). Throughout the duration of the study, the rate of total screens completed was also evaluated. No statistically significance difference ($P = 0.16$) was found between the ICU (mean = 55.1% ± SD 23.7%, range of 23.5% to 88.2%) and Med/Surg (mean = 46.8% ± SD 20.0%, range of 25% to 92.1%) completion rates. Completion rates for both units are charted in Figure 4.
A statistically significant difference in improved referral rates was seen on the Med/Surg unit after the implementation of the IDPC screening tool with referral rates increasing from 0% to 44.4% ($P = 0.002$, SD ± 18.8%). T-test analysis for improvement of positive referrals (if indicated) revealed a statistically significant difference ($P = 0.0001$) between the ICU and Med/Surg units after the implementation of the IDPC nutrition screening tool on Med/Surg. The ICU referral rate was an average of 9.0% (SD ± 22.0%) compared to 44.4% (SD ± 18.8%) on the Med/Surg unit. No statistically significant difference ($P = 0.36$) was noted on ICU referral rate throughout the 10-month study period. Figure 5 charts the percentage of referrals made for positive nutrition screening factors.
Total compliance was compiled based two variables for each n. Variables for compliance included (1) if the screen was completed and (2) if the referral was made for a positive referral. When the new IDPC form was started, Med/Surg total compliance for screen completion and referrals made increased from 55.3% (SD ± 5.3%) to 71.5% (SD ± 11.6%) with statistical significance ($P = .02$). The correlation coefficient between screening tool completion and positive referral made was $r = 0.835$ for the study period for the Med/Surg unit. The correlation coefficient was $r = 0.440$ for the same factors on the ICU. No other significant difference for total compliance was established for ICU during the study period or between ICU and Med/Surg after the IDPC implementation. The rates for total compliance of nutrition screen completion and subsequent referrals can be seen in Figure 6.
Discussion

Objective #1 - Determine if nursing compliance improved when the nutrition screening form was integrated with the IDPC form.

Although the intervention of the IDPC form took place on the Med/Surg unit, data was collected on the ICU as a control for rating compliance. Based on the results and statistical analysis, there was a significant increase in screens completed by both the ICU and Med/Surg units. However, no statistical difference was found between the completion rates for the two units. Together, these two factors indicate that by integrating the screening form into the IDPC form, nutrition screening completion was not necessarily improved. The methods for screen completion, as later discussed, played an important role in this compliance rate. The increased rate of screens completed for both units may be due to the increased monitoring of the form completion.

The significantly increased rate noted in July as seen in Figure 6 was likely due to the JCAHO review during that month, resulting in substantially improved compliance. Additionally, as discussed previously, the data collection was completed by different members of the clinical staff, and although trained, may have resulted in skewed results.
The considerable drop of nutrition screens completed in August may be due to the completion of the JCAHO review, resulting in perceived relaxed standards of care.

The referral rate for indicated completed nutrition screens increased on the Med/Surg unit from 0% to 44% with the implementation of the IDPC form with the nutrition screen. This rate of referrals was almost twice as many referrals (23%) noted in a previously discussed study conducted by Vos (16). The referral rate did not increase on the ICU with the Patient History form. Of note, if the nutrition screen tool was not filled out, subsequent referral compliance was unknown.

Total compliance for both having both the nutrition screen completed and referring patients for positive referral was improved from 55.3% to 71.5% on the Med/Surg unit. These two variables were positively correlated \((r = 0.835)\) on the Med/Surg unit, therefore, as the rate of referrals improved, the rate of screens completed improved. The total compliance for the ICU did not improve with statistical significance and had a positive correlation between the variables, although the correlation was not as strong for this unit \((r = 0.440)\).

Despite the new IDPC screening tool initiative and implementation plan, many forms were not completed within 24 hours or without the encouragement of a monitoring dietitian. Reasons for this deficiency are many. Nurses may claim that they were unaware that it was their responsibility. Other nurses may have little time to complete the screening form or may view it as a low priority. It was observed that certain nurses consistently did not fill out the screening form despite constant monitoring. Perhaps nurses lacked insight to the importance of nutrition screening or failed to recognize the impact that a referral would have on patient outcomes.
The accuracy of the nutrition screens completed was also questioned. Nurses were suspected of simply filling out within normal limits (WNL) as an quick solution to the requirement. Some patients were screened at WNL although they presented with overt signs of undernutrition such as significant emaciation or poor oral intake. It may be argued that perhaps the screening tool took away the subjective judgment of the nurse, however an “other” section was provided to meet this need. There are benefits of including subjectivity into the screening tool. Subjectivity allows for clinical experience and sound reasoning to recognize problems before they are detected by set objective criteria.

**Objective #2 - To improve the overall screening tool and increase the relevance of the nutrition related screening factors.**

Based on the previously reviewed recommendations of the British Association for Parenteral and Enteral Nutrition, the nutrition risk factors chosen for the screening tool met the criteria for evaluating weight change, appetite, ability to eat, and risk factors associated with the illness or its treatment (20). Although the screening tool did not request specific height and weights or evaluate altered physical or mental function, all other recommended nutrition factors were present.

The nutrition standards maintained by the Joint Commission on Accreditation of Healthcare Organizations require that all patients be screened for nutritional risk, use an interdisciplinary approach, monitor response to therapy and adjust the care plan as needed (10). The new screening procedure and tool functions by using all of these set standards for nutrition care.
The two compared screening tools were completed with very different procedures, the Patient History form was completed by the patient, whereas the IDPC form was completed by the nurse. This significant difference in the two screening forms was a significant limiting factor when evaluating nursing compliance. Furthermore, the screening responsibility was virtually taken away from the nurse and given to the patient with the Patient History form. Although it was the nurses responsibility to ensure that the form was filled out, the patient’s ability to complete the form restricted its usefulness. Furthermore, if the nurse did not review the patient’s responses and make appropriate referrals, the Patient History form was useless as a nutrition screening tool. By integrating the screening tool into the IDPC form, the nurse was then responsible for assessing patient’s risk of undernutrition. Of note, this study did not collect data on whether the Patient History form was reviewed by the nurse, but rather on if the form was completed or not. Had the data set been changed to evaluate nurses review of questionnaire completion, the data might have shown very different results for compliance.

With the total amount of referrals based on the IDPC form, the dietary staff did not receive enough referrals to meet their full capacity for assessments. Additional patients were seen based on a separate criteria used to supplement the nursing screening tool.

The approach for incorporating the screening tool into the IDPC utilizes a multidisciplinary philosophy for the nutrition screening tool. A multidisciplinary approach has been sited as a lacking element in the usual routine in nutritional care (19). When the IDPC form is reviewed and amended by all ancillary services, patient care
issues from each discipline can be addressed with a team approach. Although all disciplines were required to fill out their section and review the plan of care, this was not a consistent standard. Nurses, respiratory therapy, and dietitians were the clinicians that used the form to its capacity.

A disadvantage of the IDPC form was its length. The six-page form was more burdensome than the two-page Patient History form. However the IDPC also replaced a two-sided care plan form that included very little information specific to patient care. The IDPC form is a more complete tool when utilized fully by all disciplines.

Many of the listed risk factors (hemophilia, prostate problems, and others) from the Patient History form did not relate to nutrition-related issues compared to the current literature. With these factors included in the form, referrals were not encouraged because of the poor quality of referrals that would result. Furthermore, the diagnosis-related nutrition screening factors used on the Patient History form were not valued to be significant when used as risk factors alone. Just like the previously discussed NRS 2002 and MUST screening tools, the diagnosis risk factors are functional when coupled with other factors (21, 28). The new policy did not utilize a method for scoring nutritional risk, however the multiple factors used were commonly found in the literature to contribute to nutrition risk.

In a previously discussed study, nurses were asked why patients were not screened and for what reason nutrition plans were not created (33). The new screening tool combined both the nutrition screen and plan for nutritional care which subsequently, although not specifically studied, caused potential increase in the completion of plans
made for deficient nutritional problems and reevaluation. This integration was in response to the recommendation by one study to improve completion compliance (12).

Other limitations include the lack of a specified timeframe for reevaluation in case of a change in the course of stay, given that WNL was marked on admission. As a standard, the dietitian staff would further screen patients who had been in the hospital for greater than seven days if WNL had been marked. The frequency of monitoring or efficacy of nutrition monitoring is not found in current literature (23). However, in order for timely intervention, the nutrition care plan should incorporate plan for follow-up and adjustment.

Regardless of the nutrition screening factors identified, the screening tool prompted nursing staff to consider the nutritional care of their patients. However, there is a possibility that patients' nutritional risk may be misclassified or defined as not at risk, resulting in unidentified undernourished patients and inappropriate use of resources. Additionally, it was observed by the clinical dietitian staff that with the implementation of the new screening procedure, nursing and dietitian rapport improved; nurses more frequently approached the dietitian staff with simple requests and concerns.

Limitations

One important factor for interpreting this data includes completion compliance interpretation for the patient history form and the IDCP form. This interpretation should be different because the patient history form compliance was based on the patient filling out the form, not the nurses review of the form. Further data collection would help to
determine a better comparison for these two variables if data was collected on nursing review.

A limitation of the screening tool includes screening factors that were not validated through a multivariate technique. This study did not examine the tool for sensitivity and specificity. Therefore, it is not known whether the patients referred because of the tool were appropriate referrals or whether the patients not referred should have been. The tool also did not differentiate between nutrition risk levels with a scoring system, a common method found in the literature.

Conclusions

By integrating the nutrition screening tool into the Interdisciplinary Plan of Care form, nutrition screening completion rates may not increase, however, the subsequent dietitian referral rates may improve. Additionally, the perceived quality of those referrals may improve with screening factors better related to nutrition risk.

In order to determine validity (content, predictive, and concurrent), sensitivity, and specificity of the nutrition risk factors chose, further multivariate research and analysis would be necessary. Follow-up research for this pilot study would help to further evaluate continued compliance rates for screens completed and referrals made. Further studies could be designed to follow the rate of care plan completion compliance. Nursing surveys would help to determine the reasons why the screen was not completed or why patients at risk not referred. These issues could then be addressed and followed.

A screening tool can not be judged with any degree of confidence unless it is tested. Although this screening tool was not designed to study the validity or specificity
of the risk factors used or screening tool developed, or to correctly identify all undernourished patients through a validated technique, it did function as a trigger. Nurses were reminded of their responsibility to consider nutritional risk factors and seek appropriate care and intervention. By integrating the new screening tool into the care plan, this hospital progressed towards improving the process for detecting undernutrition and seeking early intervention.
CHAPTER IV
PRACTICAL APPLICATION AND IMPLICATIONS

The objective of creating screening tools is to enable nurses to consistently identify patients at risk. Many barriers limit this identification of nutrition risk. Barriers include nursing priorities, lack of time and the need to manage multiple tasks. Often the needed data for screening is not available and may not even be proven as valid factors that contribute to nutritional risk. Objective criteria is difficult to define and useful subjective criteria varies between clinicians. Additionally, a lack of definition for undernutrition broadens this problem. Although, the purpose of nutrition screening is not to define or diagnose undernutrition, but rather classify nutrition risk levels.

It is reasonable to integrate the nutrition screening process into the total plan of care for all healthcare providers. By doing so, the care plan can be developed as they relate to the nutritional risk screening factors. Implications for nurses include a resource for identifying patients at nutritional risk, possible interventions, and goals to work towards. Physicians benefit from this changed process because their patients are being evaluated for nutritional risk with intervention instigated to improve outcomes. Implications for the dietitians include better allocation of time and resources because they evaluate patients that are identified as at risk. More important than the clinical staff, the patient benefits from an improved screening process with subsequent dietitian referral and early intervention.

Clinical judgment should remain a key element in nutritional screening alongside any tool used until a valid reliable screening tool can be developed. This need for clinical
judgment does not, however replace the value of the nutrition screening tool. Therefore screening completion is the best area of focus for identifying risk. In order to mandate that nurses complete the screening, nursing supervisors and unit directors must be directly involved in the monitoring process in addition to the dietitians. Dietitians involvement in the development and monitoring of the form use improved rapport and trust between the nursing and dietitian staff, allowing for better communication and discussion of interventions. Additionally, educational trainings for nurses would help to improve compliance rates. By teaching basic nutrition, intervention techniques, and emphasizing nurses involvement, nurses can understand their role and responsibilities in providing nutrition care.

In this struggle to define which patients qualify as at nutritional risk and in need of additional nutritional assessment, one solution may include an electronic screening. Many hospitals are mandating that electronic documentation be the standard for nursing, clinical, and all ancillary staff. With this requirement, reports could be created based on variables easily accessed in the computer-based medical record. This would then generate automatic referrals for further nutrition evaluation. Potential factors might include available labs, height, weight, BMI, oral intake, allergies, difficulty chewing/swallowing, and diet history. Although this may seem to be an easy solution, many of the same problems might occur for the initial documentation of such information. If the nursing staff was not compliant with the paper-based screening form, it is doubtful that computer charting would increase that compliance. However, monitoring compliance could be as simple as printing a report. One option to demand compliance may be to restrict nursing access to the chart after 24 hours of admission if
the nutrition screening is not complete. This action may, however, decrease the quality and value of the nutrition screen completed.

The nutrition screening process provides a continued challenge in the healthcare setting. By setting standards, monitoring effectiveness and reevaluating these processes, undernutrition identification will expand and patient care will improve.
REFERENCES


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APPENDIX B. Patient History Form
<table>
<thead>
<tr>
<th>Health History</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>YES</strong></td>
</tr>
<tr>
<td>1. <strong>DIABETES</strong></td>
</tr>
<tr>
<td>2. <strong>HYPOGLYCEMIA</strong> (Low Blood Sugar)</td>
</tr>
<tr>
<td>3. <strong>THYROID PROBLEMS</strong></td>
</tr>
<tr>
<td>4. <strong>HEART PROBLEMS</strong> (Rheumatic Fever, Murmur, Chest Pain, Heart Attack, Irregular Heartbeat, Angina, Arthritis Swelling, Valve Replacement, etc.)</td>
</tr>
<tr>
<td>5. <strong>BLOOD CLOTS, TRANSFUSION PROBLEMS, OR BLEEDING TENDENCY</strong> (Hemophilia, etc.)</td>
</tr>
<tr>
<td>6. <strong>HIGH BLOOD PRESSURE</strong></td>
</tr>
<tr>
<td>7. <strong>STROKE</strong> (Neurological Nutriment on one side, Difficulty Speaking, Loss of Vision, etc.)</td>
</tr>
<tr>
<td>8. <strong>SEIZURES</strong> (Epilepsy, Convulsions, Blackouts, etc.)</td>
</tr>
<tr>
<td>9. <strong>NEUROLOGICAL PROBLEMS</strong> (Loss of Sensation, Blindness, Tingling, etc.)</td>
</tr>
<tr>
<td>10. <strong>SEVERE HEADACHES</strong></td>
</tr>
<tr>
<td>11. <strong>LUNG PROBLEMS</strong> (Asthma, Chronic Cough, Pneumonia, Wheezing, Shortness of Breath, Emphysema, Abnormal Chest X-ray, etc.)</td>
</tr>
<tr>
<td>12. <strong>TUBERCULOSIS</strong> / TB</td>
</tr>
<tr>
<td>13. <strong>SLEEP APNEA</strong> (breathing Intermittent During Sleep, etc.)</td>
</tr>
<tr>
<td>14. <strong>LIVER PROBLEMS</strong> (Jaundice, Hepatitis, etc.)</td>
</tr>
<tr>
<td>15. <strong>KIDNEY, BLADDER OR PROSTATE PROBLEMS</strong> (infections, etc.)</td>
</tr>
<tr>
<td>16. <strong>STOMACH PROBLEMS</strong> (Ulcer, Herpes, Inflamed, Heartburn, etc.)</td>
</tr>
<tr>
<td>17. <strong>Bowel PROBLEMS</strong> (irritable Bowel, Diverticulitis, etc.)</td>
</tr>
<tr>
<td>18. <strong>BACK TROUBLE</strong> (Back, Disc Problems, Nutriment Tingling of Hands or Feet, etc.)</td>
</tr>
<tr>
<td>19. <strong>BROKEN BONES OF HEAD, NECK OR SPINE OR RESTRICTIONS IN MOVEMENT</strong></td>
</tr>
<tr>
<td>20. <strong>ARTHRITIS</strong></td>
</tr>
<tr>
<td>21. <strong>DIFFICULTY OPENING MOUTH</strong> (Trouble, etc.)</td>
</tr>
<tr>
<td>22. <strong>MUSCLE DISORDERS</strong> (Muscle Weakness, Strain, etc.)</td>
</tr>
<tr>
<td>23. <strong>CANCER</strong></td>
</tr>
<tr>
<td>24. <strong>MENTAL HEALTH / PHOBIAS</strong> (Anxiety, Depression, Psychosis, etc.)</td>
</tr>
<tr>
<td>25. <strong>MENTAL DISABILITIES</strong> (Confusion, Memory Loss, Down Syndrome, etc.)</td>
</tr>
<tr>
<td>26. <strong>SKIN PROBLEMS</strong> (Eczema, Itching, Scars, Breakdown, etc.)</td>
</tr>
<tr>
<td>27. <strong>OTHER MEDICAL PROBLEMS / COMMENTS</strong></td>
</tr>
</tbody>
</table>

**Has a Blood Relative Had a Bad Reaction to Anesthesia?**
- **YES**
- **NO**

**Health History**

**Has a Blood Relative Had a Bad Reaction to Anesthesia?**

**Should You Have Any of the Following:***
- False Teeth
- Loose Teeth
- Capped Teeth
- Chipped Teeth
- Bridges
- Retainers
- Braces
- Body Piercing

---

**Patient History**

---

**Date:**

**Time:**
52. Do you need help with any of the following activities, check "No" or any box that applies.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Device used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating</td>
<td></td>
</tr>
<tr>
<td>Toileting</td>
<td></td>
</tr>
<tr>
<td>Bathing</td>
<td></td>
</tr>
<tr>
<td>Grooming</td>
<td></td>
</tr>
<tr>
<td>Clothing</td>
<td></td>
</tr>
<tr>
<td>Walking</td>
<td></td>
</tr>
<tr>
<td>Mobility/Transfer</td>
<td></td>
</tr>
<tr>
<td>Cooking</td>
<td></td>
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<tr>
<td>Home Maintenance</td>
<td></td>
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<tr>
<td>Shopping</td>
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</tr>
<tr>
<td>Medication Administration</td>
<td></td>
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<tr>
<td>Telephone Use</td>
<td></td>
</tr>
<tr>
<td>Handling Finances</td>
<td></td>
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</tbody>
</table>

53. Describe your living accommodations:
- Own Home
- Nursing Home
- Senior Home
- Group Home (Relatives)
- Rented Home
- Out of State/Country
- Assisted Living Center
- Own Home
- Other
- Other

54. Will your living arrangements change after discharge? (Φ)
- Yes
- No
- Other
- Other

55. Do others depend on you for their care? (Φ)
- Yes
- No
- Other
- Other

56. Will you need help in caring for them? (Φ)
- Yes
- No
- Other
- Other

57. Who is willing and able to help you after you are discharged? (Φ)
- Spouse
- Significant Other
- Elderly Parent(s)
- Children
- Pets
- Other

58. Have you been injured, house bound, or hospitalized due to a violent situation with someone close to you? (Φ)
- Yes
- No
- Other
- Other

59. Do you have concerns regarding: (Φ)
- Yes
- No
- Other
- Other

60. Have you used or do you currently use any of the following services? (Indicate providers name) (Φ)
- Homemaker Services
- Meals on Wheels
- Transportation
- Medical supplies / Oxygen
- Home Health Care
- Adult Day Care
- Mental Health Care
- Other...

61. In the last 6 months, have you experienced any of the following? (Φ)
- Unintentional Weight Loss - how much?
- Significant Weight Gain - how much?
- Loss of Appetite - Explain:

62. Are you on special diet or is there anything you cannot eat? Explain:

63. Do you have any difficult chewing, swallowing or with digestion? Explain:

64. Do you have any problems or complaints regarding:
- Urination?
- LIPain / Burning
- Control
- Urgency
- Frequency
- Other...

65. Do you have any problems or complaints regarding your bowel movements? (Φ)
- Constipation
- Diarrhea
- Black / bloody stools
- Control
- Other...

66. Do you use anything to maintain your usual bowel pattern? (Φ)
- Enemas
- Laxatives
- Special Diet
- Fiber supplements
- Other...

67. Do you have any of the following? (check all that apply)
- Headaches in the morning
- Nightmares
- Daytime sleepiness
- Snoring
- Confusion at night
- # of pillows used
- Sleep Habits:
- What time do you: Go to bed
- Wake up

68. Do you use sleeping aids?

69. Please indicate the month/year of your last immunization:
- Tetanus
- Pneumonia
- Meningitis
- Salmonella
- PPD
- Rubella
- Polio
- Hepatitis B
- Tuberculosis
- Chickenpox Vaccine

70. Do you have vision problems? (Φ)
- Impaired
- Glaucoma
- Glasses
- Contacts
- Cataracts
- Blind
- False Eye
- Right
- Left

71. Do you require other assistance / assistive devices?

72. Do you have hearing problems? (Φ)
- Impaired
- Deaf
- Right
- Left

73. Do you use a hearing aid?

74. Do others suggest you have a hearing problem?

75. Do you require other assistance / assistive devices?

76. Do others suggest you have a hearing problem?

77. Do you require other assistance / assistive devices?

78. Do you have vision problems?

79. Do others suggest you have a vision problem?

80. Do you require other assistance / assistive devices?

81. Do others suggest you have a vision problem?

82. Do you require other assistance / assistive devices?

83. Do others suggest you have a vision problem?

84. Do you require other assistance / assistive devices?

85. Do you have any of the following? (Φ)
- Cataracts
- Blind
- Other...

86. Do you have any of the following? (Φ)
- Diarrhea
- Constipation
- Black / bloody stools
- Control
- Other...

87. Do you have any of the following? (Φ)
- Enemas
- Laxatives
- Special Diet
- Fiber supplements
- Other...

88. Do you have any of the following? (Φ)
- Headaches in the morning
- Nightmares
- Daytime sleepiness
- Snoring
- Confusion at night
- # of pillows used

89. Do you have any of the following? (Φ)
- Urination?
- LIPain / Burning
- Control
- Urgency
- Frequency
- Other...

90. Do you have any of the following? (Φ)
- Constipation
- Diarrhea
- Black / bloody stools
- Control
- Other...

91. Do you use anything to maintain your usual bowel pattern? (Φ)
- Enemas
- Laxatives
- Special Diet
- Fiber supplements
- Other...

92. Do you have any of the following? (Φ)
- Headaches in the morning
- Nightmares
- Daytime sleepiness
- Snoring
- Confusion at night
- # of pillows used

93. Do you require other assistance / assistive devices?

94. Do others suggest you have a hearing problem?

95. Do you require other assistance / assistive devices?

96. Do others suggest you have a vision problem?

97. Do you require other assistance / assistive devices?

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108. Do others suggest you have a vision problem?

109. Do you require other assistance / assistive devices?

110. Do others suggest you have a vision problem?
APPENDIX C. Interdisciplinary Plan of Care Form
## INTERDISCIPLINARY PLAN OF CARE

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<th>Date</th>
<th>Discipline</th>
<th>Initials</th>
<th>Problem</th>
<th>Intervention</th>
<th>Date ADD</th>
<th>Date DC</th>
<th>Expected Outcome</th>
<th>Outcome Status</th>
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- **Concern re. patient’s ability to return to premorbid living arrangements R/T**  
- **Inadequate home support**  
- **Troubling illness**  
- **Suspected abuse / neglect**  
- **Financial concerns**  
- **Homeless**  
- **Stays at home**  
- **Other**

- **Need for follow-up care Post Discharge**  
- **Wound care**  
- **IV therapy**  
- **Diabetes**  
- **Other**

- **Nursing Screening Factors Identified for Nutrition Risk:**  
  - **Requires enteral and/or parenteral support**  
  - **Diagnosis of Failure To Thrive**  
  - **New diagnosis End Stage Renal Disease/failure**  
  - **Pregnant/Acting Mother (not admitted to Women Center)**  
  - **Albumin less than 2.1 mg/dl**  
  - **Bowel/mucosal ulcer (stage III or greater)**  
  - **Nausea/Vomiting/Diarrhea over 72 hrs prior to admission**  
  - **Problems Swallowing/Chewing**  
  - **Unintentional weight loss**  
  - **Patient eating less than 50% over 72 hrs prior to admission**  
  - **Other**

- **WL/N, no risk factors identified**  
- **New Onset/Premorbid Diabetes**

- **Risk for Injury R/T**  
  - **Impaired mobility**  
  - **Impaired mental status**  
  - **High fall risk**  
  - **Seizures**  
  - **Other**

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- **Order Dietitian Referral for risk factors identified**  
  - **Give Supplements and/or snacks**  
  - **Provide consultation/recommendations**  
  - **Provide education/counseling**  
  - **Cater count**  
  - **Supervise/assist with meals**  
  - **Blood glucose testing as ordered**  
  - **Swallowing evaluation/precautions**  
  - **Restrict fluids**  
  - **Encourage fluids/p.o. intake**  
  - **Other alternative choices when food is refused**

- **Assess / Monitor**  
  - **Tolerance to diet/enteral feeding /TPN**  
  - **Labs**  
  - **Weight**  
  - **% meals eaten**  
  - **I & O**  
  - **Other**

- **Order Diabetes Educator Referral**

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- **Order Psych/Verbalizations of appropriate D/C planning arrangements are evidenced by verbalizing what services are being arranged**  
- **Discharge needs met**  
- **Other**

**KEY:**
- **N** - Nursing  
- **PT** - Physical Therapy  
- **OT** - Occupational Therapy  
- **D** - Dietary  
- **C** - Cardiology  
- **SP** - Speech Pathology  
- **SS** - Social Services  
- **DP** - Discharge Planning  
- **F** - Financial Counselor  
- **CM** - Case Manager  
- **Ps** - Physician  
- **CH** - Chaplain/Spiritual  
- **DE** - Diabetic Educator  
- **RT** - Respiratory Therapy  
- **Rx** - Pharmacy  
- **R** - Radiation  
- **ET** - Entomological Therapy

**Addressograph**

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### INTERDISCIPLINARY PLAN OF CARE

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### INTERVENTION

- **Request orders for:**
  - PT
  - OT
  - Speech Therapy
  - Transfer training
  - Bed mobility
  - Gait training
  - Star training
  - Involves Pt/PSO in goal setting
  - Therapeutic exercises
  - Ambulate
  - With assist device
  - ROM exercises
  - Active
  - Passive
  - Use orthotic/prosthetic devices, if indicated
  - Provide alternate forms of communication
  - Simplify requests/instructions
  - Allow time for Pt to process & respond completely
  - Swallowing precautions
  - Supervise/evaluation/assist feeding
  - Encourage/Supervise/Assist/ADL's
  - Other

### EXPECTED OUTCOMES

- Increased activity as tolerated
- Maintains optimal mobility
- Contractures/deficiencies are minimized
- Pt/PSO will demonstrate safe use of
- ADL's are performed optimally as evidenced by
- Communicates effectively within limits of impairment
- Pt aspiration risk for food/secretions will be reduced
- Other

### OUTCOME STATUS

- No Signs or Symptoms of infection
- Other

### KEY:

- N - Nursing
- PT - Physical Therapy
- OT - Occupational Therapy
- D - Diet Therapy
- C - Cardiology
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**Intervention**

- Arrange for Counseling
- Support group
- Contact spiritual support
- Allow needed cultural/spiritual items
- Provide reassurance
- Encourage PSO to verbalize feelings
- Utilize age specific approach
  - Adolescent 12 - 18 yrs
  - Adult 18 - 44 yrs
  - Adult 45 - 64 yrs
  - Older Adult 65 yrs and above
- Address worries about future
- Provide information to make medication use, home safer. Avoid making assumptions about loss of abilities (e.g. hearing, memory)
- Offer sleep aids/comfort measures
- Minimize disruption during sleeping hours
- Reduce noise during desired sleep hours
- Other
- Assess for causative factors
- Monitor vital signs
- Assess for discomfort, using pain assessment tool, as appropriate
- Provide comfort measures
- Instruct regarding use of PCA
- Instruct patient in pain relief options
  - Breathing exercises
  - Relaxation exercises
  - Other
  - Initiate physical therapy treatment
  - Repositioning
  - Range of motion
  - Other
- Pt will verbalize relief of discomfort after intervention
- Demonstrate ability to use PCA/Epidural pump
- Patient's comfort pain relief goal of ______/10 met

**Expected Outcome**

- Coping improved
- Spiritual/Religious/Cultural needs met
- Age specific needs met
- PsSO verbalizes decreased feelings of anxiety
- PsSO expresses feelings and opinions
- PsSO will participate in care decisions
- PsSO verbalizes decreased self-image
- PsSO verbalizes increased self-image
- Verbalized improved self-image
- Verbalized improvement with sleep pattern
- Other

**Outcome Status**

- Improved
- Resolved
- Unchanged
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**KEY:**
- N - Nursing
- PT - Physical Therapy
- OT - Occupational Therapy
- D - Dietary
- C - Cardiology
- DE - Diabetic Educator
- F - Financial Counselor
- RT - Respiratory Therapy
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- SS - Social Services
- DP - Discharge Planning
- CH - Chaplain/Spiritual
- EL - Enteral Therapist
- CM - Case Manager
- Rx - Pharmacy
- Physician

**Addressograph**
<table>
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<tr>
<th>Date</th>
<th>Discipline</th>
<th>Initials</th>
<th>Problem</th>
<th>Intervention</th>
<th>Date ADD</th>
<th>Date DC</th>
<th>Expected Outcome</th>
<th>Outcome Status</th>
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</table>
|      |            |          | Potential for / [ ] Actual Alteration                                    |                                                                               |          |        | PVSO will verbalize/ demonstrate elimination management                           | Date
|      |            |          | In bowel elimination R/T                                                |                                                                               |          |        | bowel elimination pattern improved from baseline                                | Date Initials |
|      |            |          | Diarrhea                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Constipation                                                            |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Incontinence                                                           |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Ileus                                                                   |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Ostomy type                                                            |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Neurogenic bowel                                                       |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Other                                                                   |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Gastrointestinal Problems R/T                                           |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Bleeding                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Reflux/heartburn                                                       |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Abdominal pain                                                         |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Nausea/vomiting                                                        |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Other                                                                   |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Potential for / [ ] Actual Alteration                                    |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | In urinary elimination R/T                                              |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Incontinence                                                           |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Dysuria                                                                |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Hematuria                                                              |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Bladder spasms                                                        |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Retention                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Neurogenic bladder                                                     |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Renal failure                                                          |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Urostomy                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Catheter                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Discharge                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Breast                                                                 |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Vaginal                                                                |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Penile                                                                  |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Other                                                                   |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Potential for / [ ] Actual Alteration                                    |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Incontinence                                                           |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Dysuria                                                                |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Hematuria                                                              |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Bladder spasms                                                        |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Retention                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Neurogenic bladder                                                     |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Renal failure                                                          |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Urostomy                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Catheter                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Potential for / [ ] Actual Alteration                                    |                                                                               |          |        | PVSO will demonstrate elimination management                                      | Date Initials |
|      |            |          | Incontinence                                                           |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Dysuria                                                                |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Hematuria                                                              |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Bladder spasms                                                        |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Retention                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Neurogenic bladder                                                     |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Renal failure                                                          |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
|      |            |          | Urostomy                                                               |                                                                               |          |        | PVSO will demonstrate elimination management                                      | DateInitials |
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**INTERDISCIPLINARY PLAN OF CARE**

**DATE:**

**INITIATING INTERDISCIPLINARY PLAN OF CARE RECORD**

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**EDUCATION #14**

**ACTIVE ON ALL PATIENTS UPON ADMISSION**

- Unit Orientation/Care Education
- Signs and Symptoms to Report
- Pain Management
- Disease Process
- Pre/Post Procedure
- Academic Needs (LOS >5 days)
- Medication/Drug Interaction

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