



MALNUTRITION QUALITY  
IMPROVEMENT INITIATIVE

Welcome to Today's  
Expert Webinar for the 2019 MQii Learning Collaborative:  
**“Improving Nutrition Care for Surgical Patients:  
Pre-Admission through Inpatient Stay  
Recommendations”**  
Tuesday, July 16, 2019

We will get started promptly at  
2:00PM ET  
(1:00PM CT; 12:00PM MT; 11:00AM PT)  
*All phone lines have been muted*

The Malnutrition Quality Improvement Initiative (MQii) is a project of the Academy of Nutrition and Dietetics, Avalere Health, and other stakeholders who provided guidance and expertise through a collaborative partnership. Support provided by Abbott.

# Before We Get Started...

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Participants Chat Recorder Notes

Participants

Speak

Laura Fincher (Host, me)

EF Eleanor Fitall

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MALNUTRITION QUALITY  
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# Today's Agenda

Agenda Item	Presenter(s)
Welcome and introduction to the webinar	Kelsey Jones
Guidelines and benefits for nutrition care in surgical patients: One hospital's experience using Enhanced Recovery After Surgery (ERAS) protocols	Ashley L. Matthews, MS, RDN, LD, CNSC, PMP, <i>One WellStar Clinical Nutrition Lead</i>
A surgeon's perspective: Increased risk of malnutrition in surgical patients and best practices to support nutritional care and partner with surgical leaders	Ken Nepple, MD, FACS, <i>Clinical Associate Professor in the Department of Urology at the University of Iowa Hospitals and Clinics</i>
Questions – 15 mins	



## MALNUTRITION QUALITY IMPROVEMENT INITIATIVE



Ashley L. Matthews, MS, RDN, LD,  
CNSC, PMP  
***One WellStar Clinical Nutrition Lead***

- Define malnutrition and briefly describe the current state of affairs
- Review ERAS & ASER related nutrition guidelines & recommendations
- Discuss the benefits of pre-operative carbohydrate loading and immunonutrition
- Offer advice on nutrition product procurement & delivery to patients
- Highlight experiences in hospital ERAS pilots & healthcare system/multiple service line deployment of ERAS protocols

No Disclosures

# Malnutrition

Malnutrition is defined as the inadequate intake of nutrients, particularly protein, over time and can occur in people who are both underweight or overweight.

AND/A.S.P.E.N. Clinical Characteristics the Clinician Can Obtain and Document to Support a Diagnosis of Malnutrition

Clinical Characteristic	Malnutrition in the Context of Acute Illness or Injury		Malnutrition in the Context of Chronic Illness		Malnutrition in the Context of Social or Environmental Circumstances	
	Moderate <sup>a</sup>	Severe <sup>b</sup>	Moderate <sup>a</sup>	Severe <sup>b</sup>	Moderate <sup>a</sup>	Severe <sup>b</sup>
<b>Energy intake:</b> Malnutrition is the result of inadequate food and nutrient intake or assimilation; thus, recent intake compared with estimated requirements is a primary criterion defining malnutrition. The clinician may obtain or review the food and nutrition history, estimate optimum energy needs, compare them with estimates of energy consumed, and report inadequate intake as a percentage of estimated energy requirements over time.	< 75% of estimated energy requirement for > 7 days		≤ 50% of estimated energy requirement for ≥ 5 days		< 75% of estimated energy requirement for ≥ 1 month	
<b>Interpretation of weight loss:</b> The clinician may evaluate weight in light of other clinical findings, including the presence of under- or over-hydration. The clinician may assess weight change over time reported as a percentage of weight lost from baseline.	% 1-2 5 7.5	Time 1 week 1 month 3 month	% > 2 > 5 > 7.5	Time 1 week 1 month 3 month	% 5 7.5 10 20	Time 1 month 3 month 6 month 1 year
<b>Physical findings:</b> Malnutrition typically results in changes to the physical exam. The clinician may perform a physical exam and document any one of the physical exam findings below as an indicator of malnutrition.						
<b>Body fat:</b> Loss of subcutaneous fat (e.g., orbital, triceps, fat overlying the ribs).	Mild	Moderate	Mild	Severe	Mild	Severe
<b>Muscle mass:</b> Muscle loss (e.g., wasting of the temples, clavicles, shoulders, interosseous muscles, scapula, thigh, and calf).	Mild	Moderate	Mild	Severe	Mild	Severe
<b>Fluid accumulation:</b> The clinician may evaluate generalized or localized fluid accumulation evident on exam (extremities, vulvar/scrotal edema, or ascites). Weight loss is often masked by generalized fluid retention (edema), and weight gain may be observed.	Mild	Moderate to severe	Mild	Severe	Mild	Severe
<b>Reduced grip strength:</b> Consult normative standards supplied by the manufacturer of the measurement device.	NA	Measurably reduced	NA	Measurably reduced	NA	Measurably reduced

# Malnutrition: Prevalence in Acute Care



## ► ***Re-Admission & LOS***

- Malnourished, hospitalized adults have a 54% higher likelihood of hospital 30-day readmission than those who are well-nourished

## ► ***Hospital Acquired Infection***

- Disease-associated malnutrition can lead to slower wound healing and increased infection rate

## ► ***LOS***

- Malnourished surgical patients are two - three times more likely to experience post-op complications

# Nutrition & Surgery

- Immunonutrition and Preoperative Carbohydrate Loading are complementary practices.
- Society recommendations include perioperative immunonutrition and preoperative carbohydrate loading.



# The Impact of Surgical Nutrition



Reduce Surgical  
Site Infections<sup>3</sup>



Decrease  
Complications<sup>4,5</sup>



Shorten Length  
of Stay<sup>6,7,8</sup>



Decrease Cost  
of Care<sup>9</sup>

## Surgical Nutrition is Associated with Reductions in Length of Stay

Intervention	Length of Stay Reduction	Cost Savings Associated with Length of Stay Reduction
Preoperative Complex Carbohydrate Loading	0.2 Days <sup>10*</sup>	\$843 <sup>11*</sup>
Immunonutrition	2.5 Days <sup>5,12,13†</sup>	\$10,537 <sup>11†</sup>

3. Marik PE, et al. *JPEN J ParenterEnteral Nutr.* 2010;34(3):378-386. 4. Cerantola Y, et al. *Br J Surg.* 2011;98(1):37-48 5. Drover JW, et al. *J Am Coll Surg.* 2011;212(3):385-399. 6. Marik PE, et al. *JPEN J ParenterEnteral Nutr.* 2010;34(3):378-386. 7. Cerantola Y, et al. *Br J Surg.* 2011;98(1):37-48. 8. Drover JW, et al. *J Am Coll Surg.* 2011;212(3):385-399. 9. Cerantola Y, et al. *Gastroenterol Res Pract.* 2011;2011:739347.

# Nutrition: Preoperative Carbohydrate Loading

# ERAS & ASA Fasting Guidelines

## Background

### ERAS Evidenced-Based Practice

#### Nutritional aspects of ERAS

- Abandoning NPO from Midnight
- Pre-operative carbohydrate loading
- Appropriate intraoperative fluids and volumes
- Early postoperative nutrition

### 1999 ASA Fasting Guidelines

- Clear Liquids = 2 hours minimum fast  
i.e. water, fruit juice without pulp, carbonated beverages, clear tea, black coffee

### 2011 Updates of the ASA Fasting Guidelines

#### Clear Liquids

- #1 Findings: Meta-analysis of randomized fasting time of 2-4 h versus more than 4 h report smaller gastric volume and higher pH in adult patients given clear liquids 2-4 h before a procedure
- #1 Recommendation for Clear Liquids: It is appropriate to fast from intake of clear liquids at least 2 h before elective procedures requiring general anesthesia, regional anesthesia or sedation/analgesia (i.e., monitored anesthesia care [or MAC])." (Anesthesiol. 2011;114:495-511)

# Guidelines & Recommendations- Preoperative Carbohydrate Loading

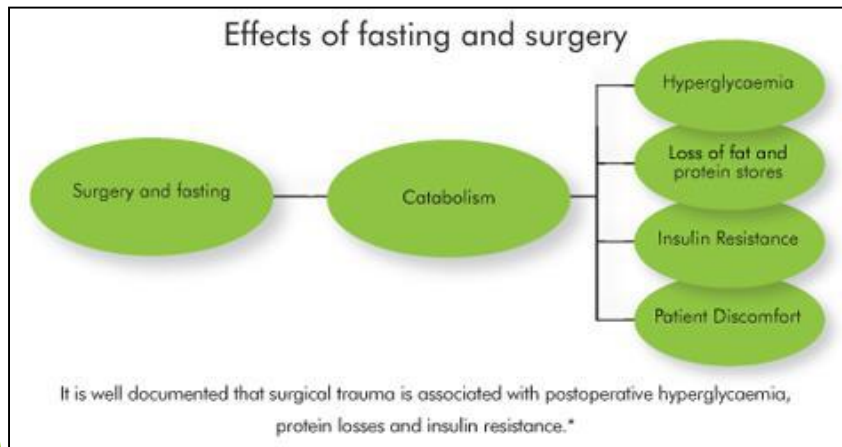
**Drink 2**  
bottles the night before  
surgery and

**Drink 1**  
bottle the morning  
of surgery



# Nutrition Benefits - Preoperative Carbohydrate Loading

- Avoids dehydration
- Reduces preoperative thirst, hunger, anxiety, nausea
- Decreased catabolism/preserves muscle mass
- Decreased post-op insulin resistance



- Decreased hyperglycemia
- Enhances patient comfort
- Facilitates IV access
- Reduces IV fluid requirements (current shortage)
- Avoids sodium overload
- Improved grip strength
- Decreased LOS

# Additional Benefits

## Additional Reasons to Consider Preoperative Carb Loading

- Beneficial to anyone undergoing elective surgery
- Prolonged preoperative fast is likely harmful
- Beyond 12 hours of fasting, normal metabolism shifts to a “starved” state
- Water, tea or coffee hydrate but do not nourish effectively, the patient is “metabolically starved”
- Clear liquids with protein are not ideal 2 hours pre-op because they slow digestion/gastric emptying

# Timeline & Type of CHO

## Timeline, Type of Carbohydrate & Osmolarity

### Timeline

- ASA Guidelines - Single serving 2 hours prior to surgery
- ERAS Recommendation - 2 servings 8-12 hours prior to surgery & 1 serving 2 hours prior to surgery

### Type of Carbohydrate

- Maltodextrin - complex carb that is absorbed quickly & released slowly

### Osmolarity

- Normal osmolarity of the tissue, cells & fluids of the human body is 280-300 mosm
- A clear liquid that is close to the osmolarity of the human body will help nourish & hydrate the body without causing dehydration

# Nutrition: Immunonutrition

The background of the slide features abstract, overlapping geometric shapes in various shades of green, ranging from light lime to dark forest green. These shapes are primarily located on the right side and bottom of the frame, creating a modern, dynamic aesthetic.



# Guidelines & Recommendations- Immunonutrition

- ▶ Immunonutrition is a blend of protein, arginine and fish oil to support recovery and modulate inflammation
- ▶ Benefits
  - ▶ 71% less risk of surgical site infections
  - ▶ 62% less risk of infectious complications
  - ▶ 45% less risk of complications

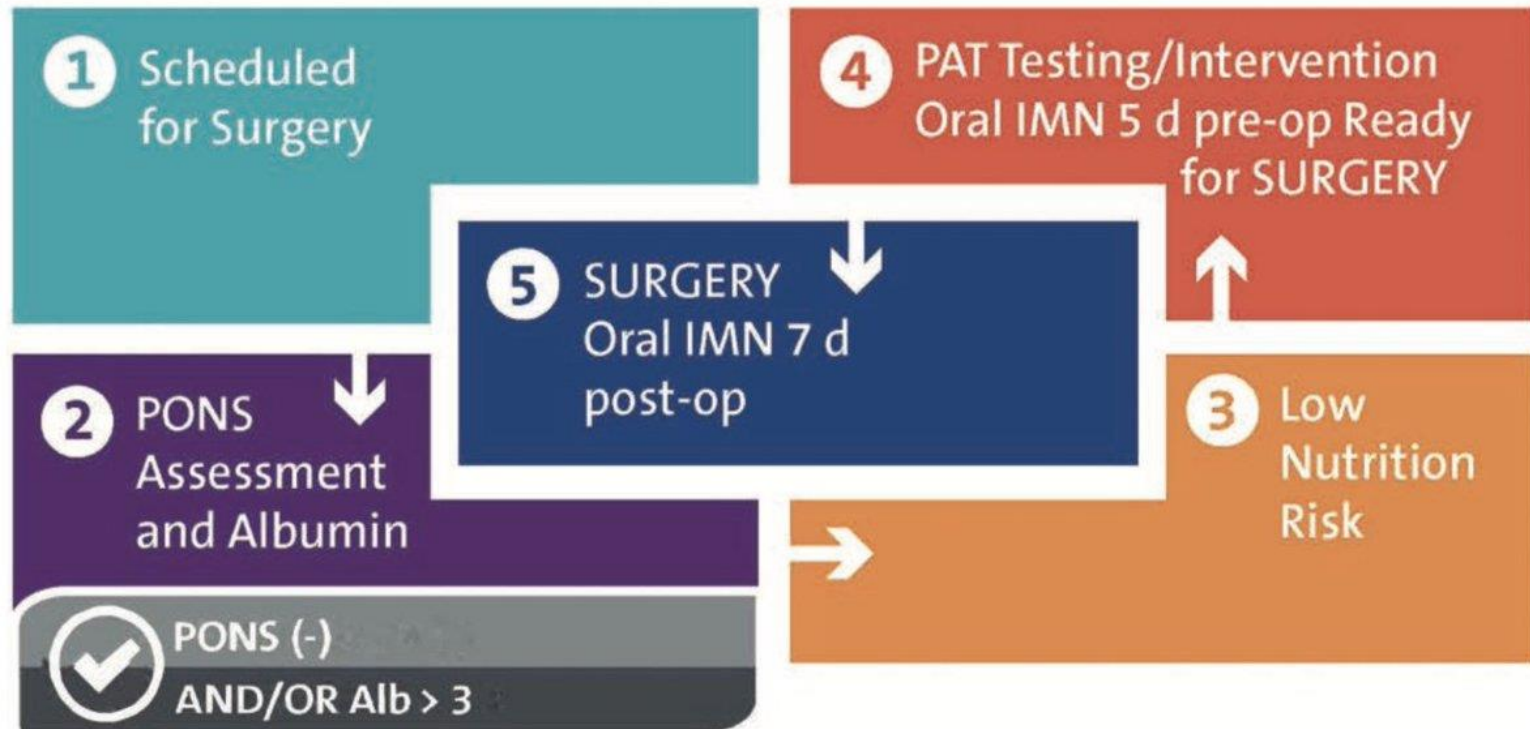
**Drink 2-3  
shakes/day**

*for 5-7 days  
before and after surgery*

**If patient is at risk of  
malnutrition consider  
immunonutrition for  
a minimum of 7 days  
perioperatively**

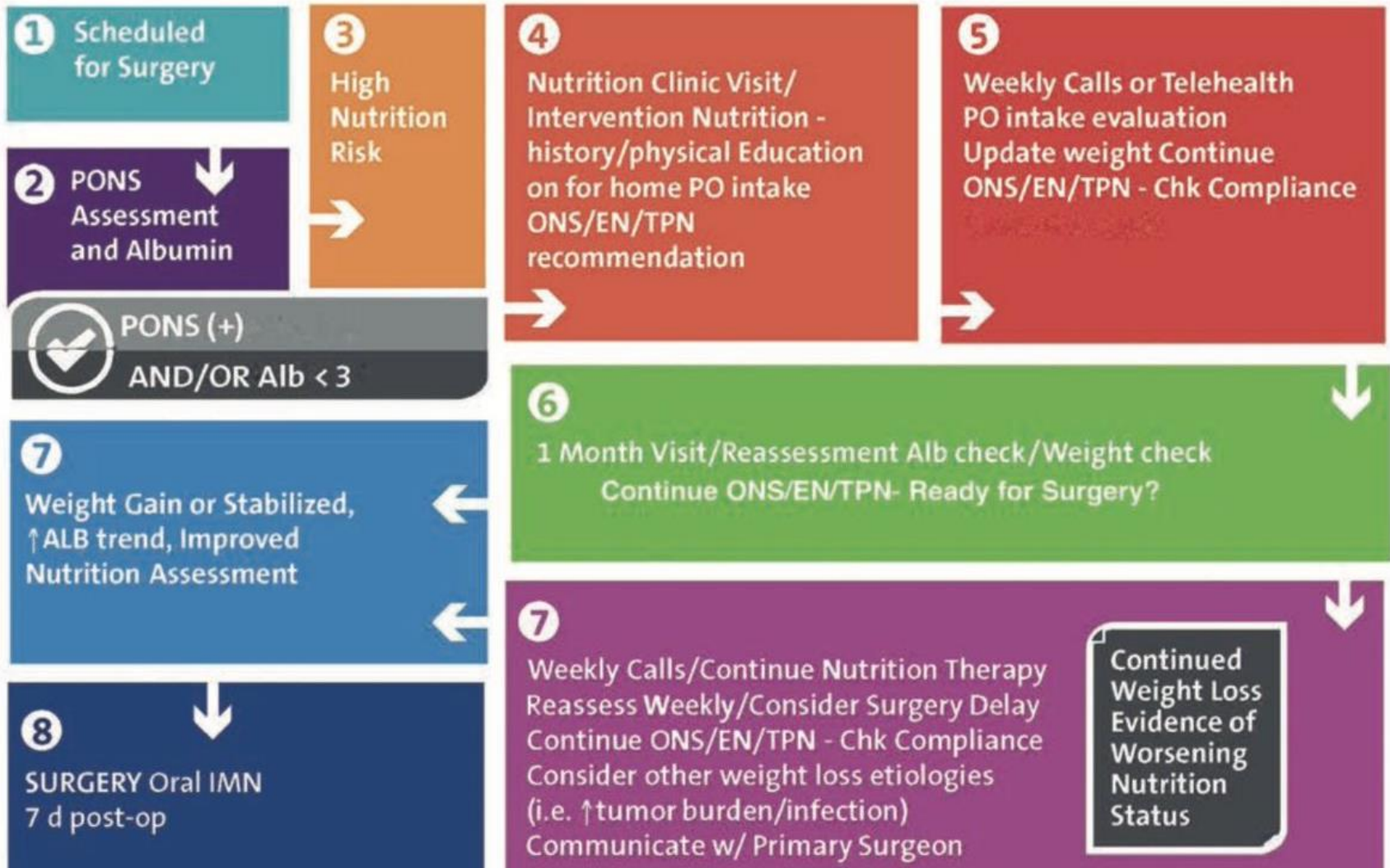
# PRE-OPERATIVE NUTRITION CARE PATHWAY

## Low Nutrition Risk



# PRE-OPERATIVE NUTRITION CARE PATHWAY

## High Nutrition Risk



# Nutrition Products: Procurement & Delivery to Patients

# Nutrition Product Selection

## Considerations

- ▶ Nutrition content
- ▶ Does evidence-based research support the use of the product for the intended use?
- ▶ Primary Vendor Contracts for Nutrition Products
- ▶ Cost
  - ▶ Financial Implications to the hospital/hospital system
  - ▶ Inpatient vs Outpatient Contract Obligations
  - ▶ Can the cost be passed on to the patient?
- ▶ Does your contract allow for product to be sent home with patients?
- ▶ What stakeholders or committees must approve the product?

# Nutrition Product Procurement

## Considerations

- ▶ Where will the centralized storage of your product be located?
- ▶ Do you have data to support appropriate PAR levels of your product?
- ▶ Who will be responsible for ordering the product and stocking the product for inpatient and/or outpatient use?
- ▶ How will costs of the product be handled? Will the cost be passed on to the patient?

# Nutrition Product Delivery to Patients

## Considerations

- ▶ Pre-Op & Post-Op
  - ▶ MD Office vs PATT vs Inpatient
- ▶ Will the product be available for order in the Electronic Health Record for inpatients? If so, on the MAR or as a Nutrition Supplement order?
- ▶ Physician Orders Sets

# Hospital Pilots & Healthcare System/Service Line Expansion Opportunities

- ▶ Enterprise Project Management Model
  - ▶ Data Collection
  - ▶ Stakeholder Analysis
  - ▶ Patient, Provider & other stakeholder education
  - ▶ Outcomes
  - ▶ Lessons Learned
  - ▶ Duplication





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Ken Nepple, MD, FACS

***Clinical Associate Professor in the  
Department of Urology at the University  
of Iowa Hospitals and Clinics***

- Identify the increased risk of malnutrition or nutritional decline for surgical patients
- Highlight best practices to support nutritional care for surgical patients from pre-admission through discharge
- Discuss opportunities to partner with surgical leaders in your facility for better nutrition care

- No personal disclosures

# University of Iowa Hospitals and Clinics

*Iowa's Only Comprehensive Academic Medical Center*

- 3 Hospitals

- UIHC, Children's, Psychiatric

- 761 beds
- Inpatient Admissions 34,900
- Emergency Department 58,607
- Operative Procedures 30,877

- 300 Clinics

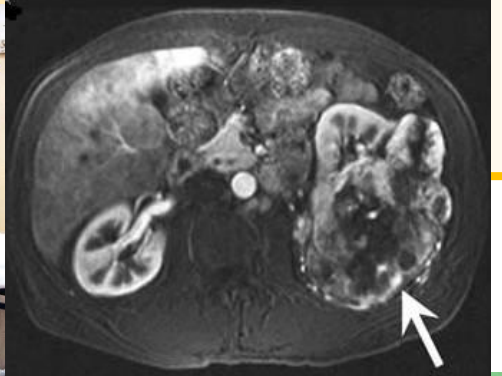
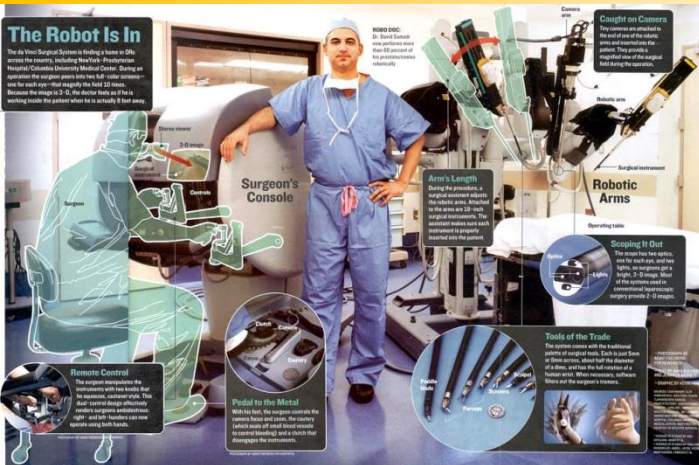
- UI Clinic Visits 803,539
- Outreach and UI Community Medical Services Visits 158,391

- 9,297 Staff

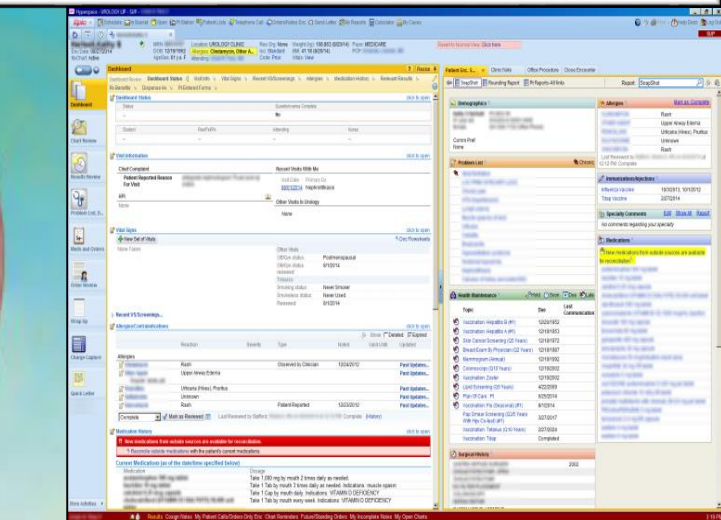
- Nurses 2,141
- Physicians and Dentists 1,663







# Urologist = Surgeon who Likes Technology



# Malnutrition

# The Skeleton in the Hospital Closet

*As awareness of the role of nutrition in recovery from disease increases, physicians are becoming alarmed by the frequency with which patients in our hospitals are being malnourished and even starved. One authority regards physician-induced malnutrition as one of the most serious nutritional problems of our time.*

by CHARLES E. BUTTERWORTH, Jr., M.D.

In recent years there has been growing concern over the rapidly mounting costs of hospitalization. In 1968, for example, short- and long-term hospital care costs were \$20,751,000,000 in a total national health expenditure of \$57,103,000,000, according to the Office of Research and Statistics of the Social Security Administration. Ob-

be better to speak forthrightly and refer to the condition as "physician-induced malnutrition." I suspect, as a matter of fact, that one of the largest pockets of unrecognized malnutrition in America, and Canada, too, exists, not in rural slums or urban ghettos, but in the private rooms and wards of big city hospitals.

see the inevitable consequences of the neglect of nutrition education in our medical schools. While the principles of good nutrition are practiced in some institutions and by some individuals, this seems to be the exception rather than the rule. It is, therefore, fallacious for either the public or the medical fraternity to assume that good nutri-

Nutr Today 1979; 9:4-8

The Joint Commission requires nutrition risk assessment be identified in all patients within 24 hours in all patients



*PC.2.20 (AHC, HAP, LTC, OME only) the organization defines in writing the data and information gathered during assessment and reassessment.*

**EP.4 (HAP and AHC only)** *The information defined by the hospital to be gathered during the initial assessment includes the following, as relevant to the care, treatment, and services: physical assessment, psychological assessment, social assessment, each patient's nutrition and hydration status, each patient's functional status, for patients receiving end-of-life care, the social spiritual, and cultural variables that influence the perceptions and expressions of grief by the patient, family members, or significant others.*



# Malnutrition Diagnosis during Adult Inpatient Hospitalizations: Analysis of a Multi-Institutional Collaborative Database of Academic Medical Centers



Conrad M. Tobert, MD; Sarah L. Mott, MS; Kenneth G. Nepple, MD, FACS

## ARTICLE INFORMATION

### Article history:

Submitted 18 August 2016  
Accepted 29 December 2016  
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### Keywords:

Malnutrition  
Diagnosis  
Clinical documentation  
Patient satisfaction  
Quality improvement

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Nutrition and Dietetics.  
<http://dx.doi.org/10.1016/j.jand.2016.12.019>

## ABSTRACT

**Background** Malnutrition is a significant problem for hospitalized patients. However, the true prevalence of reported malnutrition diagnosis in real-world clinical practice is largely unknown. Using a large collaborative multi-institutional database, the rate of malnutrition diagnosis was assessed and used to assess institutional variables associated with higher rates of malnutrition diagnosis.

**Objective** The aim of this study was to define the prevalence of malnutrition diagnosis reported among inpatient hospitalizations.

**Design** The University Health System Consortium (Vizient) database was retrospectively reviewed for reported rates of malnutrition diagnosis.

**Participants/setting** All adult inpatient hospitalization at 105 member institutions during fiscal years 2014 and 2015 were evaluated.

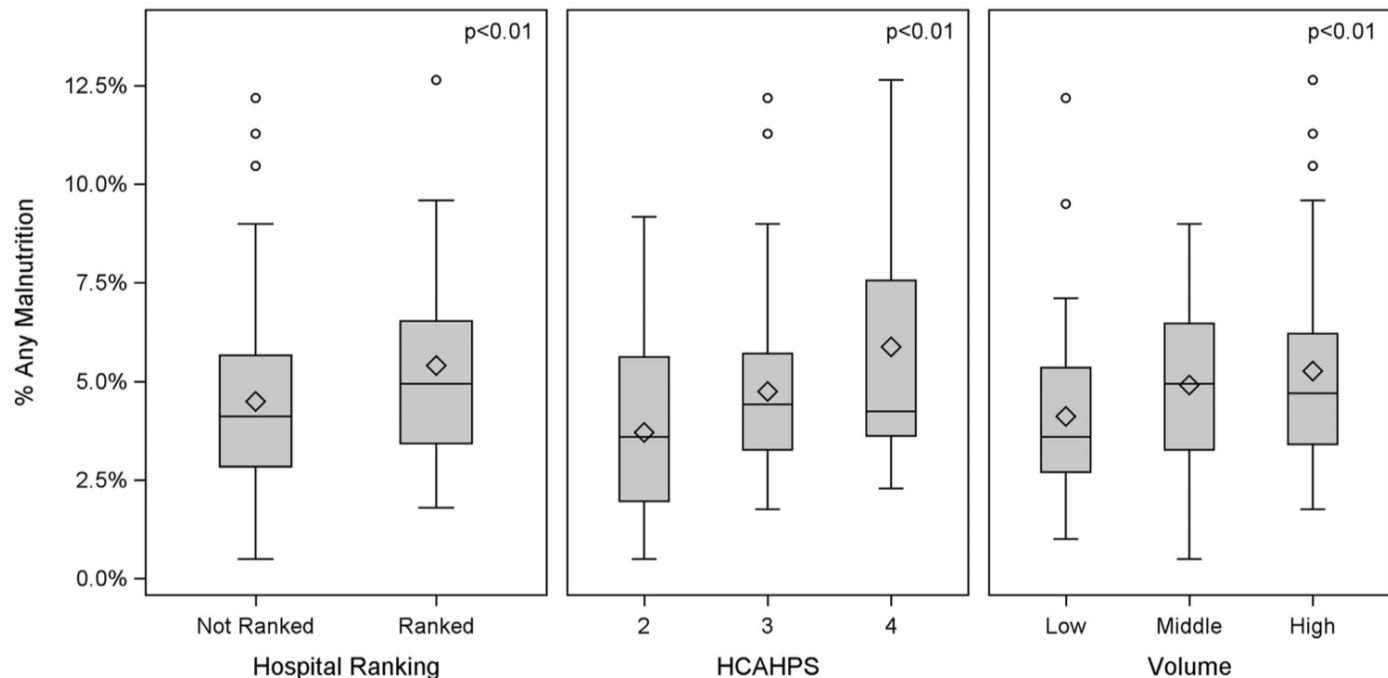
**Main outcome measures** Malnutrition diagnosis based on the presence of an International Classification of Diseases-Ninth Revision diagnosis code.

**Statistical analysis** Hospital volume and publicly available hospital rankings and patient satisfaction scores were obtained. Multiple regression analysis was performed to assess the association between these variables and reported rates of malnutrition.

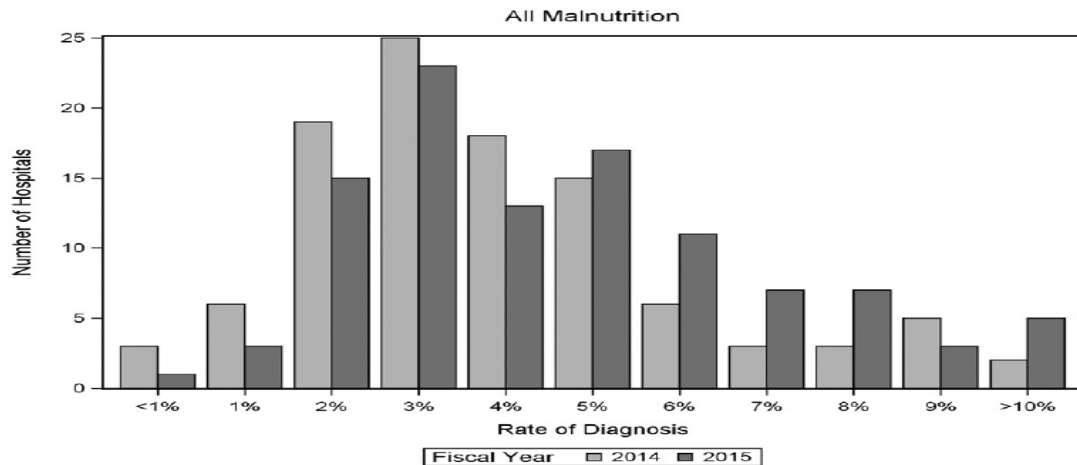
**Results** A total of 5,896,792 hospitalizations were identified from 105 institutions during the 2-year period. It was found that 292,754 patients (5.0%) had a malnutrition diagnosis during their hospital stay. By institution, median rate of malnutrition diagnosis during hospitalization was 4.0%, whereas the rate of severe malnutrition diagnosis was 0.9%. There was a statistically significant increase in malnutrition diagnosis from 4.0% to 4.9% between 2014 and 2015 ( $P < 0.01$ ). Institutional factors associated with increased diagnosis of malnutrition were higher hospital volume, hospital ranking, and patient satisfaction scores ( $P < 0.01$ ).

**Conclusions** Missing a malnutrition diagnosis appears to be a universal issue because the rate of malnutrition diagnosis was consistently low across academic medical centers. Institutional variables were associated with the prevalence of malnutrition diagnosis, which suggests that institutional culture influences malnutrition diagnosis. Quality improvement efforts aimed at improved structure and process appear to be needed to improve the identification of malnutrition.

J Acad Nutr Diet. 2018;118:125-131.



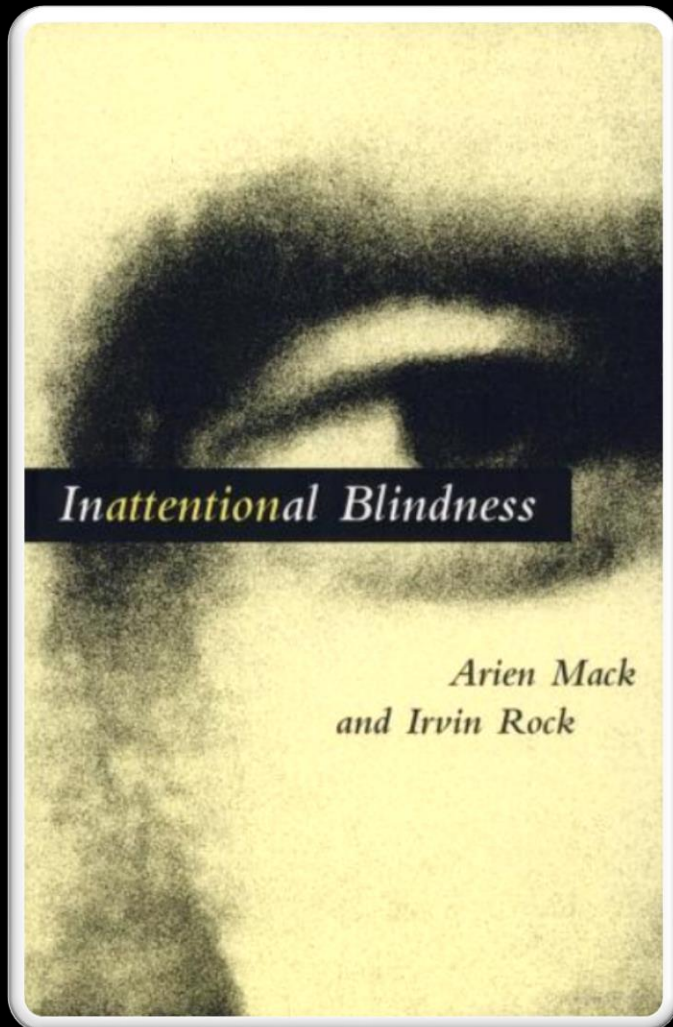
**Figure 3.** Box plots illustrating association of institutional variables (hospital ranking, patient satisfaction score via Hospital Consumer Assessment of Healthcare Providers and Systems [HCHAPS], and hospital volume) from 105 academic medical centers with the rate of any malnutrition diagnosis during adult inpatient hospitalization. Hospital rankings are based on *U.S. News & World Report* gastrointestinal and gastrointestinal surgery ranking.<sup>20</sup> Volume describes hospital volume by admissions.



**Figure 1.** Distribution of rates of any malnutrition diagnosis during adult inpatient hospitalization at 105 academic medical centers during 2014 and 2015 in the University Health System Consortium (Vizient) database.

## CONCLUSIONS

Missing malnutrition diagnosis appears to be a universal and systematic issue because the rate of malnutrition diagnosis was consistently low across academic medical centers. Institutional variables were associated with the prevalence of malnutrition diagnosis, which suggests that institutional culture influences malnutrition diagnosis. Quality improvement efforts aimed at improved structure and process appear to be needed to improve the identification of malnutrition.



- **Inattentional blindness**, also known as **perceptual blindness**, is a **psychological lack of attention** and is not associated with any vision defects or deficits. It may be further defined as the event in which an individual **fails to recognize an unexpected stimulus that is in plain sight.**

# Importance of Malnutrition

## Malnutrition is a comorbidity that matters

**1 in 3**  
hospitalized  
patients  
is malnourished



**4-19 million**  
cases are left  
undiagnosed  
and untreated  
each year



Malnutrition  
increases  
hospital costs  
up to **300%**



Malnutrition  
increases the  
incidence of  
pressure ulcers,  
infection rates,  
fall risk, and slows  
wound healing



Patients with  
malnutrition  
have greater  
mortality rates,  
clinical complications,  
and length of stay



**Reference: MQii**  
**[mqii.defeatmalnutrition.today](http://mqii.defeatmalnutrition.today)**

- Malnutrition is common in hospitalized patients (30-50%)
- Malnutrition is associated with decreased response to therapy and increased mortality
  - Increased length of stay, hospital costs, risk for readmission
  - 3x the risk for surgical site infection and 2x more likely to develop pressure ulcers



# ERAS: Enhanced Recovery After Surgery



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#### Thank you for your interest in Strong for Surgery.

The American College of Surgeons (ACS) is now the new home as a quality initiative aimed at identifying and evaluating evidence surgery.

#### 🔗 Access the Toolkit

Strong for Surgery empowers hospitals and clinics to integrate of elective operations. The checklists are used to screen patients for complications, and to provide appropriate interventions to ensure known to be highly influential determinants of surgical outcomes.



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## NEW - Optimizing Outcomes in Urologic Surgery: Postoperative

Published 2018

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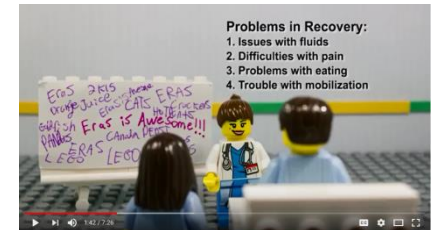
The American Urological Association gratefully acknowledges the assistance of the American Society of Anesthesiologists and Society of Urologic Nurses and Associates in the creation of the white paper.

[Unabridged version of this white paper \[pdf\]](#)

### Introduction

Understanding best practices in perioperative care is critical for quality of care for our urologic patients. In the third part of this white paper series, we provide a summary of key elements to optimize postoperative care in adult urologic surgery. Optimal postoperative care includes minimizing postoperative complications, optimizing postoperative recovery and improving patients' postsurgical outcomes. The assembled white paper multidisciplinary writing team includes experts in a number of different areas (urologists, nurses, anesthesiologists) to address a comprehensive set of topics that urologic providers face when caring for postoperative patients.

The importance of improving postoperative care has grown out of the Enhanced Recovery after Surgery (ERAS) movement, which emphasizes the importance of standardizing elements of postoperative care. Lessons learned from ERAS protocols suggest that compiling *and using* the best evidence-based medicine can improve the surgical outcomes of our patients. However, assembling these resources is challenging, and we recognized a distinct need from our membership to compile a single, concise resource that provides this information in one place. Postoperative considerations include a number of relevant topics, which will be reviewed and synthesized to create a standard set of recommendations for optimal care. Herein, we present our recommendations for optimizing postoperative outcomes in adult patients by addressing three broad topics:



#### Problems in Recovery:

1. Issues with fluids
2. Difficulties with pain
3. Problems with eating
4. Trouble with mobilization

LEGO Surgery - Enhanced Recovery After Surgery (ERAS is

Awesome)

Surgery 101

Subscribe

18K

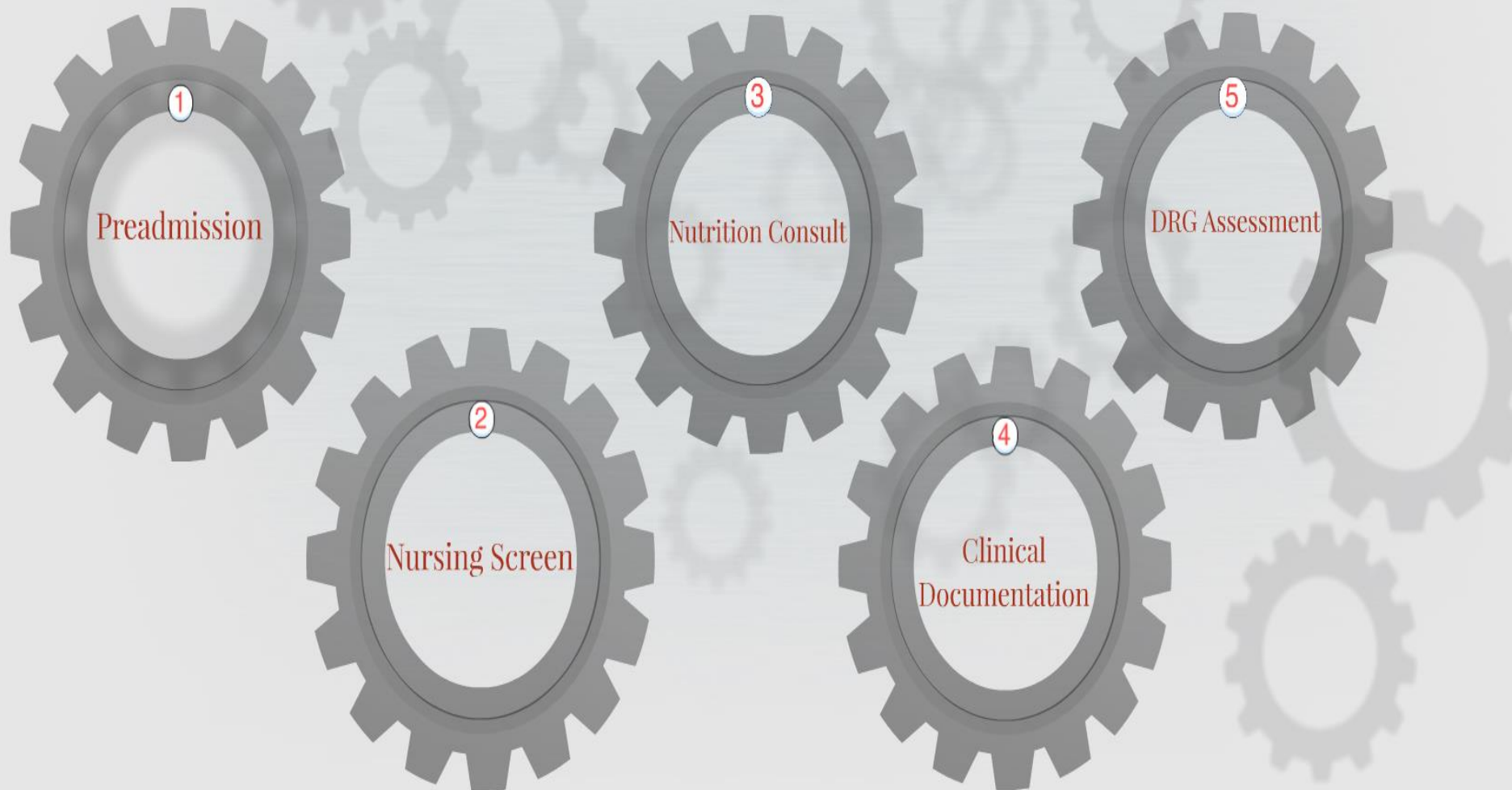
21,888 views





# Malnutrition Pilot

Multidisciplinary team (Clinicians, Nursing, DRG, Nutrition, HCIS...)



The Health Resources and Services Administration (HRSA) notes that the quality improvement model includes four key principles to support successful initiatives:<sup>9</sup>



**Figure 4: Key Principles to Support Successful Quality Improvement Initiatives**



# ERAS (Enhanced Recovery After Surgery) Perioperative Cystectomy Care

## Emerging Impact of Malnutrition on Surgical Patients: Literature Review and Potential Implications for Cystectomy in Bladder Cancer



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**Purpose:** Malnutrition is emerging as a significant factor in patient outcomes. A contemporary review of malnutrition has not been performed for the urologist. We review the available literature and current standards of care for malnutrition screening, assessment and intervention, focusing on patients with bladder cancer treated with cystectomy.

**Materials and Methods:** Our multidisciplinary team searched PubMed® for available literature on malnutrition, focusing on definition and significance, importance to urologists, screening, assessment, diagnosis, immunological and economic impacts, and interventions.

**Results:** The prevalence of malnutrition in hospitalized patients is estimated to range from 15% to 60%, reaching upward of 71% in those with cancer. Malnutrition has been shown to increase inflammatory markers, further intensifying catabolism and weight loss. Bladder cancer is catabolic and patients undergoing cystectomy have increased resting energy expenditure postoperatively. Data are emerging on the impact of malnutrition in the cystectomy population. Recent studies have identified poor nutritional status based on low albumin or sarcopenia (loss of muscle) as having an adverse impact on length of hospitalization, complications and survival. The current standard of care malnutrition assessment tool, the 2012 consensus statement of the Academy of Nutrition and Dietetics and the American Society for Parenteral and Enteral Nutrition, has not been evaluated in the urological literature. Perioperative immunonutrition in patients undergoing colorectal surgery has been associated with significant decreases in postoperative complications, and recent pilot work has identified the potential for immunonutrition to positively impact the cystectomy population.

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UROTHELIAL CANCER (S DANESHMAND, SECTION EDITOR)



## Optimizing Nutrition Prior to Radical Cystectomy

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### Abstract

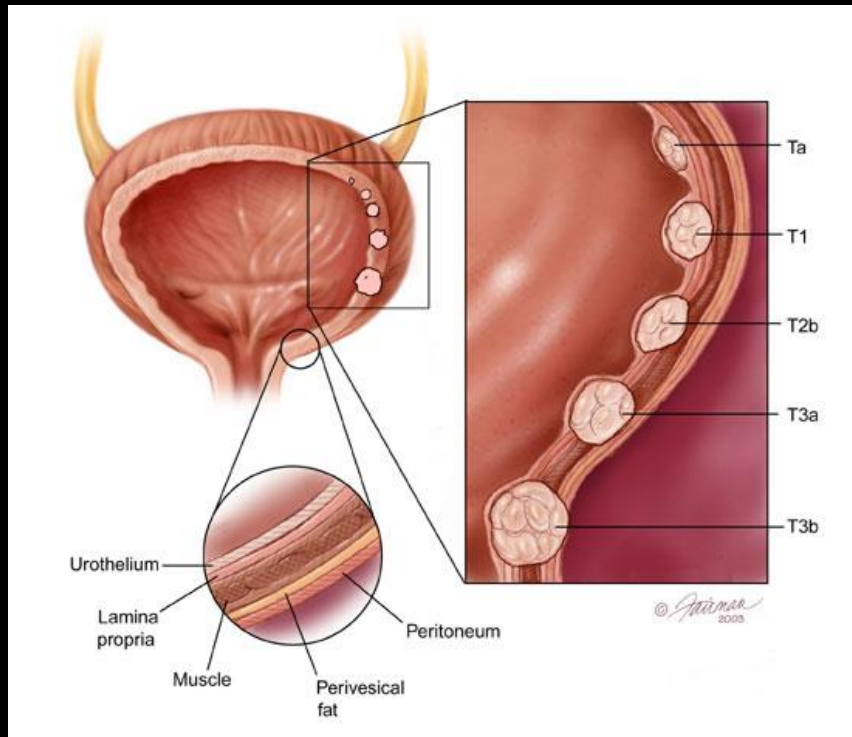
**Purpose of Review** Malnutrition is a prevalent problem in patients undergoing radical cystectomy. Preoperative malnutrition has been shown to contribute to increased rates of postoperative complications. Given the significant morbidity and mortality of the procedure of radical cystectomy, there is potential for improvement in patient outcomes by nutritional intervention.

**Recent Findings** Prospective studies have demonstrated a reduction in postoperative infection rates in patients who receive supplemental immunonutrition prior to major surgery including radical cystectomy. These initial evaluations of nutritional optimization show significant potential for improved outcomes. Additionally, several studies using enhanced recovery after surgery protocols, which include a preoperative nutritional component, have shown a benefit in reducing length of stay.

**Summary** Emerging literature has shown the benefits of preoperative immunonutrition in improving postoperative outcomes of radical cystectomy. However, further work is needed to determine the best mechanism to optimize nutrition prior to radical cystectomy.



# Muscle invasive bladder cancer



# Radical cystectomy Neobladder

Radical Cystoprostatectomy - Male v06.03.14  
Nepple G261

## Preop

Mark for stoma regardless of planned diversion  
No longer prep except mag citrate  
Epidural  
Type and cross X2  
Cefoxitin + Flagyl preop  
OG and 5000 units SC heps  
Mitomycin, or Adriamycin  
Single horizontal mark on S  
Head light for resident

## Draping and Catheter placement

squage with green towels, or  
fold a green towel in thirds  
then dry  
place an Ioban to hold the t  
place a 22f foley catheter, f  
instill Mitomycin and place  
connect the catheter to a dri  
finish draping in the standa

## Opening and Exposure

Vertical midline incision w/  
incise fascia with electroca  
incise the preperitoneal fat  
keep the transversalis fasci  
Bluntly develop the space o  
Open the peritoneum sharpl  
identify the urachus, ligate  
place a peon clamp on the u  
incise the peritoneum down  
place the bookwalter retract  
two body wall clac  
pull down omentu  
three wet laps on tl  
two medium malle

## Cystoprostatectomy

### Ureteral dissection

isolate the vas, clamp blood  
leave the silk on the proxim  
reflect bowel on white line  
place a small malleable fir  
isolate the ureters (start on  
incising the peritoneal folds  
free tissue off the underside  
encircle with a right angle, j  
use right angle dissection, k  
(on left will need to dissect  
dissect distally, obliterated  
place a right angle as far di  
divide with right angle scis  
hold ureter and obtain the d  
send for frozen section anal  
a negative margin you must  
place a 4-0 chromic throug  
(straight hemostat for right,  
suture ligate distal ureter w/  
repeat for the left ureter

## Lateral and Posterior dissection

Can open endopelvic here to give a target for dissection (enter the endopelvic fascia with scissors (VERTICALLY) and develop with digital dissection)

can free the the flimsy lateral bladder attachments to improve mobility

incise the peritoneal reflection posterior to the bladder

place Allis clamps on the reflection and sweep the plane with a Kittner

for posterior, use right angle dissection and electrocautery

develop the plane posterior to the bladder up to the apex of the prostate with digital dissection, will be held up by Danon's

use the LigaSure if necessary to free any other peritoneal attachments

ALWAYS push the rectum down

thin the tissue out between your fingers and ligate the la

ligate with Ligasure, break through Danomyliar's fasc

## Dissection and transection of the dorsal venous complex (DVC)

Return to the anterior dissection

Tell scrub to have 2-0 Chromic UR5 ready and loaded

enter the endopelvic fascia with scissors (VERTICALLY)

clean off puboprostic ligaments with a Kittner and inc

If conduct then can take the DVC with a Ligasure, right

If considering a neobladder with perform like a

place a back-bleeding stitch by grabbing the su

develop the groove between the posterior DVC

pass the Lahey clamp posterior to the DVC

pass a #3 silk and tie cephalad

pass an 0 Vicryl with the needle on, ligate, pla

throw a figure-of-eight 0 chromic on a UR5 ju

transect the DVC with electrocautery between:

control any additional DVC bleeding the 2-0 ci

clear the tissue along the urethra

pass the Lahey or right angle clamp posterior to the uret

sweep along the lateral aspect, underneath, and across

transect the anterior urethra with cautery (cut if neoblad

slay the foley through the anterior urethrotomy and c

transect the catheter at the penis

bring the catheter through and place a second Kocher or

If not a neobladder, may place a peon across specimen s

complete the transection of any remaining lateral pedic

Remove specimen, pass the specimen off taking care no

2-0 chromic on UR5 stop DVC bleeding, if any persist

dissect the posterior prostate off of the rectum with right

irrigate the pelvis with 2L sterile H2O

3-0 Vicryl as needed for hemostasis

send bladder for a urethral margin for frozen section

if needed can place the Greenwald sound into the urethra

## Bilateral Pelvic Lymph Node Dissection

Standard Extent	rostral	common iliac artery
	caudal	node of eloquet
	anterior	genitofemoral nerve
	posterior	obturator nerve and

take care to preserve the genitofemoral nerve running al  
use right angle dissection, electrocautery, and LigaSure.  
retraction with sucker, kittner then vein hook  
find the obturator nerve under the pelvic bone

Urinary Diversion -- see specific type

## Ligasure Impact.

On/off suction.

Automatic medium clip applier

0.50% Marcaine for end (not at beginning)

Ioban

Bookwalter

22 french foley

## Ileal Neobladder Diversion (Hautmann Pouch or W-Pouch)

Nepple

See Cystectomy for opening

## Urethral Anastomotic Sutures

Place after complete removal of the specimen

Place CapioRP sutures

If not available

Use the Greenwald/Roth Grooved Suture Guide

2-0 Chromics on a UR5 at 12, 2, 4, 6, 8, 10 o'clock

place out to in

leave the needles on

Tag and cover for later use

## Isolate the Ileal Segment

Identify a mobile portion of terminal ileum at least 15cm from the ileocecal valve

Mark 70cm of ileum with silks

Back light the mesentery to identify the vascular arcade on which to take the ileal

Isolate the segment

Puncture the mesentery with a small clamp the base of the mesentery windo

pass a piece of 1/4 inch pemrose through the opening and clamp each end

puncture the mesentery with a small clamp just under the bowel

pass a piece of 1/4 inch pemrose, loop it around the bowel, and clamp it

incise the mesentery between the two puncture sites on both sides

ligate the mesentery with the Ligasure.

Clear the fat from along the bowel

use Addison's and electrocautery to clear the fat which is adherent to the ser

Create a large enough window to pass the stapler

Transect the ileum to isolate the segment with GIA80

Transect a corner of the staple lines to place the GIA80

Place the diversion under the bowel segment that is to be reanastomosed

"water under the bridge"

Roll the bowel so the antimesenteric borders of the bowel to reanastomose are fi

Place 2-3 interrupted 3-0 silks at the apex of the intended staple line, protects the

Reanastomose the ileum side-to-side with GIA80 and

non-overlapping staple lines

Allis clamps to grasp

TA 90

Reinforce the stapled end with interrupted Lemberb 3-0 silks to invert the mucosa

Close the mesenteric window with interrupted 3-0 silk

Cut the staple lines off of the ends of the segment and irrigate to clear

## Create the Neobladder

Wet laps to minimize spillage, open the ileum along the anti-mesenteric side with

place a Yankau into the segment and use it to stretch the bowel out

deviate near the expected dependent portion to give a flap for the neourethra

Configure the segment into a W with a 10 cm afferent limb (proximal end of the l

Don't open the proximal or the distal 10 cm

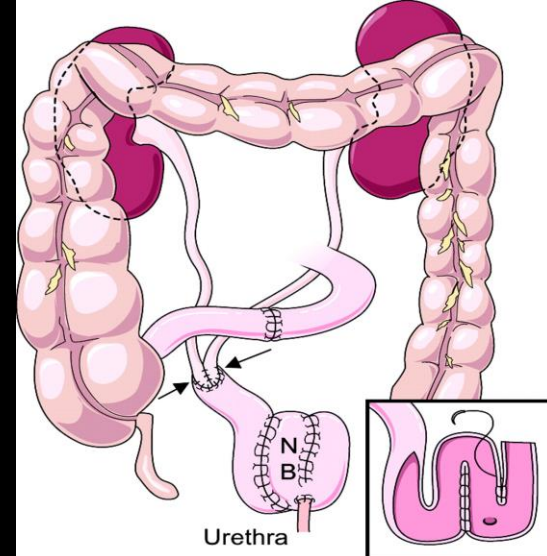
Tags at each corner

Oversew the butt ends with 3-0 Vicryl

Close the posterior walls

single layer of running 3-0 Vicryl

lock every third throw (reduces tension)



## Anastomosis the ureters to the Neobladder

Identify sites in chimneys where there will be no tension to place the ureters

Bricker fashion ureterointestinal anastomoses

Spatulate the ureter opposite the stay suture

Anastomosis the ureter to the neobladder with interrupted 4-0 Vicryl (coated with Vaseline)

Prior to complete closure place a 70cm 7f single J ureteral stent to each ureter

secure the stent to the inside of the neobladder with 4-0 chromic

Bring the ureteral stents out separate incisions secured with a purse-string of 3-0 chromic

## Create the Neobladder-neck and Urethral-Neobladder Anastomosis

Locate the most dependent portion of the neobladder as the previous skewed site

Evert the intestinal mucosa with interrupted 4-0 Chromic

Place a 20f foley as an SP, bring out a separate neobladder incision, and secure with a purse-string of 2-0 Chromic

Close the majority of the anterior wall of the neobladder with a single layer 3-0 Vicryl, lock every third throw

leave a ~4cm opening to facilitate placement of the anastomotic sutures and positioning in the pelvis

Place the posterior urethral anastomotic sutures into their respective location in the neobladder-neck

place in to out (needle will still be on)

place the 20f Silastic urethral catheter after placing the three posterior sutures

inflate the balloon with 15cc of fluid and place the remaining three anterior sutures

Remove the flex from the table

Maneuver the neobladder into the pelvis into proximity to the urethral stump

walk out the slack in the anastomotic sutures

use only light traction on the foley to "pull" the neobladder down into the pelvis

there should be no tension on the anastomosis

can place a sponge stick into the neobladder through the opening to push the neobladder into the pelvis

if there is still tension, you can give an Ampule (?) of Glucoagon IV which will relax the bowel

Tie the anastomotic sutures beginning with the anterior sutures

Close the remaining anterior wall of the neobladder

Check for leaks by instilling fluid into the neobladder

inject 60cc via the urethral catheter and SP tube

over sew any visible leaks with 3-0 Vicryl

Secure the SP to the abdominal wall using 3-0 Vicryl in interrupted Triangle stitch

## Closure

Bring the SP out a stab wound in the abdomen and secure with Prolene

Bring the ureteral stents out the opposite side of the abdomen via separate incisions and secure with 2-0 nylon

place stents into PCN tubing with Touhey and place into separate drainage bags

Place a Blake drain and bring out the same side as the ureteral stents

Close the fascia with running looped #1 PDS

reinforce with interrupted #1 PDS every third throw

Irrigate the wound

Close the subq with 2-0 Monocryl

Close the skin with staples, telfa.

The Foley stays for 3 weeks

SP tube stays for 4 weeks

- Neoadjuvant chemotherapy followed by cystectomy is a grueling therapeutic course
  - Hematuria → TURBT → Recovery → Neoadjuvant chemotherapy → Recovery → Cystectomy → Recovery
  - Treatment is a marathon, not a sprint
  - Are most of our patients marathoners?



## **Pre-op (and during hospitalization)**

- Dietitian Assessment and Counseling**



# Where we wanted to be:

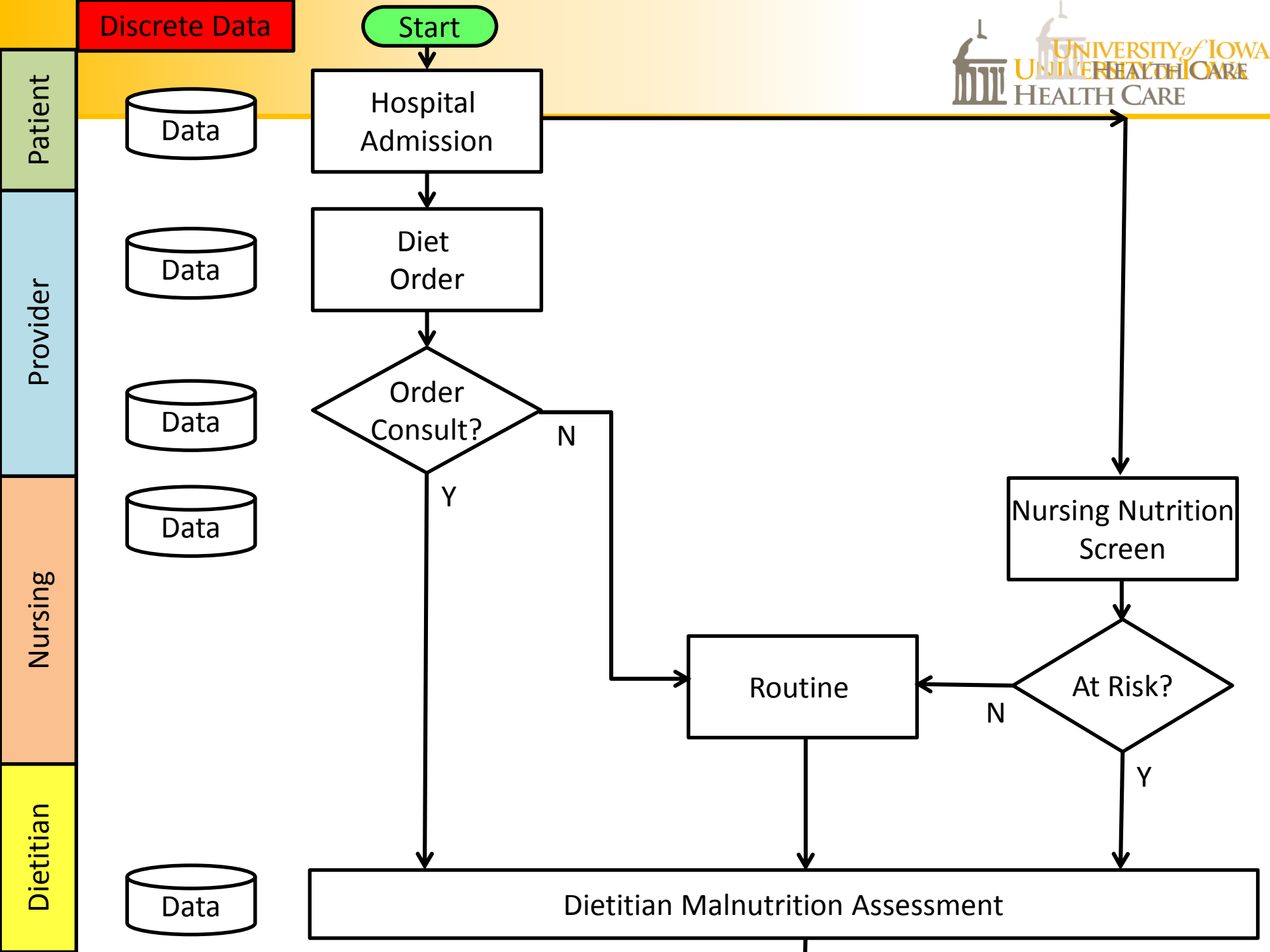
## Academy/ASPEN 2012 Consensus Statement

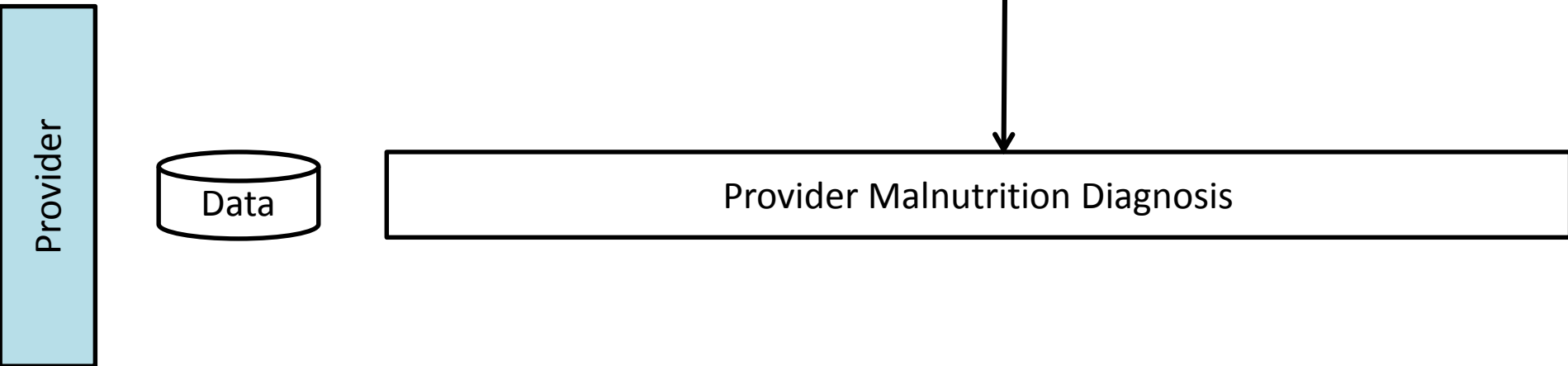
### ACADEMY/ASPEN clinical characteristics

A minimum of two characteristics is recommended for diagnosing either non-severe (moderate/mild) or severe malnutrition

	Malnutrition of acute illness/injury		Malnutrition of chronic illness (> 3 months)		Impaired social/environmental circumstances	
Type of malnutrition	Non-severe malnutrition	Severe malnutrition	Non-severe malnutrition	Severe malnutrition	Non-severe malnutrition	Severe malnutrition
Energy intake	< 75% intake of estimated energy needs for > 7 days	≤ 50% intake of estimated energy needs for ≥ 5 days	< 75% intake of estimated energy needs for ≥ 1 month	≤ 75% intake of estimated energy needs for ≥ 1 month	< 75% intake of estimated energy needs for ≥ 3 months	≤ 50% intake of estimated energy needs for ≥ 1 month
Weight loss	1–2% in 1 week 5% in 1 month 7.5% in 3 months	> 2% in 1 week > 5% in 1 month > 7.5% in 3 months	5% in 1 month 7.5% in 3 months 10% in 6 months 20% in 1 year	> 5% in 1 month > 7.5% in 3 months > 10% in 6 months > 20% in 1 year	5% in 1 month 7.5% in 3 months 10% in 6 months 20% in 1 year	> 5% in 1 month > 7.5% in 3 months > 10% in 6 months > 20% in 1 year
Subcutaneous fat loss Muscle loss Fluid accumulation	Mild	Moderate	Mild	Severe	Mild	Severe
Grip strength	Normal	Reduced	Normal	Reduced	Normal	Reduced

- How to develop and implement a validated assessment across a large busy inpatient practice environment
  - No ideal workflow from EHR vendor
  - Not part of typical provider workflow
  - Dietitian documentation alone is not adequate
  - Universal provider education on malnutrition assessment is futile
- Not enough dietitians



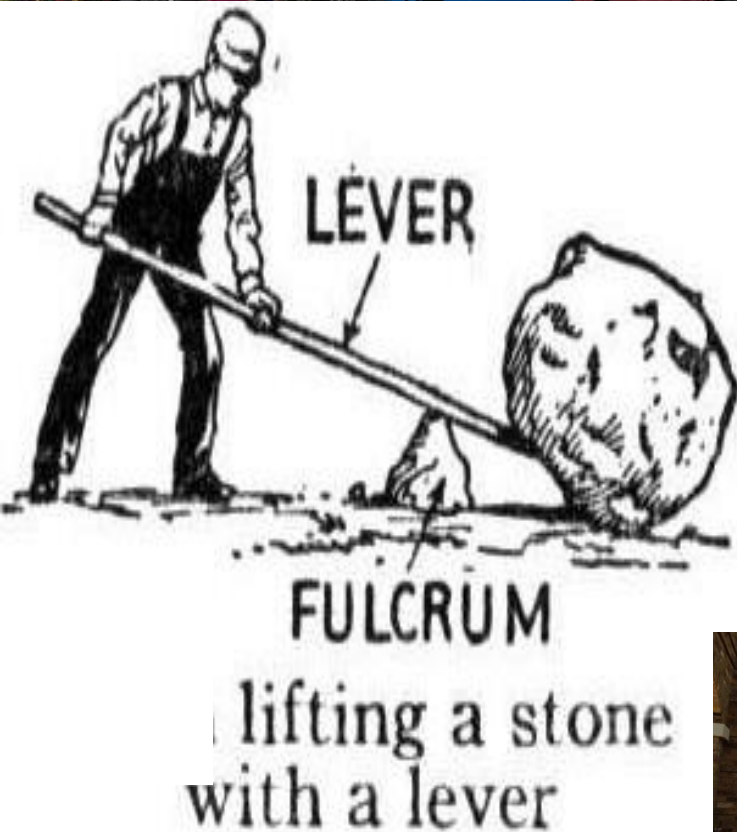


### Processes Leading to Malnutrition Intervention

Malnutrition Screening	Malnutrition Assessment	Malnutrition Diagnosis
<ul style="list-style-type: none"> <li>Usually by nursing</li> <li>Ideally within 24 hours of admission and using a validated tool</li> <li>At risk patients referred to dietitian for assessment</li> </ul>	<ul style="list-style-type: none"> <li>Usually by dietitian</li> <li>Consensus Statement criteria (2 or more)               <ul style="list-style-type: none"> <li>* <i>Insufficient energy intake</i></li> <li>* <i>Weight loss</i></li> <li>* <i>Muscle mass loss</i></li> <li>* <i>Subcutaneous fat loss</i></li> <li>* <i>Fluid accumulation</i></li> <li>* <i>Decreased functional status as assessed by hand grip strength</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Usually by clinician</li> <li>Informed by the dietitian assessment</li> <li>Clinical diagnosis and documentation of malnutrition severity (mid, moderate, severe)</li> </ul>



# Define Diagnose Document in the EHR using leverage



# Malnutrition Assessment by Validated Method

- Definition: American Society for Parenteral and Enteral Nutrition (ASPEN) consensus evidence-based guidelines defines malnutrition as a non-severe or severe condition based on the presence of:
- Two or more of these six characteristics:
  - Insufficient energy intake
  - Weight loss
  - Loss of muscle mass
  - Loss of subcutaneous fat
  - Localized or generalized fluid accumulation that can mask weight loss
  - Decreased functional status as measured by hand dynamometer



**When two or more criteria are present in any of the three contexts the patient is considered to have malnutrition**

- Clinicians need not know all the specifics of malnutrition diagnosis -> Nutrition consult can be a resource

# Dietitian Documentation

**Nutrition**

Travel Screening  
Travel Screening

FOOD AND NUTRITION SERVICES

Nutrition Screenings  
Documentation  
Energy Calculator  
Enteral Formulas  
Calorie Count  
Diet  
**Malnutrition**  
Progress Note  
Clinic Note

Discharge Instructions  
Patient Inst  
Preview AYS  
Report  
Handoff Report  
Dietary Notes  
Social Services Not...  
Discharge Plannin...  
BestPractice

**Malnutrition Evaluation**

Malnutrition Assessment Date:

Nutrition-Focused Physical Findings: Morbidly obese, fluid +.

Malnutrition Type: 35851

Malnutrition (was/was not):

- Mild (non-severe) malnutrition in the context of acute illness or injury and severe acute inflammation related to \*\*\* as evidenced by: (Choose at least 2 from Mild Acute Illness:35850)
- Moderate (non-severe) malnutrition in the context of acute illness or injury and severe acute inflammation related to \*\*\* as evidenced by: (Choose at least 2 from Moderate Acute Illness:35850)
- Severe protein calorie malnutrition in the context of acute illness or injury and severe acute inflammation related to \*\*\* as evidenced by: (Choose at least 2 from Severe Acute Illness:35849)
- Mild (non-severe) malnutrition in the context of chronic illness (> 3 months) with mild to moderate chronic inflammation related to \*\*\* as evidenced by: (Choose at least 2 from Mild Chronic Illness:35847)
- Moderate (non-severe) malnutrition in the context of chronic illness (> 3 months) with mild to moderate chronic inflammation related to \*\*\* as evidenced by: (Choose at least 2 from Moderate Chronic Illness:35847)
- Severe protein calorie malnutrition in the context of chronic illness (> 3 months) with mild to moderate chronic inflammation related to \*\*\* as evidenced by: (Choose at least 2 from Severe Chronic Illness:35848)
- Mild (non-severe) malnutrition in the context of Social or Environmental circumstances without apparent inflammation related to \*\*\* as evidenced by: (Choose at least 2 from Mild Social or Environmental:35846)

001: Restore Close F9

Previous Next

**Progress Note**

Create Note Go to Notes Refresh

You have no filed Progress Notes for this patient within the last 24 hours.

**Clinic Note**

Create Note Go to Notes Refresh

No Clinic Note have been filed for this patient within the last 24 hours.

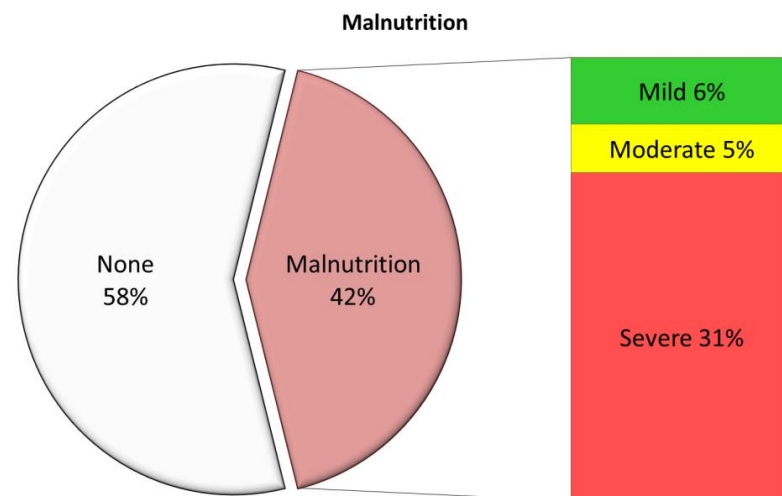
**\* Discrete data**

# Malnutrition Pilot Specifics

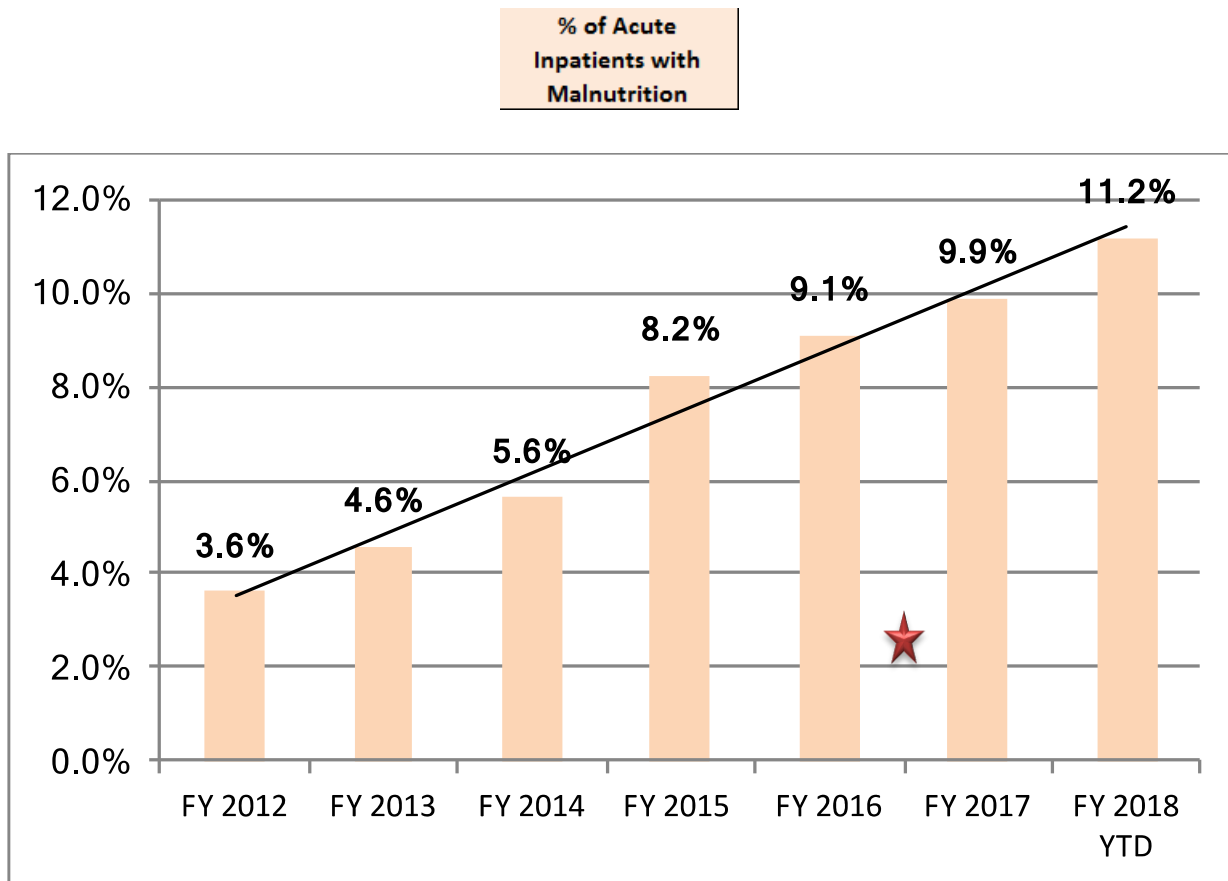
- Multidisciplinary team (Clinicians, Nursing, DRG, Nutrition, HCIS...)
- Enhanced Admission Nursing Nutrition Screen
- Evaluation of 100% of 5 adult populations (plus others via standard referral) on two units:
  - **Inpatient chemotherapy**
  - **Cystectomy**
  - **Esophagectomy**
  - **Pancreatectomy/Whipple**
  - **Hip fractures**
- Changed Dietitian Assessment and Chart Note Format
  - New assessments will list a recommended malnutrition diagnosis based on ASPEN criteria. Possible conditions are as follows:
    - Mild (non-severe) malnutrition (ICD10: First degree)
    - Moderate (non-severe) malnutrition (ICD10: Second degree)
    - Severe protein calorie malnutrition (ICD10: Third degree)
- Improve Workflow using Epic
  - Epic dot phrase can be used to insert the diagnosis and Present on Admission status from the dietitian assessment into progress notes.
    - .malnutritiontext

- **Multidisciplinary group** refined the process of inpatient evaluation, with a focus on communication and accurate malnutrition assessment in the EHR (electronic health record) using the Academy/ASPEN Consensus Statement.
- Malnutrition pilot of the new workflow on two inpatient units during a four-month period (no added FTEs).
- Malnutrition was then identified in 42% of patients on the two pilot units.
- Favorable impact on allowable length of stay
- Hospital administration almost immediately added 6FTEs (from 25 to 31 FTEs to 33 to 37)
- The pilot malnutrition workflow was implemented hospital-wide.

Results of Malnutrition Pilot on Two Units



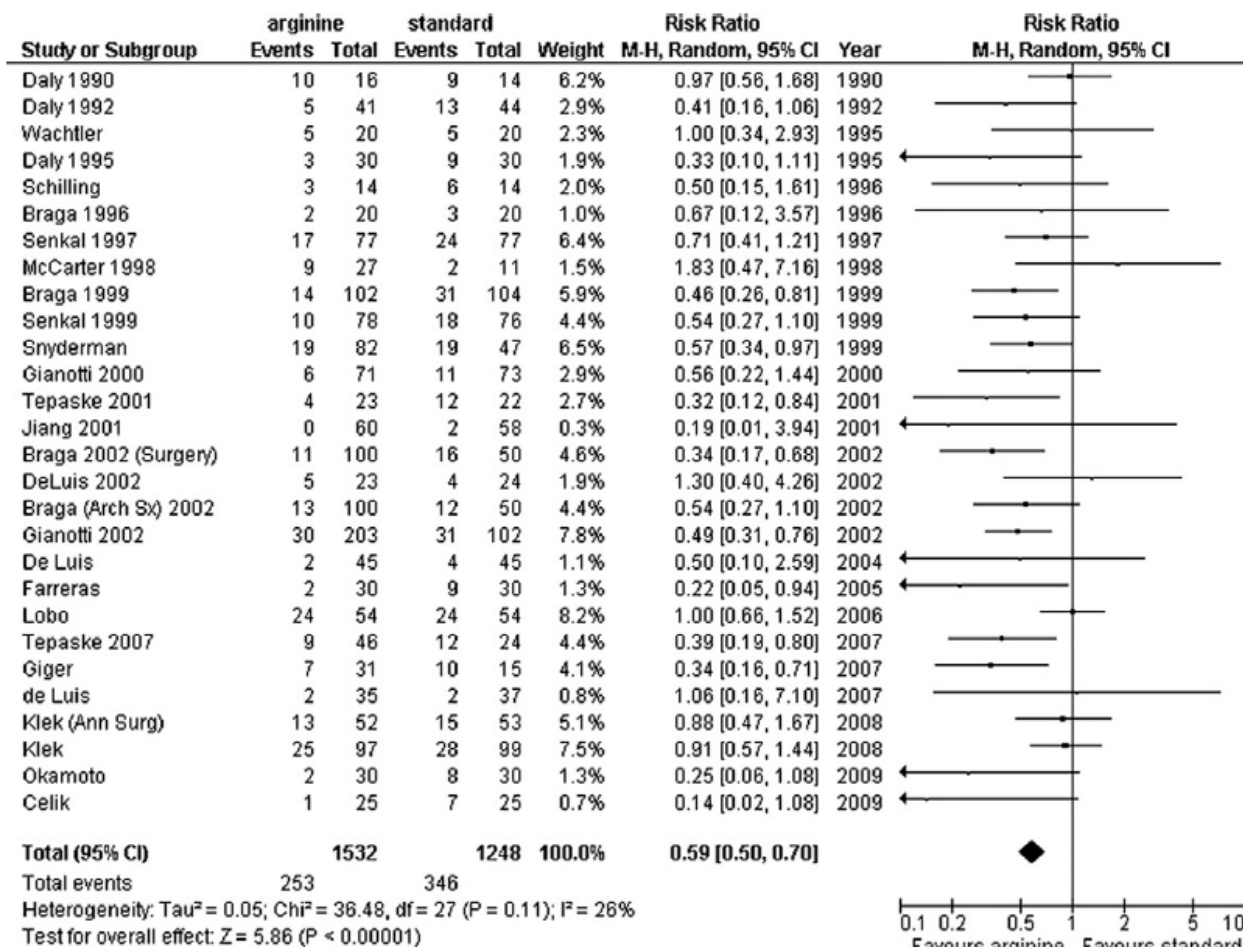
## Improvement in Hospital Malnutrition Diagnosis



# **Pre-op**

- Immunonutrition**

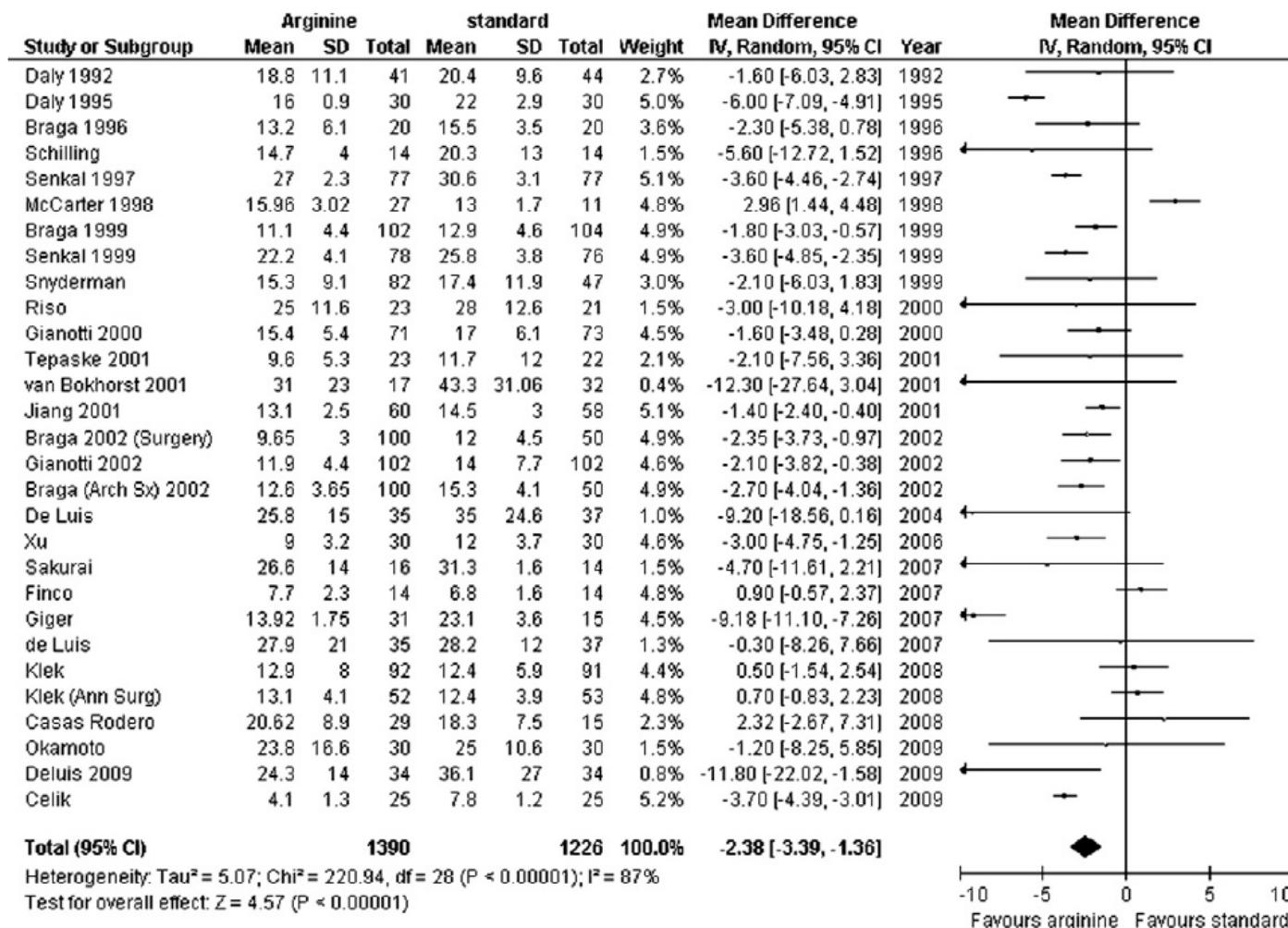




**Figure 1.** Effect of arginine-supplemented diets on infections. Events, number of patients with infections; Total, total number of patients in group; M-H, Random, Mantzel-Haenzel Random effects.

- 41% reduction in infections





**Figure 2.** Effect of arginine-supplemented diets on hospital length of stay. Mean, mean hospital length of stay; SD, standard deviation; Total, total number of patients in group; IV, Random, inverse variance, random effects.

- 2.4 day decrease in length of stay

# Perioperative Use of Arginine-supplemented Diets: A Systematic Review of the Evidence

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Infections are the most frequent cause of morbidity after surgery and up to 54% of all hospital-acquired infections occur in high-risk surgical populations.<sup>1</sup> Infections result in prolongation of hospital stay<sup>2</sup> and increased health care costs by up to \$10 billion per year in the United States alone.<sup>3</sup> Multifaceted efforts to prevent infection are an essential component of any surgical practice.<sup>4</sup>

Surgical stress predisposes patients to immune dysfunction, placing them at higher risk of infection, risks that are increased even more if the patient is malnourished before surgical insult.<sup>5</sup> Various nutrient and nutritional strategies have been studied to evaluate their effect on immune function and clinical outcomes. One pharmaconutrient that has been the center of much debate in the literature is arginine and arginine-supplemented nutritional formulas.<sup>6-9</sup> Arginine is an amino acid involved in multiple metabolic processes. It is a precursor of the formation of polyamines and hydroxyproline, which is important for connective tissue repair, and is the precursor for the formation of nitric oxide, an important signaling molecule.<sup>10</sup> In addition to these vital roles, arginine is an essential metabolic substrate for immune cells and required for normal lymphocyte function.<sup>11</sup>

Arginine deficiency after surgical stress was reported more than 30 years ago, although the mechanisms behind this have until recently remained unknown.<sup>11,12</sup> More than 20 years ago, supraphysiologic concentrations of arginine were added to the diets of critically ill and surgical patients. These diets were aimed at "enhancing immune function" and also contained increased amounts of omega-3 fatty acids, nucleotides, and other nutrients. These nutrients

were eventually incorporated into commercial diets without a rigorous evaluation of their individual effects or side effects in different patient populations. In 2001, Heyland and others reported a meta-analysis suggesting that these arginine-supplemented diets were not beneficial in critically ill patients and could even potentially adversely affect outcomes in this population.<sup>9</sup> In contrast, patients undergoing elective surgery appeared to exhibit a benefit, with a possible decreased rate of infection. The treatment effect of these diets was systematically different in critically ill patients compared with elective surgery patients, and it became apparent that a dedicated meta-analysis should be done separately for patients undergoing elective surgery. Although subsequent meta-analyses have recently been done,<sup>13,14</sup> they were limited in scope, not including all pertinent articles, included unpublished and duplicate publications, and combined studies with different study designs in evaluating the role of perioperative nutrition. The purpose of this review is to provide an up-to-date systematic review on all studies of arginine-supplemented diets in elective surgical patients. With a larger database, we might be able to shed some light on the perioperative role of such diets.

## METHODS

### Study Identification

We conducted a systematic review of the published literature to identify all relevant trials. Using text word or MeSH headings containing "randomized," "blind," "clinical trial," "nutrition," "arginine," "glutamine," "omega-3 fatty acids," "fish oil," "nucleotides," "immune," "immunonutrition," we performed computerized searches for relevant articles on MEDLINE, EMBASE, BIOSIS, CINAHL electronic databases Cochrane Controlled Trials Register from 1990 to March 2010. We also searched our personal files and reference lists of review articles and original studies. There were no language restrictions.

### Study selection criteria

Citations were classified as primary studies, review articles, or other. All primary studies were retrieved and reviewed independently. We included primary studies if they were randomized clinical trials (RCTs); studied elective surgical

• 35 RCTs

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European Association of Urology



## Brief Correspondence

# Effects of Immunonutrition for Cystectomy on Immune Response and Infection Rates: A Pilot Randomized Controlled Clinical Trial

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Fish oil

## Abstract

After radical cystectomy (RC), patients are at risk for complications including infections. The expansion of myeloid-derived suppressor cells (MDSCs) after surgery may contribute to the lower resistance to infection. Immune response and postoperative complications were compared in men consuming either specialized immunonutrition (SIM;  $n = 14$ ) or an oral nutrition supplement (ONS;  $n = 15$ ) before and after RC. MDSC count (Lin<sup>−</sup> CD11b<sup>+</sup> CD33<sup>+</sup>) was significantly different between the groups over time ( $p = 0.005$ ) and significantly lower in SIM 2 d after RC ( $p < 0.001$ ). MDSC count expansion from surgery to 2 d after RC showed a weak association with an increase in infection rate 90 d after surgery ( $p = 0.061$ ). Neutrophil:lymphocyte ratio was significantly lower in SIM compared with ONS 3 h after the first incision ( $p = 0.039$ ). Participants receiving SIM had a 33% reduction in postoperative complication rate (95% confidence interval [CI], 1–64;  $p = 0.060$ ) and a 39% reduction in infection rate (95% CI, 8–70;  $p = 0.027$ ) during late-phase recovery. The small sample size limits the study findings.

**Patient summary:** Results show that the immune response to surgery and late infection rates differ between radical cystectomy patients receiving specialized immunonutrition versus oral nutrition supplement in the perioperative period.

**Trial registration:** ClinicalTrials.gov NCT01868087.

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Table 1 – Postoperative complications of men after bladder cancer surgery<sup>1</sup>

	Specialized immunonutrition, n = 14 men	Oral nutrition supplement, n = 15 men	Differences between groups, % (95% CI)
Complications, n (%)			
30 d	10 (71)	11 (73)	-2 (-36 to 33)
90 d*	2 (14)	7 (47)	-33 (-70 to -5.7)
High-grade complications, n (%)			
30 d	2 (14)	2 (13)	1 (-25 to 27)
90 d	0 (0)	2 (13)	-13 (-37 to 11)
Antibiotic use, n (%) <sup>2</sup>			
30 d	5 (36)	9 (60)	-24 (-66 to 18)
90 d**	2 (14)	8 (53)	-39 (-77 to -0.94)
Intra-abdominal infection, n (%)			
30 d	1 (7)	4 (27)	-20 (-53 to 14)
90 d	0 (0)	1 (7)	-7 (-26 to 13)
Ileus >5 d, n (%)	4 (27)	2 (13)	14 (-21 to 51)
Length of stay	6.3 (3.1)	6.1 (1.9)	0.2 (-1.79 to 2.23)
SIRS, n (%) <sup>3</sup>	1 (7)	2 (13)	-6 (-34 to 22)
Readmission, n (%)			
Yes	4 (29)	6 (40)	-11 (-53 to 30)
No	10 (71)	9 (60)	11 (-29 to 53)
Clavien-Dindo grade 30 d, n (%) <sup>4</sup>			
Grade 0	0 (0)	0 (0)	
Grade 1	2 (14)	1 (7)	7 (-22 to 37)
Grade 2	8 (57)	8 (53)	4 (-36 to 44)
Grade 3a	0 (0)	1 (7)	-7 (-26 to 13)
Grade 3b	0 (0)	1 (7)	-7 (-26 to 13)
Grade 4-5	0 (0)	0 (0)	
Clavien-Dindo grade 90 d, n (%)			
Grade 0	0 (0)	0 (0)	
Grade 1	0 (0)	0 (0)	
Grade 2	2 (14)	5 (33)	-19 (-56 to 18)
Grade 3a	0 (0)	2 (13)	-13 (-37 to 11)
Grade 3b	0 (0)	0 (0)	
Grade 4-5	0 (0)	0 (0)	

CI = confidence interval; SIRS = systemic inflammatory response syndrome.

<sup>1</sup> Recruitment and follow-up occurred from September 2013 to April 2015. Clinical outcomes data abstracted at 30 and 90 d were analyzed from all participants who signed the informed consent and who received any allocated supplements. Rates were compared using a chi-square test using intention to treat for categorical variables. A  $p < 0.05$  was considered statistically significant.

<sup>2</sup> Infectious complications were defined by the need for intervention or prescription of nonprophylactic antibiotics. All patients followed the same antibiotic protocol according to the standard pathways of the University of Kansas Medical Center. All patients receive 24 h of Mefoxin followed by 1 mo of Macrochantin 100 mg every day.

<sup>3</sup> SIRS, based on temperature ( $<36^{\circ}\text{C}$  or  $>38^{\circ}\text{C}$ ), heart rate ( $>90$  beats/min), respirations ( $>20$  breaths/min or  $\text{Paco}_2 <4.3$  kPa), white blood cell count ( $<4000$  cells/ $\text{mm}^3$  or  $>12\,000$  cells/ $\text{mm}^3$  or  $>10\%$  bands present).

<sup>4</sup> Clavien-Dindo classification of surgical complications; a higher grade indicates a greater severity of complication.

\*  $p = 0.060$ .

\*\*  $p = 0.027$ .



## Perioperative Oral Nutrition Supplementation Reduces Prevalence of Sarcopenia following Radical Cystectomy: Results of a Prospective Randomized Controlled Trial.

Ritch CR<sup>1,2</sup>, Cookson MS<sup>3</sup>, Clark PE<sup>4</sup>, Chang SS<sup>2</sup>, Fakhoury K<sup>5</sup>, Ralls V<sup>6</sup>, Thu MH<sup>7</sup>, Penson DF<sup>2</sup>, Smith JA Jr<sup>2</sup>, Silver HJ<sup>8</sup>.

### Author information

### Abstract

**PURPOSE:** We designed a prospective randomized, controlled pilot trial to investigate the effects of an enriched oral nutrition supplement on body composition and clinical outcomes following radical cystectomy.

**MATERIALS AND METHODS:** A total of 61 patients were randomized to an oral nutrition supplement or a multivitamin multimineral supplement twice daily during an 8-week perioperative period. Body composition was determined by analyzing abdominal computerized tomography images at the L3 vertebra. Sarcopenia was defined as a skeletal muscle index of less than 55 cm/m in males and less than 39 cm/m in females. The primary outcome was the difference in 30-day hospital free days. Secondary outcomes included hospital length of stay, complications, readmissions and mortality.

**RESULTS:** The oral nutrition supplement group lost less weight (-5 vs -6.5 kg,  $p = 0.04$ ) compared to the multivitamin multimineral supplement group. The proportion of patients with sarcopenia did not change in the oral nutrition supplement group but increased 20% in the multivitamin multimineral supplement group ( $p = 0.01$ ). Mean length of stay and 30-day hospital free days were similar in the groups. The oral nutrition supplement group had a lower rate of overall and major (Clavien grade 3 or greater) complications (48% vs 67% and 19% vs 25%, respectively) and a lower readmission rate (7% vs 17%) but the differences did not reach statistical significance.

**CONCLUSIONS:** Patients who undergo radical cystectomy after consuming an oral nutrition supplement perioperatively have a reduced prevalence of sarcopenia and may also experience fewer and less severe complications and readmissions. A larger blinded, randomized, controlled trial is necessary to determine whether oral nutrition supplement interventions can improve outcomes following radical cystectomy.

Subjects were stratified by age (less than 75, or 75 years or greater) and block randomized to receive twice daily servings of an ONS (Ensure® Clinical Strength) or twice daily MVI (Member's Mark® Multivitamin) for 3 to 4 weeks before and 4 weeks after RC (fig. 1). Supplements were supplied directly to subjects every other week at clinic visits with a trained research RDN (Registered Dietitian Nutritionist) who reviewed weekly checklists for subject logging of supplement use.

- Preoperative immunonutrition supplied to patients

In response to general surgery literature along with the subsequent urologic literature on immunonutrition, the University of Iowa Department of Urology began supplementing all patients undergoing RC with arginine-containing immunonutrition (commercially available products include Impact Advanced Recovery from Nestle or Ensure Surgery Immunonutrition from Abbott). This is to be taken three times daily, in the 5 days immediately prior to RC. All patients are provided with verbal and written dietary instructions at the preoperative clinic visit from a registered dietitian, and these instructions include the recommendation of a high-calorie, high-protein diet before and after surgery once tolerating a general diet. Patients are provided with nutritional information and suggestions for potential ways to achieve this high-protein diet.

## **Pre-op**

- Carbohydrate loading**
- No bowel prep\***

- Multi-disciplinary discussion with anesthesia
- 50 g per serving drink of clear carbohydrate drink
- The night before and 2 hours prior to surgery

## Carbohydrate Loading

Compared to supplementation with arginine-containing nutritional formula, the literature on optimization of preoperative carbohydrate nutrition prior to RC is less robust. It has been hypothesized that “nothing by mouth” prior to surgery leads to a period of preoperative fasting, which can promote insulin resistance and lead to an intensified catabolic state in postoperative RC patients [26, 27]. Therefore, in the general surgery literature, the role of preoperative carbohydrate loading has been examined [28]. While oral carbohydrate supplementation has been demonstrated to be safe and effective in lowering insulin resistance, an improvement in postoperative outcomes has not been clearly demonstrated [28]. Given the low risks of implementation, at the University of Iowa, we do encourage patients to perform carbohydrate loading prior to surgery.



## **Admission**

- Early feeding**
- Nursing Screening and Dietitian Consult**

# Admission Nursing Nutrition Screen

## Old Screen

Question	Point Total
CVN/PVN/tube feed	7
Food intake less than 50% of usual greater than 7 days	4
NPO/clear liquids greater than 5 days	4
Unintentional wt loss/gain greater than 9 lbs	4
Chew/swallow difficulty	4
Emaciated/Chronic non-healing wound	4
Post surgery greater than 77 y/o	4
Vomit/diarrhea greater than 3 days	2
Food allergies	2
Pregnant/lactating	4
OB patient only	7

**Expedite dietitian consult  
in high-risk patients**

## FNS Documentation Guidelines:

- Nutrition screen must be completed by nursing within 24 hours of admission
- Once the nutrition screen is complete an initial assessment must be done by FNS staff as follows:
  - Patients with a total score of 7 or above (**high risk**) need to be assessed within 48 hours of the screen
  - Patients with a total score of 4-6 (**moderate risk**) need to be assessed within 72 hours of the screen
  - Patients with a score of 3 or lower (**low risk**) need to be rescreened by FNS staff on a weekly basis (every calendar week)
- Follow-up notes are due on a weekly basis (every calendar week)

Our documentation guidelines have not changed since we have implemented the new screen. Let me know if you have any questions

# Nutrition Consult

Per your request, the Inpatient Food and Nutrition consult order has been added to the Cystectomy Post-op Order Set.

## ▼ GU:Cystectomy Post-op Orders

▷ Admit Orders

▷ Code Status

▷ Isolation

▷ Patient Care Orders

▷ Medication Orders

▷ Lab Orders

▷ Radiology Orders

## ▼ Consults

▷ Consults

☒ INPATIENT CONSULT FOOD & NUTRITION SERVICES

Routine, ONCE, Today at 0945, OR - Postop, Sign & Hold

## ▼ Ad-hoc Orders

Click the Add Order button to add an order in this section

Consults

1 of 1 selected

INPATIENT CONSULT FOOD & NUTRITION SERVICES

Routine, ONCE, Today at 1215, OR - Postop, Sign & Hold

Accept Cancel

Priority: Routine STAT

Questions:

Prompt	Answer	Comments
1. When Desired	Tomorrow Today Tomorrow First Available Next Visit-Any Service Next Visit-This Service	
2. Requested Action:	Consultation (Request for advice/opinion) Referral (Transfer of care)	
3. Faculty Physician/Staff Clinician requesting consultation:		
4. Faculty Phone #:		
5. Faculty Pager #:		
Single response		

Comments (F6):

Postop from cystectomy, eval for malnutrition, provide recommendations.

# **Admission**

- Advanced Nutritional Support Team**

- For complex patients or patients where primary service is unsure of management, Advanced Nutritional Support Team is an inpatient consult service staffed by GI physician, 2 dietitians, and a pharmacist

**Today will be a busy day as we ensure everything is prepared for your upcoming surgery. We attempt to have all testing and visits done today to avoid another trip back for you prior to surgery.**

**However if it is not ideal for you to spend a few hours with us today, please let us know and we can arrange some of these visits on another day.**

**The plan for today:**

- ☐ ARNP or Resident–Physical assessment and consent signing.
- ☐ Gabriel Conley , medical Student- testing regarding strength and mobility
- ☐ Celeste Charchalac-Research assistant- discuss research study
- ☐ Dietician-Amy Lukas- discussion about nutrition before and after surgery.
- ☐ Social worker- discussion about cares at home after surgery
- ☐ Ostomy nurse- mark skin and teach about ostomy and managing after surgery
- ☐ Clinic nurse- teaching about the day before surgery and what to expect after surgery.
- ☐ Lab work - blood and urine (if not done recently)
- ☐ EKG (if not done recently)- 4<sup>th</sup> floor elevator I
- ☐ CXR (if not done recently)- 3<sup>rd</sup> floor elevator F
- ☐ Anesthesia clinic visit (not required for all) Appointment time\_\_\_\_\_
- ☐ Anemia Clinic at Iowa River Landing Appointment time\_\_\_\_\_



- At Baseline
  - Patients required to pay for nutrition evaluation. Never done.
  - No standard preoperative nutrition evaluation
- First Steps
  - American Cancer Society seed grant
  - Preoperative evaluation by registered dietitian
  - Preoperative immunonutrition
  - Postoperative nutrition consult
- Version 2.0
  - Added dedicated cancer center dietitian
  - MQii and MN funding for immunonutrition. Trying to bridge to institutional support.
  - Inpatient: Advanced Nutrition Support Team across inpatient services

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# *Questions?*



15 mins