

# ISQIC Nutrition Optimization Toolkit



# Disclaimer

By downloading or accessing this toolkit or any other materials from this website, or through this portal, the user acknowledges and agrees that: (1) he/she is an authorized agent or employee of a hospital currently participating in ISQIC (“Hospital”) under a valid ISQIC Instructional and Related Services Agreement (“Agreement”) with rights to access this material, subject to the terms of such Agreement; (2) the information and materials available through this link are being provided “as is” with no warranties of any kind; (3) he/she has authority to, and does in fact accept responsibility on behalf of Hospital for Hospitals’ and his/her own use or implementation of the suggestions or information provided in the materials; (4) user and Hospital, and not Northwestern University or ISQIC, determine how or whether user or Hospital makes use of the materials or information provided here; and, (5) all use of materials or information provided here is subject to the terms and conditions of the Agreement.

# Contents

- Disclaimer..... 2
- How to Use This Toolkit ..... 4
- Feedback on This Toolkit..... 4
- Implementing Nutritional Optimization ..... 5**
  - Protocol Overview ..... 5
  - Preoperative ..... 5
  - Perioperative ..... 5
  - Postoperative..... 5
  - Utilizing the Strong for Surgery approach to improve perioperative outcomes for elective colorectal resections..... 5
  - ACS Strong for Surgery..... 6
  - Building and working with a multi-disciplinary care team ..... 6
  - Motivations, Implementation Tasks, and Challenges by Provider/Care Venue ..... 7
    - Surgeons..... 7
    - Anesthesiologists..... 7
    - Outpatient Clinic..... 7
    - Dieticians ..... 7
    - Inpatient Providers (Preoperative area nurses, inpatient nurses, physicians/surgeons) ..... 7
    - IT/EMR..... 7
  - Implementation Tips..... 8
    - Pre-Operative ..... 8
    - Post-Operative..... 8
  - EMR Tips ..... 9
    - Pre-Operative Elements ..... 9
    - Peri-Operative and Post-Operative Elements..... 9
- ISQIC Resources ..... 11**
  - Provider Resources ..... 11
  - Patient Education Resources ..... 14
- Strong for Surgery Provider Resources ..... 16**
- References ..... 18**
- Appendix ..... 20**
  - Table 1: Recent clinical studies in prehabilitation and preoperative nutrition ..... 21
- Frequently Asked Questions ..... 22**



# How to Use This Toolkit

Implementing a prehabilitation optimization protocol requires significant coordination between groups within a hospital and will involve other teams and processes that may be unfamiliar to your quality improvement team. There are protocol components that must be completed by the patient prior to surgery, intraoperatively by members of the care team, and finally postoperatively from the time surgery ends until discharge. Many excellent resources have been created by groups across the country; therefore, this toolkit is meant to house many of those resources so you can easily see what each has to offer.

We hope you will find the resources and case studies in this toolkit useful and that you can easily tailor the interventions to your institution's needs.

The following functions have been added to this pdf to make it easy to navigate:

1. This pdf is searchable so you can type a page number or word into the search box to be taken to places in the toolkit where that search item appears.
2. Clicking on any section header or sub-header in the Table of Contents will take you directly to that section.
3. Clicking on the ISQIC logo in the bottom right corner of each page will take you back to the Table of Contents.
4. Clicking on the reference to an appendix in the text will take you directly to that appendix.
5. You may double click any caption that says "Double click image to open attachment" and the attachment will open. To get back to the Toolkit, click on 'Close' in the file menu and you will be able to re-open the Toolkit. Adobe Reader is the preferred method for viewing attachments.

# Feedback on This Toolkit

We hope this toolkit will assist your hospital in deciding how to implement the prehabilitation optimization bundle and which tools and interventions may be optimal in your local care context. In keeping with the spirits of our learning collaborative, we need feedback so we can iteratively update the toolkit to highlight new interventions, clarify existing ones, and generally make the toolkit more user-friendly and helpful. We encourage your group to share its early experience so ISQIC can highlight and share lessons learned from early adopters and flatten the learning curve for other hospitals. Please send any questions, comments, or overviews of what your institution implemented to us at [info@isqic.org](mailto:info@isqic.org).

# Implementing Nutritional Optimization

## Protocol Overview

The following bundle should be implemented for all NSQIP elective open, laparoscopic, and robotic colectomy and proctectomy procedures (e.g. low anterior resection, abdominoperineal resection) by voluntarily participating hospitals. Additional detail on the questions for abstraction can be found in the Nutrition section of the Prehabilitation Optimization Bundle Abstraction Guide available at [isqicdata.org](http://isqicdata.org).

### Preoperative

- Standardized perioperative diet education regarding high protein/carbohydrate foods and supplements
- 2 servings (bottles) of immunonutrition (e.g. Ensure® Surgery Immunonutrition Shake, Impact Advanced Recovery® Immunonutrition Drink) for 7 days pre-operatively
- 100g maltodextrin (e.g. Ensure® Pre-surgery, ClearFast Pre-Op®) loading the night prior to surgery

### Perioperative

- Solid foods up until 6 hours prior to surgery
- Clear liquids up until 2-3 hours prior to surgery (unless obstructed)
- 50g maltodextrin (e.g. Ensure® Pre-surgery, ClearFast Pre-Op®) loading 2-3 hours prior to surgery (unless obstructed)

### Postoperative

- Full liquids or solid food post op day 1 (unless clinically contraindicated)
- 2 servings (bottles) of immunonutrition (e.g. Ensure® Surgery Immunonutrition Shake, Impact Advanced Recovery® Immunonutrition Drink) for 7 days post-operatively (unless clinically contraindicated)

## Utilizing the Strong for Surgery approach to improve perioperative outcomes for elective colorectal resections

Abdominal and gastrointestinal surgery can lead to a range of postoperative complications impacting the patient and health care system. In a broad sense, surgical complications arise from potentially modifiable and non-modifiable patient, provider, and health care system factors. Prehabilitation refers to a series of interventions occurring between diagnosis and surgical treatment that includes physical, nutritional, and psychological assessments that promote physical and psychological health to reduce the incidence and/or severity of future impairments<sup>1</sup>. Smoking cessation, as well as implementation of prehabilitation programs targeting optimization of modifiable patient factors have been associated with improvements in perioperative outcomes for a variety of surgeries (Appendix Table 1).

## ACS Strong for Surgery

The American College of Surgeons' Strong for Surgery program is a prominent example of a national effort to improve surgical outcomes by incorporating bundled quality improvement (QI) interventions. Strong for Surgery is a combination of evidence-based checklists, targeted interventions, and best practice recommendations developed by the Comparative Effectiveness Research Translation Network (CERTAIN) in partnership with the Surgical Care and Outcomes Assessment Program (SCOAP) launched in the state of Washington in 2012. In aggregate, the Strong for Surgery program is comprised of pre- and peri-operative QI elements intended to assess, optimize, and intervene upon patients in domains of nutrition, prehabilitation, smoking cessation, opioid usage, glycemic control, delirium avoidance, perioperative medication management, and establishing patient directives. Participating institutions are encouraged to adopt portions of Strong for Surgery to drive desired improvements.

Nutritional therapy plays an important role in the Strong for Surgery program. Immunonutrition, which typically involves pre-operative supplementation with specially-designed supplements rich in arginine, omega-3 fatty acid and antioxidants has been associated with improved clinical outcomes following elective gastrointestinal surgeries<sup>2-6</sup> and recommended by national and international perioperative care society guidelines<sup>7,8</sup> and by national care guidelines in France 2. When coupled with enhanced recovery program strategies of minimizing fasting and immediate pre-operative complex carbohydrate (e.g. maltodextrin) loading, improvements in insulin resistance<sup>8</sup> and length of stay<sup>9</sup> have been reported for patients undergoing a variety of surgery types.

## Building and working with a multi-disciplinary care team

As you've learned through the ISQIC quality and process improvement curriculum, a project team with defined ownership, accountability, and role definitions is critical to success. Teams consist of sponsors, process and improvement leaders, and other members. For a reminder of their roles as defined in the ISQIC curriculum, click [here](#).

Team members are responsible for contributing to the project's direction and implementation; therefore, it is important to ensure teams represent multiple disciplines and include most, if not all, of the relevant stakeholders. In addition to your ISQIC team, you may want to consider inviting a representative from some or all of these cohorts, along with others based on your local care context: surgeons, anesthesiologists, OR managers, educators, in- and out-patient nurses, patient safety representatives, and pre-, intra-, and post-operative services representatives. Reach out to your nutritionists, if possible, early on to gain buy-in.

If you plan on utilizing Abbott products, particular focus on both outpatient clinic and inpatient ward supply chains will be crucial to distribute nutritional products to patients. You will need to identify how nutritional supplies will be delivered to both your clinic and hospital, how and where they will be stored, and who will be responsible for maintaining product supply and re-ordering.

# Motivations, Implementation Tasks, and Challenges by Provider/Care Venue

One of the most common questions the ISQIC Coordinating Center receives is whether there is literature to support each bundle component. Publications supporting the bundle are included below and may be useful in presenting a case for buy-in at your institution.

## Surgeons

Benefits of immunonutrition<sup>1-3,5-8,10-12</sup>

Benefits of carbohydrate loading<sup>12,13</sup>

Benefits and safety of feeding patients in the early post-op phase<sup>2,5,7,8,10</sup>

[Developing reliable and efficient ways to educate your patients](#)

[Developing a supply chain to physically deliver product to outpatients](#)

## Anesthesiologists

[Allowing patients to consume clear liquids up to 2-3 hours pre-op](#)<sup>14</sup>

## Outpatient Clinic

[Developing reliable and efficient ways to educate your patients and physically deliver product to outpatients](#)

[Maintaining the physical product supply chain](#)

[Developing reliable and efficient ways to document adherence to patient education in your medical record](#)

## Dieticians

[Creating outpatient patient education documents](#)

[Determining logistics of inpatient product supply chain](#)

[Developing reliable and efficient ways to deliver product to inpatients](#)

## Inpatient Providers (Preoperative area nurses, inpatient nurses, physicians/surgeons)

[Determining reliable and efficient ways to document patient adherence with pre-op drinks in your medical record](#)

[Determining reliable and efficient ways to document post-op orders for immunonutrition and dietary orders to your medical record](#)

## IT/EMR

[Determining reliable, automated, and efficient ways to capture compliance with outpatient bundle elements](#)

[Determining reliable, automated, and efficient ways to capture compliance with inpatient bundle elements](#)

## Implementation Tips

### Pre-Operative

#### *Engaging your patients*

First decide and secure your patient education documents. Your institution may already have pre-prepared patient-facing materials that you may wish to use. If not, ISQIC suggests adopting the ISQIC dietary education publication which is already prepared and ready for distribution. Review the document with your surgical team and determine how your dietary educational document will be distributed to patients. ISQIC suggests embedding electronic versions of your education document into “patient instructions” or a similar patient-facing field of your EMR. Also develop a system with your surgical team so that delivery of the patient educational materials is easily documented and easily discoverable by your SCR team. Consider combining patient instructions for pre-operative immunonutrition and carbohydrate loading with the dietary education form.

#### *Engaging the surgical team*

Decide with your group which immunonutrition and product you wish to use at your institution. If participating with the ISQIC Abbott grant program, review the documents at the end of the toolkit regarding ordering products. You will need to determine:

- (a) Who will be responsible for ordering products for your outpatient clinic?
- (b) Where the products will be shipped to your outpatient storage/distribution point (e.g. clinic, gift shop, embedded pharmacy)
- (c) Who will be responsible for physically delivering products from your delivery receiving address (loading dock, mailroom, etc.) to your storage/distribution space?
- (d) Who will store, maintain, and re-order supplies to ensure constant supplies?
- (e) How will patients physically carry products (which may be heavy) to their home?

Confirm with your anesthesiology and surgery teams that patients are allowed to consume clear liquids (such as the maltodextrin carbohydrate drink) 2-3 hours prior to the surgery start team.

Decide how and when you will assess if patients consumed immunonutrition and carbohydrate (maltodextrin) loading. ISQIC suggests adding these assessments to check-in questionnaires in your hospital’s pre-operative area. Patients are typically asked by pre-op area nurses (or anesthesiologists) various pre-operative questions (e.g. “when was the last time you ate?”, “Any chest pain?” allergy and medication reconciliation, etc.) This requires your pre-operative area documentation to be changed, which may involve getting changes to your EMR/IT team well in advance of project launch. Adding to this form will also require your pre-operative area providers (nurses, physicians, advance practice providers) to be educated on the new question items, rationale, and definitions.

### Post-Operative

#### *Engaging the surgical team*

Prior to project launch, meet with your surgeons to discuss their take on post-operative diet. Discuss with your surgeons that feeding almost all patients after surgery is safe and beneficial.

ISQIC recommends making EMR or pre-printed order sets that contain orders for a full liquid or solid food diet starting on POD#0 or POD#1 for your colectomy patients. Embedded in these order sets should also be orders for post-operative immunonutrition.

Realize that your supply chain and distribution means of post-operative immunonutrition for inpatients may be very different than the pre-operative outpatient distribution. Prior to project launch, you will need to determine:

- (a) Who will be responsible for ordering products for your inpatients?
- (b) Where the products will be shipped to your inpatient storage/distribution point?
- (c) Who will be responsible for physically delivering products from your delivery receiving address (loading dock, mailroom, etc.) to your storage/distribution space?
- (d) Who will store, maintain, and re-order supplies to ensure constant supplies for inpatients?
- (e) Who and how will you mark and secure inpatient materials (and also keep them separate from hospital supplies?)
- (f) How will patients physically carry products (which may be heavy) to their home post discharge?

## EMR Tips

### Pre-Operative Elements

ISQIC suggests making one simple EMR phrase that allows your surgical team to document completion of the entire pre-op nutritional bundle components. This can be combined with other ISQIC Prehabilitation Modules (i.e. smoking cessation, physical functioning, and cognitive preparedness) that your hospital also wishes to participate in.

*Example:*

*Epic "Smart Phrase" or "Smart Text" or "dot phrase" (or similar functionality based on your EMR):*

*ISQIC Prehabilitation Bundle:*

*Patient nutritional education provided at visit: [Y/N]*

*Patient received ISQIC Pre-Operative Activity Guide at visit [Y/N]*

### Peri-Operative and Post-Operative Elements

ISQIC suggests assessing patient adherence to the immunonutrition and carbohydrate drinks at the time of surgical check in. This may be combined with other pre-operative anesthesia assessments or with other ISQIC prehabilitation assessment items that involve direct patient questioning (e.g. smoking cessation).

*Example:*

*ISQIC Prehabilitation Bundle (Added to existing pre-operative check-in assessment from nurses or anesthesiologist)*

*Epic "Smart Phrase" or "Smart Text" or "dot phrase" (or similar functionality based on your EMR):*

*ISQIC Prehabilitation Bundle:*

*Did the patient consume 100 g (2 bottles) of maltodextrin the day prior to surgery?*

- Yes, all (2 bottles)*
- Yes,  $\geq 50\%$  ( $\geq 1$  bottle)*
- Yes,  $< 50\%$  ( $< 1$  bottle)*
- None*
- Not applicable*

*Did the patient consume 50 g (1 bottle) of maltodextrin the day of surgery?*

- Yes, all (1 bottle)*
- Yes,  $\geq 50\%$  ( $\geq 1/2$  bottle)*
- Yes,  $< 50\%$  ( $< 1/2$  bottle)*
- None*
- Not applicable*

Assessing whether or not patients were permitted clear liquids can be handled several different ways. You can make this a “policy measure” and get your institution to adopt this guideline hospital-wide so there is no variation. Alternatively, you can use consumption of the 1 bottle of carbohydrate drink 2-3 hours prior to surgery as a surrogate for clear liquid consumption (since the carbohydrate drink is a clear liquid). Many institutions currently question and document when patients last ate solid and liquids as part of a pre-operative anesthesia evaluation. You may need to work with your pre-operative nurses and anesthesiology teams to learn about these work flows and determine if these items are currently assessed and where they reside in your medical record.

Assessing post-operative diet orders and nutritional should be straightforward. ISQIC recommends updating your post-operative order sets to make it clear that patients are ordered full liquids (or solid food) diets on the first post-operative day, and that a specific order for immunonutrition is placed for at least the first post-operative day. SCRs should meet with your surgeon and inpatient care teams to learn how and where these items will be recorded in the medical record.

# ISQIC Resources

The resources listed below were compiled by the ISQIC Coordinating Center to assist your hospital in implementing the Nutrition Optimization Bundle. Click on the bulleted name of an item to open the item as a PDF. You can also access the resources in Word or PowerPoint format at [isqicdata.org](http://isqicdata.org) within the ISQIC Documents tab.

## Provider Resources

1. Preoperative Carbohydrate Loading: Recommendations from Professional Societies Carbohydrate Drink Comparison

### Preoperative Carbohydrate Loading: Recommendations From Professional Societies

**ENHANCED RECOVERY AFTER SURGERY (ERAS®) GUIDELINES FOR COLORECTAL SURGERY**  
 "Patients should be allowed to take clear fluids including carbohydrate drinks, up until 2 hours before initiation of anesthesia."<sup>1</sup>

**EUROPEAN SOCIETY FOR CLINICAL NUTRITION AND METABOLISM (ESPEN) GUIDELINE: CLINICAL NUTRITION IN SURGERY**  
 "Preoperative carbohydrate loading (instead of overnight fasting) the night before and two hours before surgery should be administered. Preoperative carbohydrates can be considered in patients undergoing major surgery."<sup>2</sup>

**AMERICAN SOCIETY FOR ENHANCED RECOVERY (ASER) AND PERIOPERATIVE QUALITY INITIATIVE (POQI) JOINT CONSENSUS STATEMENT**  
 "We recommend a preoperative carbohydrate drink containing at least 45 g of carbohydrate to improve insulin sensitivity (except in type 1 diabetics due to their insulin deficiency state). We suggest that complex carbohydrate (e.g., maltodextrin) be used when available."<sup>3</sup>

**AMERICAN SOCIETY OF ANESTHESIOLOGISTS (ASA) PRACTICE GUIDELINES**  
 "Clear liquids may be ingested for up to 2 h before procedures requiring general anesthesia, regional anesthesia, or procedural sedation and analgesia. Examples of clear liquids include, but are not limited to, water, and fruit juices without pulp, carbonated beverages, carbohydrate-rich nutritional drinks, clear tea, and black coffee."<sup>4</sup>

Based on a review by Buijs et al., at least 48 g of carbohydrates are needed to overcome the fasted state.<sup>5</sup>

	ENSURE® PRE-SURGERY	LEADING SPORTS DRINK*	100% APPLE JUICE*	CLEAR FAST®	GLYCEMIC ENDOTHELIAL DRINK (G.E.D.) <sup>6</sup>	WATER*	COMMENTS
<b>Serving Size</b>	296 mL (10 fl oz)	355 mL (12 fl oz)	296 mL (10 fl oz)	355 mL (12 fl oz)	355 mL (12 fl oz as prepared) <sup>6</sup>	296 mL (10 fl oz)	
<b>Carbohydrate, g</b>	50	21	36	50	27	0	A patient would need to consume over 24 fl oz of the leading sports drink at a time in order to get the recommended amount of carbohydrate. <sup>3</sup>
<b>% Carbohydrate (of total volume)</b>	17%	6%	12%	14%	8%	0%	Ensure Pre-Surgery contains 50 g carbohydrate. Data show that ingestion of a 50 g carbohydrate drink preoperatively reduces postoperative nausea and vomiting <sup>6,7</sup> and postoperative insulin resistance. <sup>8</sup>
<b>Carbohydrate Sources</b>	Maltodextrin, Fructose	Sugar, Dextrose	Fructose, Sucrose, Glucose	Maltodextrin	Maltodextrin, Sucrose	N/A	Ensure Pre-Surgery contains maltodextrin as recommended by ASER. <sup>3</sup>
<b>Sugar, g</b>	6	21	33	5	2	0	Ensure Pre-Surgery has less sugar per serving than sports drinks and apple juice.
<b>Sodium, mg</b>	180	160	30	188	45	7	

## 2. Abbott Nutrition Product Request Form



### STUDY IIS# ANAM1904 PRODUCT REQUEST FORM

PROJECT COORDINATOR: **Jan Fonarow** Email: [Janice.Fonarow@abbott.com](mailto:Janice.Fonarow@abbott.com)  
**Jordan Brauning** Email: [Jordan.Brauning@abbott.com](mailto:Jordan.Brauning@abbott.com)

STUDY INVESTIGATOR: **Dr. Michael McGee**

STUDY COORDINATOR:  
Phone:  
Email:

Clinic **OR**  Hospital

SHIPPING ADDRESS: Facility name  
Street address floor/building etc.  
City  
State  
Zip

DATE OF REQUEST: \_\_\_\_\_

**> PLEASE ALLOW 15 BUSINESS DAYS TO RECEIVE PRODUCT AT YOUR SITE <**

Check here if expedited delivery is required

STUDY PRODUCT	FLAVOR	CODE NO.	NO. OF CASES 24 bottles/case
Ensure Surgery <i>(mp)</i>	Vanilla	99991	14
Ensure Presure <i>ev</i>	Strawberry	99992	7

## 3. Abbott Nutrition Product Receipt Confirmation

### Abbott Nutrition – IIS#ANAM1904 PRODUCT RECEIPT CONFIRMATION

*Please return form within 48hr of product receipt*

PROJECT COORDINATOR: **Jan Fonarow** Phone: (614) 624-4027  
Email: [Janice.Fonarow@abbott.com](mailto:Janice.Fonarow@abbott.com)  
**Jordan Brauning** Phone: (614) 624-3834  
Email: [Jordan.Brauning@abbott.com](mailto:Jordan.Brauning@abbott.com)

STUDY INVESTIGATOR: DR. MICHAEL MCGEE

RECIPIENT INFORMATION:

SITE NAME	
ATTENTION	
ADDRESS	
CITY	
STATE	
COUNTRY	
ZIP/POSTAL CODE	
PHONE	
FAX	

DATE SHIPPED: \_\_\_\_\_ DATE RECEIVED: \_\_\_\_\_

**PLEASE FILL IN QUANTITY RECEIVED, EXPIRATION DATE  
AND THEN SIGN AND DATE BELOW**

PRODUCT CODE	UNIT SIZE	QUANTITY SHIPPED	QUANTITY RECEIVED	EXPIRATION DATE
99991	case	14		
99992	Case	7		

Signature \_\_\_\_\_

Date \_\_\_\_\_

--	--	--

Version 2.3/15/17

#### 4. Abbott Product Storage Tips

Hospitals will be provided with a preset quantity of nutrition drinks from Abbott.

- Product needs to be stored off the floor (on pallets, cabinets, shelving, etc.)
- Room temperature is recommended for storage
- Refer to the product label for serving instructions/temperature
- Drinks should be marked for “project use only” and stored in a secured location with access limited to project staff only, research pharmacy, or product accountability-specific personnel

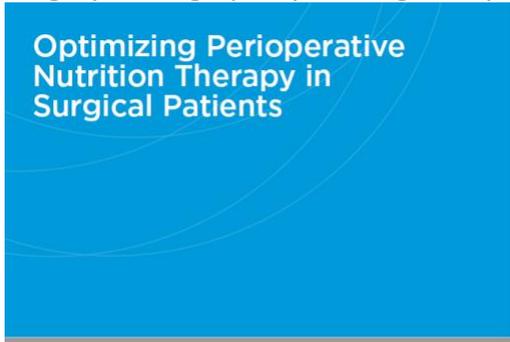
Other tips:

- Drinks should be used by the "use by" date stamped on their container
- Log your expiration dates on your product confirmation form so that you can easily track your product’s expiration dates
- Be mindful of your drink inventory so that you allow at least 2 weeks when reordering for processing time

Other Ensure frequently asked questions can be accessed here:

<https://ensure.com/nutrition-facts-questions-answers>

#### 5. Surgery Monograph Optimizing Perioperative Nutrition Therapy in Surgical Patients



**Optimizing Perioperative Nutrition Therapy in Surgical Patients**

Optimizing Perioperative Nutrition Therapy in Surgical Patients

Patients are often malnourished or are at risk of malnutrition prior to surgery. This can be due to a number of reasons: poor diet, poor appetite, problems with chewing or swallowing, malabsorption, vomiting, diarrhea, and/or depression.<sup>1,11</sup>

Surgery itself causes significant trauma to the body, and normal metabolic and physiological processes are disrupted in reaction to the stress of surgical procedures. Hypermetabolism and hypercatabolism occur and lead to muscle wasting, impaired immune function, and poor wound healing.<sup>12</sup>

Modulating the systemic inflammatory, hormonal, and metabolic responses with appropriate nutrition can help reduce the impact of the hypermetabolic and stress responses.<sup>4</sup>

Evidence-based guidance for nutrition therapy in the perioperative surgical period is provided by professional societies with the aim of optimizing the recovery process and patient outcomes.<sup>8,9</sup>

A malnourished body is at risk for infection and even organ failure and death.<sup>4</sup>

In order to help address potential nutritional shortfalls in the perioperative period, Abbott Nutrition provides a suite of nutritional products specially designed for surgical patients. The Ensure® Perioperative Nutrition Bundle includes Ensure® Pre-Surgery Clear Nutrition Drink, Ensure® Surgery Immunonutrition Shake, and Ensure® Enlive® Advanced Therapeutic Nutrition Shake.

# Patient Education Resources

## 1. ISQIC Colorectal Surgery Dietary Information for Patients

### COLORECTAL SURGERY DIETARY INFORMATION FOR PATIENTS

This handout explains how eating and drinking certain types of foods before your surgery may make recovery easier for your body. Your doctors recommend a **FOUR STEP** nutritional plan for the time before your surgery.



#### Why should I follow a special diet before surgery?

Several studies find that patients may recover better when they follow a special diet before surgery. Eating high protein and high carbohydrate foods for the few weeks before surgery may help fill your body with the fuel needed to heal after surgery. Immunonutrition drinks add special types of amino acids that may improve healing. Carbohydrate drinks right before surgery also help replace the energy your body needs while you are asleep for the surgery. This special diet may also help by:

- Making you feel less thirsty and less hungry before and after the surgery.
- You will likely have better blood sugar control after surgery.
- Your intestine may return to normal function more quickly after surgery.
- You may even have a shorter hospital stay.

#### How do I follow the special diet?

- **Step 1:** Starting 2-4 weeks before your surgery, try your best to eat a high protein, high carbohydrate diet. SEE STEP 1: HIGH PROTEIN HIGH CALORIE DIET
- **Step 2:** Starting one week (7 days) prior to your surgery date, drink 2 immunonutrition drinks per day for a total of 14 drinks (e.g. Ensure® Surgery Immunonutrition Shake or Impact Advanced Recovery® Drink). SEE STEP 2: IMMUNONUTRITION DRINK OPTIONS
- **Step 3:** On the night before your surgery, drink 2 bottles of carbohydrate drink (e.g. Ensure® Pre-Surgery Clear Carbohydrate Drink, ClearFast Pre-Op®). On the day of your surgery, 2-3 hours before your surgery, drink one bottle of the carbohydrate drink. SEE STEP 3: CARBOHYDRATE DRINK OPTIONS
- **Step 4:** Starting right after your surgery, you will drink immunonutrition drinks twice a day for one week (7 days) after surgery. You will start these drinks while you are recovering in the hospital. Depending on when you are discharged, you will likely need to complete your post-operative immunonutrition drinks at home. SEE STEP 4: AFTER SURGERY IMMUNONUTRITION DRINK OPTIONS



## 2. Fueling Up for Surgery Handout

### FUELING UP FOR SURGERY:

HOW NUTRITION CAN HELP TO SUPPORT RECOVERY

Undergoing surgery is a lot like running a marathon. For both, your body **requires proper nutrition** in the weeks and days before and after for the best recovery.

**For the average adult, surgery can mean:<sup>1-3</sup>**

**INFLAMMATION AND LOWERED IMMUNITY**

**DEPLETED GLYCOGEN STORES AND ELEVATED BLOOD SUGAR**

**INCREASED PROTEIN AND ENERGY NEEDS**

**UNINTENDED WEIGHT LOSS**

For optimal surgery outcomes, current guidelines<sup>4-5</sup> recommend that you:

**USE SURGICAL IMMUNONUTRITION WITH ARGININE AND OMEGA-3 FATTY ACIDS**

**DRINK COMPLEX CARBOHYDRATES BEFORE SURGERY**

**MEET PROTEIN AND ENERGY GOALS**

**USE ORAL NUTRITIONAL SUPPLEMENTS**

**Benefits of perioperative nutrition**

- Decrease risk of hospital readmission<sup>6</sup>
- Support immune health and recovery from surgery<sup>7,8</sup>
- Improve general well-being before and after surgery<sup>9</sup>

**Benefits of oral nutritional supplements**

- Helps support healing and recovery<sup>10</sup>
- Maintain weight and improve strength<sup>11</sup>
- Support your immune system<sup>12</sup>

Check with your doctor before starting nutritional supplements.

References: 1. Gille C and Choi P. *Anesthesiology*. 2016; 125(2):345-352. 2. Finney CC, et al. *JBIM: Journal of Biomedical Innovation*. 2017; 1(1):1-10. 3. Srinivasan S, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10. 4. Finney CC, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10. 5. Weisberger DS, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10. 6. Liu H, et al. *Clin Nutr*. 2016; 35(1):108-117. 7. Keating BA, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10. 8. Keating BA, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10. 9. Keating BA, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10. 10. Keating BA, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10. 11. Keating BA, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10. 12. Keating BA, et al. *Journal of Parenteral Science and Technology*. 2016; 40(1):1-10.

14

### 3. ISQIC Nutritional Products Handout

## ISQIC Nutritional Products



Ensure SURGERY is a therapy specifically design to support immune health and recovery from surgery. Nutrition therapy similar to this have been shown to reduce infection up to 40% and shorten length in time in hospital after surgery.

**Should be taken twice a day (2 bottles per day) as a key part of your surgical preparation for:**

- **7 days before surgery (and)**
- **7 days after surgery**



Ensure PRE-SURGERY is designed to reduce insulin resistance and improve surgery patient outcomes. It is your key pre-surgical training solution, much like a marathon runner would prepare for a marathon.

Research studies show it can reduce length of hospital stay, nausea, vomiting and pain after surgery It is designed to be consumed up to 2 hours before surgery.

- **Drink 2 bottles the night before surgery before bed**
- **Drink 1 bottle over 5-15 minutes 2 hours before arriving for your surgery**

# Strong for Surgery Provider Resources

## 1. Strong for Surgery Nutrition Checklist

NUTRITION

Screening Checklist



## NUTRITION

### Screening Checklist

---

#### SCREENING FOR MALNUTRITION

Is BMI less than 19?  Yes  No

Has the patient had unintentional weight loss of over eight pounds in the last three months?  Yes  No

Has the patient had a poor appetite—eating less than half of meals or fewer than two meals per day?  Yes  No

Is the patient unable to take food orally (e.g., dysphagia, vomiting)?  Yes  No

**IF YES to any of the questions:**

Referral to registered dietitian for evaluation unless currently receiving nutrition therapy

---

#### LAB TESTS FOR RISK STRATIFICATION

Is the patient having inpatient surgery?  Yes  No

**IF YES:**

Check albumin level to assess complication risk after surgery

---

#### SUPPLEMENTATION

Is the patient having complex surgery (example: GI anastomosis)?  Yes  No

**IF YES:**

Give evidence-based immune modulating supplementation

References:  
Thornblade KW, Vaghese TK, et al. Perioperative Immunonutrition and Elective Colorectal Resection Outcomes. *Dis Colon Rectum*. 2017;60(1):68-75.

**IMPORTANT NOTICE**  
These sample checklists are provided for informational purposes only and should NOT be used in the care of a patient outside of a comprehensive preoperative program such as Strong for Surgery. Patients should not rely on information on this checklist as an alternative to medical advice from a doctor or other professional healthcare provider. The logos on the checklists are registered trademarks of Strong for Surgery and SCOAP. To find out how you can start using the Strong for Surgery checklist in your clinic, please contact us at [strongforsurgery@facs.org](mailto:strongforsurgery@facs.org).





AMERICAN COLLEGE OF SURGEONS  
Inspiring Quality.  
Highest Standards. Better Outcomes.  
100-years

Version 1.07 Revised 06/20/2017

## 2. Use of Nutrition in Risk Stratification



### What can you do to help your patients be Strong for Surgery?

To find out more about the Strong for Surgery program and how you can join the effort to improve surgical outcomes through nutritional intervention, please contact us at [strongforsurgery@facs.org](mailto:strongforsurgery@facs.org).

#### Facts about Nutrition and Surgery:

- Malnourished patients undergoing surgery for gastrointestinal cancer have more than 10 fold increased morbidity.
- Assessment for unintentional weight loss, change in dietary intake, and gastrointestinal symptoms can indicate that a patient may be at nutritional risk.
- Albumin levels less than 3.0 are associated with higher post-op complication rates: 25% with levels 2.5 to 2.9 and 50% 2.0 to 2.4.
- Surgery patients suffer from immune suppression, which increases infection rates. A meta-analysis looking at 3,104 patients across 28 randomized control trials on elective surgeries demonstrated that use of "arginine-supplemented diets" was associated with a 41% reduction in risk of infectious complications. Seven studies of preoperative use showed a 43% reduction in risk.

### 3. Immunonutrition and GI Surgery Studies Compendium



AUTHOR	STUDY OBJECTIVE	PATIENT POPULATION	(N)	INTERVENTION	CONTROL	RESULTS
Xu 2006 ( <i>WJS</i> ;30:1284-1289)	RCT to determine the effect of preoperative immunonutrition on nutritional status, immunity, and incidence of postoperative complications in patients having UGI and LGI elective surgery	Colorectal or gastric cancer surgery	60	Immunonutrition formula containing supplemental L-arginine, n-3 fatty acids, and nucleotides given preoperatively	Standard isocaloric/isonitrogenous pre-op formula	Incidence of post-op complications was significantly lower in the immunonutrition group (6.7% vs. 26% p<0.05). Post-op IgG and CD4/CD8 ratio was significantly higher in the immunonutrition vs standard nutrition groups (p<0.05, <0.05, respectively).
Braga 2002 ( <i>Arch Surg</i> ;137:174-180)	RCT to determine if perioperative use of immunonutrition is associated with a decrease in postoperative morbidity in malnourished upper and lower GI cancer surgery patients	GI cancer surgery: pancreatic, colorectal, and gastroesophageal	150	Oral and tube-feeding formula containing supplemental L-arginine, n-3 fatty acids, and nucleotides	Standard isocaloric/isonitrogenous post-op tube-feeding formula	ITT analysis revealed that patients fed study formula peri-op and pre-op had decreased post-op complications (18% and 28%, respectively) vs. the control group (42%, p=0.02, p=0.04, respectively). Reduction in LOS was observed in both intervention formula groups vs. control: 2.8 days in the peri-op group (p=0.001) and 2.1 days in the pre-op group (p=0.01) vs. control.
Gianotti 2002 ( <i>Gastroenterol</i> ;122:1763-1770)	RCT to measure prospectively whether preoperative immunonutrition supplementation could be as efficacious as the perioperative approach, and superior to conventional treatment (no treatment) in reducing postoperative infectious complications and LOS in mostly weight-stable GI cancer surgery patients	GI cancer surgery: pancreatic, colorectal, and gastroesophageal	305	Oral formula containing supplemental L-arginine, n-3 fatty acids, and nucleotides	Conventional practice	Use of study formula pre-op (p=0.006) was as effective as study formula used peri-op (p=0.02) in reducing post-op infections in weight-stable patients, and is superior to conventional treatment. Significantly shorter post-op LOS in pre-op (p=0.008) and peri-op (p=0.03) study formula groups, compared to conventional (11.6, 12.2 vs. 14 days). Significantly fewer antibiotic therapy days for infected patients in pre- (p=0.01) and peri-op (p=0.03) study formula groups vs. conventional group (6, 6.3 vs. 9.2 days). Post-op study formula was well tolerated in the peri-op group, with 88% reaching goal feeding rate. Post-hoc analysis showed rate of infectious complications increased for BMI >30 vs. 18-25 (p=0.04).
Braga 1999 ( <i>Arch Surg</i> ;134:428-433)	Double-blind RCT to evaluate the effect of perioperative immunonutrition on clinical outcomes in GI cancer surgery patients	GI cancer surgery: gastric, pancreatic and colorectal cancer surgery	207	Formula containing supplemental L-arginine, n-3 fatty acids, and nucleotides	Isocaloric, isonitrogenous control formula	Patients who received the intervention formula vs. control had significant reduction in post-op infections (9/85 vs. 21/86, p=0.02). A significant reduction in LOS was also noted for the intervention formula group (p=0.01).

# References

1. Carli F, Silver JK, Feldman LS, et al. Surgical Prehabilitation in Patients with Cancer: State-of-the-Science and Recommendations for Future Research from a Panel of Subject Matter Experts. *Phys Med Rehabil Clin N Am*. 2017;28(1):49-64.
2. Adiamah A, Skorepa P, Weimann A, Lobo DN. The Impact of Preoperative Immune Modulating Nutrition on Outcomes in Patients Undergoing Surgery for Gastrointestinal Cancer: A Systematic Review and Meta-analysis. *Ann Surg*. 2019;270(2):247-256.
3. Challine A, Rives-Langes C, Danoussou D, et al. Impact of Oral Immunonutrition on Postoperative Morbidity in Digestive Oncologic Surgery: A Nation-Wide Cohort Study. *Ann Surg*. 2019.
4. Drover JW, Dhaliwal R, Weitzel L, Wischmeyer PE, Ochoa JB, Heyland DK. Perioperative use of arginine-supplemented diets: a systematic review of the evidence. *J Am Coll Surg*. 2011;212(3):385-399, 399 e381.
5. Marimuthu K, Varadhan KK, Ljungqvist O, Lobo DN. A meta-analysis of the effect of combinations of immune modulating nutrients on outcome in patients undergoing major open gastrointestinal surgery. *Ann Surg*. 2012;255(6):1060-1068.
6. Thornblade LW, Varghese TK, Jr., Shi X, et al. Preoperative Immunonutrition and Elective Colorectal Resection Outcomes. *Dis Colon Rectum*. 2017;60(1):68-75.
7. Weimann A, Braga M, Carli F, et al. ESPEN guideline: Clinical nutrition in surgery. *Clin Nutr*. 2017;36(3):623-650.
8. Wischmeyer PE, Carli F, Evans DC, et al. American Society for Enhanced Recovery and Perioperative Quality Initiative Joint Consensus Statement on Nutrition Screening and Therapy Within a Surgical Enhanced Recovery Pathway. *Anesth Analg*. 2018;126(6):1883-1895.
9. Smith MD, McCall J, Plank L, Herbison GP, Soop M, Nygren J. Preoperative carbohydrate treatment for enhancing recovery after elective surgery. *Cochrane Database Syst Rev*. 2014(8):CD009161.
10. Braga M, Gianotti L, Nespoli L, Radaelli G, Di Carlo V. Nutritional approach in malnourished surgical patients: a prospective randomized study. *Arch Surg*. 2002;137(2):174-180.
11. Buijs N, Worner EA, Brinkmann SJ, et al. Novel nutritional substrates in surgery. *Proc Nutr Soc*. 2013;72(3):277-287.
12. Gillis C, Carli F. Promoting Perioperative Metabolic and Nutritional Care. *Anesthesiology*. 2015;123(6):1455-1472.
13. Singh BN, Dahiya D, Bagaria D, et al. Effects of preoperative carbohydrates drinks on immediate postoperative outcome after day care laparoscopic cholecystectomy. *Surg Endosc*. 2015;29(11):3267-3272.
14. Practice Guidelines for Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration: Application to Healthy Patients Undergoing Elective Procedures: An Updated Report by the American Society of Anesthesiologists Task Force on Preoperative Fasting and the Use of Pharmacologic Agents to Reduce the Risk of Pulmonary Aspiration. *Anesthesiology*. 2017;126(3):376-393.
15. Canbay O, Adar S, Karagoz AH, Celebi N, Bilen CY. Effect of preoperative consumption of high carbohydrate drink (Pre-Op) on postoperative metabolic stress reaction in patients undergoing radical prostatectomy. *Int Urol Nephrol*. 2014;46(7):1329-1333.
16. Gustafsson UO, Scott MJ, Hubner M, et al. Guidelines for Perioperative Care in Elective Colorectal Surgery: Enhanced Recovery After Surgery (ERAS((R))) Society Recommendations: 2018. *World J Surg*. 2019;43(3):659-695.

17. Hausel J, Nygren J, Lagerkranser M, et al. A carbohydrate-rich drink reduces preoperative discomfort in elective surgery patients. *Anesth Analg.* 2001;93(5):1344-1350.
18. Hausel J, Nygren J, Thorell A, Lagerkranser M, Ljungqvist O. Randomized clinical trial of the effects of oral preoperative carbohydrates on postoperative nausea and vomiting after laparoscopic cholecystectomy. *Br J Surg.* 2005;92(4):415-421.
19. Wang ZG, Wang Q, Wang WJ, Qin HL. Randomized clinical trial to compare the effects of preoperative oral carbohydrate versus placebo on insulin resistance after colorectal surgery. *Br J Surg.* 2010;97(3):317-327.

# Appendix

Table 1: Recent clinical studies in prehabilitation and preoperative nutrition

Author (year)	Study population	Prehabilitation Intervention	Number of Study Patients	Number of Controls	Clinical outcomes
Thornblade (2017)	Elective colorectal resections	Nestle Impact, TID x 5 preoperative days	632	2743	Pre-operative nutrition lowered rates of prolonged length of stay (14% vs 17%)
Braga (2002)	Elective pancreatic, colorectal, and gastroesophageal cancer resections	Nestle Impact Pre-Op x 7 days, Nestle Impact Pre/Post Op	50 Pre-Op Nutrition, 50 Pre and Post-Op Nutrition	50	Pre and Pre/Post-Op use of immunonutrition lowered complications and length of stay
Marimuthu (2012)	Meta-analysis of major open GI surgery	Various immunonutrition formulas (15/26 studies used arginine)	1252	1244	Immunonutrition decreased infection (RR 0.64) and LOS
Barberan-Garcia (2018)	Variety of open and laparoscopic oncologic resections in "high risk" patients	4 weeks of stationary bike riding and walking	62	63	Overall complication rate halved for prehab patients (31 v 62%)
Trepanier (2019)*	Colorectal cancer patients	Various pre-op physical therapy regimens	104	98	Improved 5y disease-free survival for stage III patients (73 v 51%)
Drover (2011)	Meta-analysis of randomized controlled trials of GI (n=25) & non GI surgery (n=10)	Perioperative (pre and post) arginine diet supplementation			Arginine supplementation reduced infectious complications & length of stay

## Frequently Asked Questions

As we receive more questions about the nutrition component of the prehabilitation optimization bundle we will share them here.



# ISQIC Nutrition Optimization Toolkit