



## ***Improving Nutrition Support Practices at YOUR SITE!***

### ***Benchmarking your performance to other ICUs in the context of the Canadian Critical Care Clinical Practice Guidelines for Nutrition Support.***


#### **Purpose/explanation of your site report:**

You already have entered data on various nutrition support practices in your ICU. The following pages will provide you with several figures that will help you compare your site's performance to that of all hospitals in the database and also to similar hospitals. You will also be able to compare your performance to the recommendations from the recently developed evidence based clinical practice guidelines. (1) These reports will provide you with an excellent benchmarking opportunity. They may be printed off and should be used for small group interactive workshops at your site where you can strategize with your colleagues on how to improve the delivery of nutrition support at your site (*see training kit for interactive workshop on the website*). You may pick and choose which areas you want to discuss with your group depending upon your current or past performance or other interests.

#### ***How to read your report:***

You will notice that there is a "recommendation" for every nutrition support practice based on the clinical practice guidelines. The graphs/figures/tables pertaining to your site appear after each recommendation. This will allow you to compare your practice to the evidence based "recommendation" in addition to the performance of other hospitals.

#### ***Glossary of terms to help you interpret your site report:***

**Your site:** this represents the average (or mean) of all the data from your site. This is often depicted in the figures by a block such as this 

**Sister hospitals:** refers to the average of all the data from hospitals similar to your hospital i.e. academic or community. If your hospital is a community hospital, the data from the "sister hospitals" in your report would be the average of all "community hospitals". If your hospital is an academic hospital, the data from the "sister hospitals" in your report would be the average of all "academic hospitals".

**All hospitals:** refers to the average of all the data from all the hospitals in the database (n = number of sites in the database).

**Highest:** refers to the highest data point from either all the hospitals or sister hospitals.

**Lowest:** refers to the lowest data point from either all the hospitals or sister hospitals.

**Mean/Median:** refers to the mean or median data point from either all the hospitals or sister hospitals.

\*(1) Heyland DK, Dhaliwal R, Drover JW, Gramlich L, Dodek P and the Canadian Critical Care Clinical Practice Guidelines Committee (2003) "Canadian Clinical Practice Guidelines for Nutrition Support in Mechanically Ventilated, Critically Ill Adult Patients". *J Parenter Enteral Nutr* 27;355-373.

## What kinds of sites are in the benchmarking database?

The table below will illustrate the characteristics of the ICUs in the benchmarking database.

**Table 1. Characteristics of Participating ICUs (n = 63)\***

	<b>Your Site</b>	<b>Sister Hospitals(n = 37)</b>	<b>All Hospitals(n = 63)</b>
Type of Hospital			
Academic	Academic	37(100%)	37(59%)
Community	---	---	26(41%)
Size of Hospital (mean, range)	433	485(97 - 1130)	416(97 - 1130)
Type of ICU			
Open	No	0(0%)	9(14%)
Closed	Yes	35(95%)	50(79%)
Other	No	2(5%)	4(6%)
Case mix			
Medical	Yes	31(84%)	57(90%)
Surgical	Yes	33(89%)	59(94%)
Trauma	Yes	19(51%)	30(48%)
Neurological	Yes	26(70%)	43(68%)
Neurosurgical	Yes	21(57%)	24(38%)
Cardiac surgery	Yes	17(46%)	17(27%)
Burns	Yes	12(32%)	17(27%)
Pediatrics	Yes	4(11%)	12(19%)
Other	No	8(22%)	11(17%)
Presence of Medical Director	Yes	37(100%)	61(97%)
Size of ICU (mean, range)	21	18(8 - 38)	16(7 - 38)
FTE RD working in ICU	0.5	0.7(0.2 - 1.5)	0.6(0.2 - 1.5)

FTE RD: full time equivalent registered dietitian

\* percentages do not add up to 100 % as centres have more than 1 case mix

## What kind of patients are in the benchmarking database?

The table below will illustrate the characteristics of the patients in the benchmarking database.

**Table 2. Patient Characteristics**

	<b>Your Site (n=16)</b>	<b>Sister Hospitals (n = 425)</b>	<b>All Hospitals (n = 670)</b>
Age, mean (range)	66(34 - 84)	60(14 - 90)	63(14 - 95)
Gender			
Male	8(50%)	232(55%)	371(55%)
Female	8(50%)	193(45%)	299(45%)
Admission Category			
Medical	9(56%)	211(50%)	390(58%)
Surgical	7(44%)	214(50%)	280(42%)
Elective Surgery	4(57%)	77(36%)	94(34%)
Emergency Surgery	3(43%)	137(64%)	186(66%)
Admission Diagnosis			
Multiple trauma with head injury	0(0%)	17(4%)	19(3%)
Multiple trauma without head injury	1(6%)	18(4%)	21(3%)
Sepsis	5(31%)	86(20%)	142(21%)
Pancreatitis	0(0%)	9(2%)	12(2%)
Burns	0(0%)	12(3%)	12(2%)
cardiovascular surgery	3(19%)	75(18%)	80(12%)
None of these apply	7(44%)	208(49%)	384(57%)
Height in meters, mean (range)	1.7(1.5 - 2)	1.7(1.2 - 2)	1.7(1.2 - 2)
Weight in kgms, mean (range)	92(58 - 280)	78(38 - 318)	78(33 - 318)
Body Mass Index*(BMI)(range)	32.5(14.7 - 96.9)	27.5(11.7 - 96.9)	27.7(11.7 - 96.9)
Presence of ARDS	1(6%)	47(11%)	75(11%)
Mortality	4(25%)	96(23%)	173(26%)
Length of Stay in days (range)			
ICU	19(4 - 58)	20(2 - 155)	18(2 - 155)
Hospital (from ICU Adm)	27(5 - 58)	26(2 - 86)	24(2 - 86)

ARDS: Acute Respiratory Distress Syndrome

\*Body Mass Index (BMI) = weight in kilograms/ht in square meters

### 1. Adequacy of Nutrition Support

Adequacy of nutrition support, defined as the % calories actually received by EN ÷ the calories that were prescribed, is the primary measure of your performance. This figure reflects or summarizes your overall performance in providing enteral nutrition compared to other sites.

Figure 1.1. Adequacy of Calories From EN

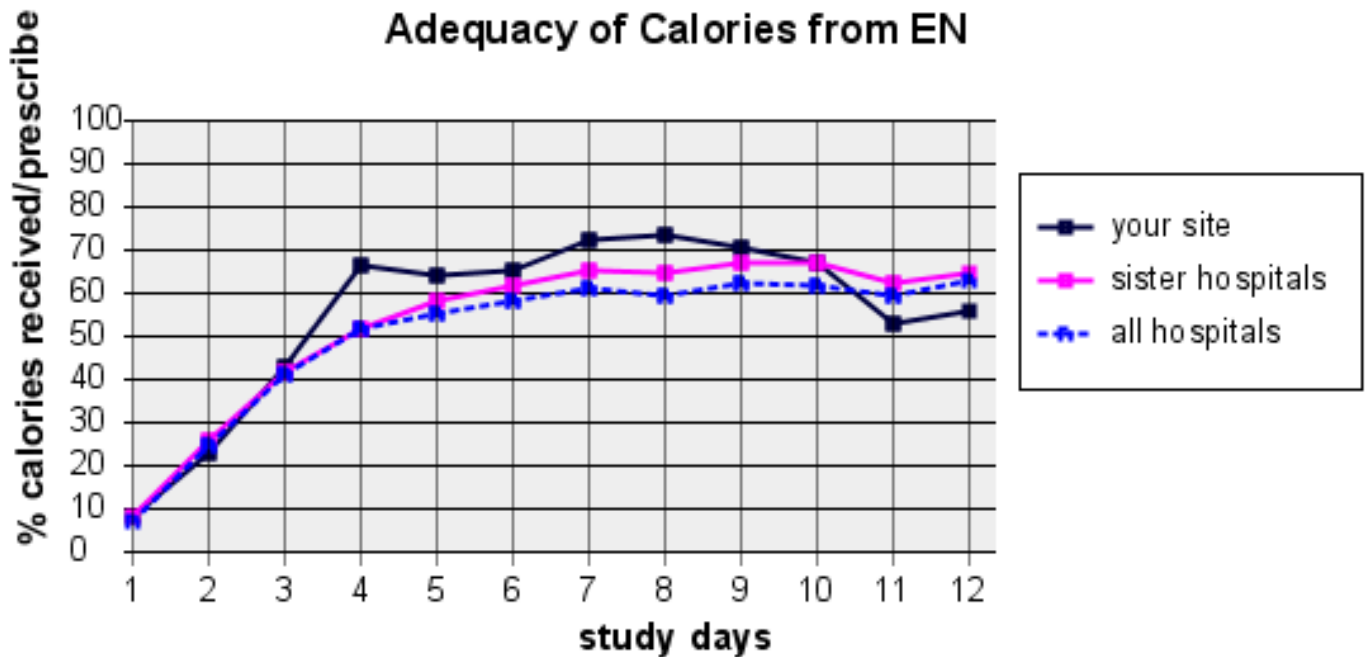
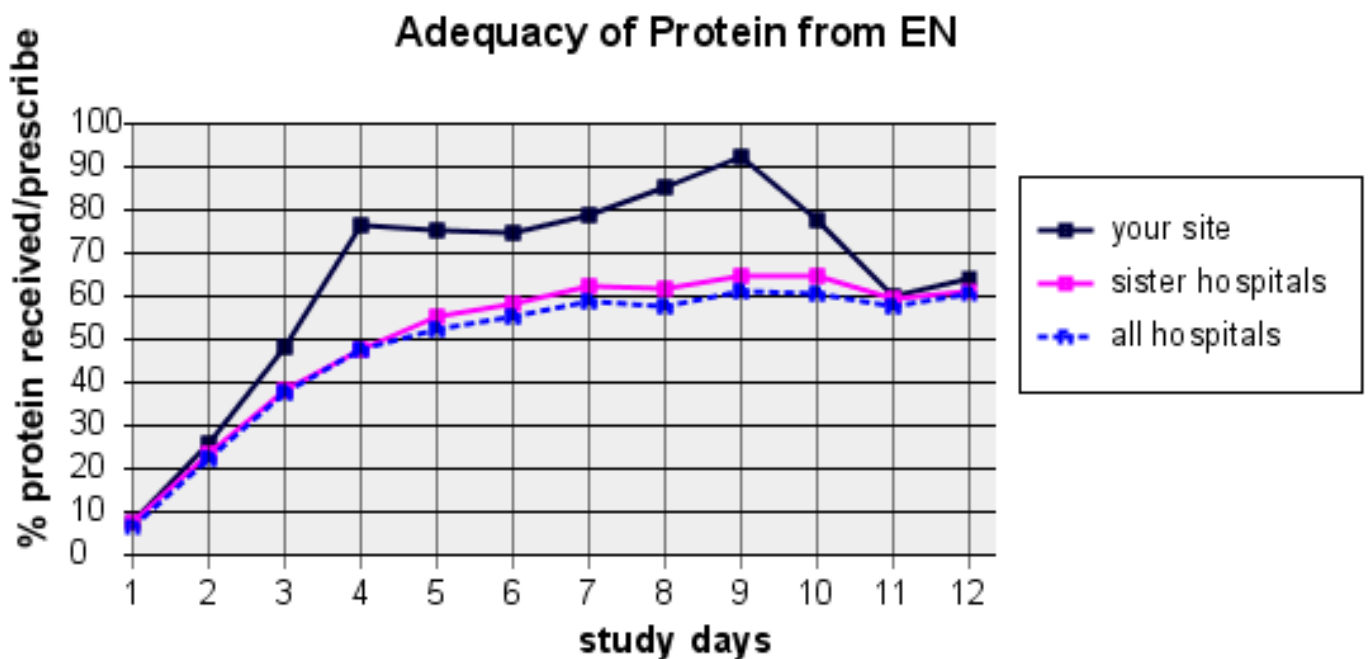


Figure 1.2 Adequacy of Protein From EN



## 2. Type of Nutrition Support

### EN vs. PN

**Recommendation:** When considering nutrition support for critically ill patients, we **strongly recommend** the use of enteral nutrition over parenteral nutrition.

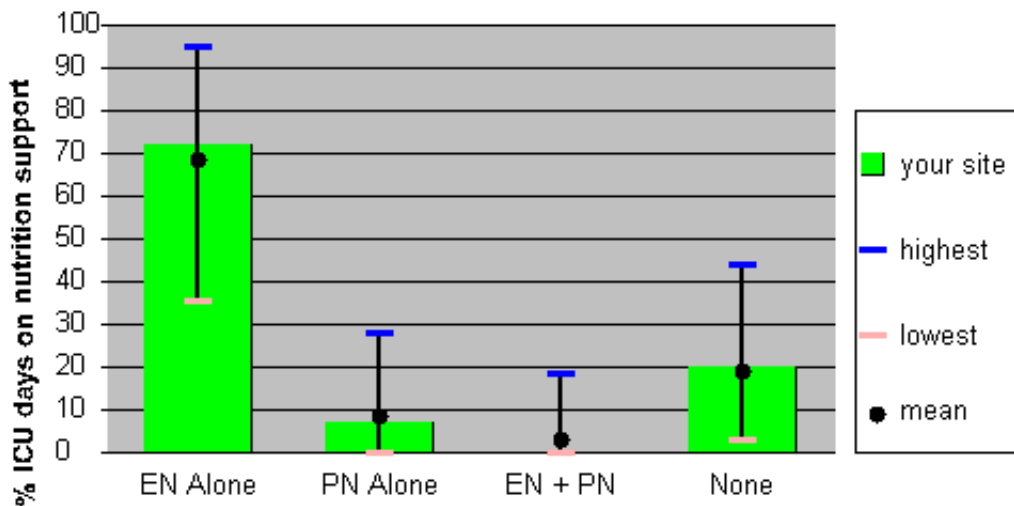
### PN vs. standard care

**Recommendation:** In critically ill patients with an intact gastrointestinal tract, we **strongly recommend** that parenteral nutrition **not be used** routinely.

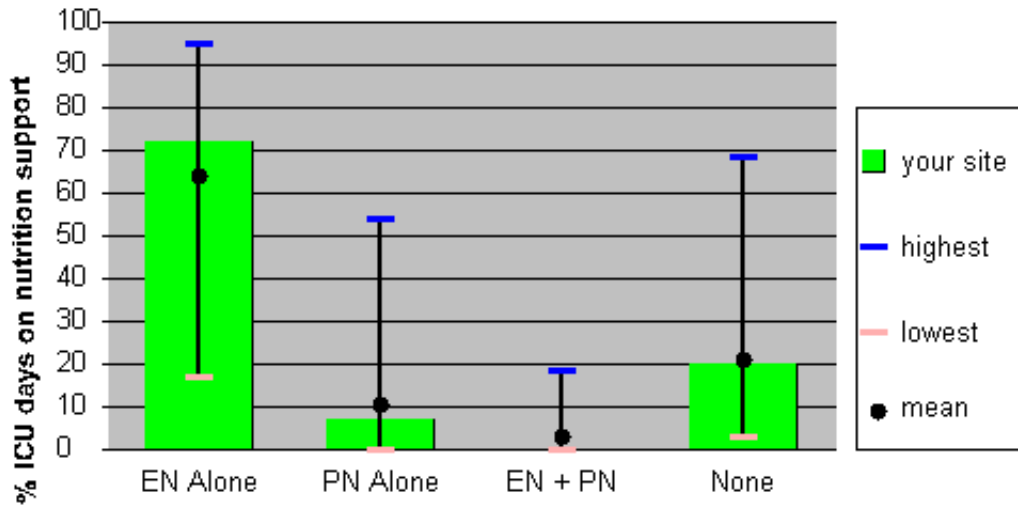
### EN in combination with PN

**Recommendation:** For critically ill patients starting on enteral nutrition, we **recommend** that parenteral nutrition **not be** started at the same time as enteral nutrition. In the patient who is not tolerating adequate enteral nutrition, there are **insufficient data** to put forward a recommendation about when parenteral nutrition should be initiated. Practitioners will have to weigh the safety and benefits of initiating PN in patients not tolerating EN on an individual case-by-case basis. We **recommend** that PN **not be** started in critically ill patients until all strategies to maximize EN delivery (such as small bowel feeding tubes, motility agents) have been attempted.

Figure 2.1 Type Of Nutrition Support: Compared To Sister Hospitals

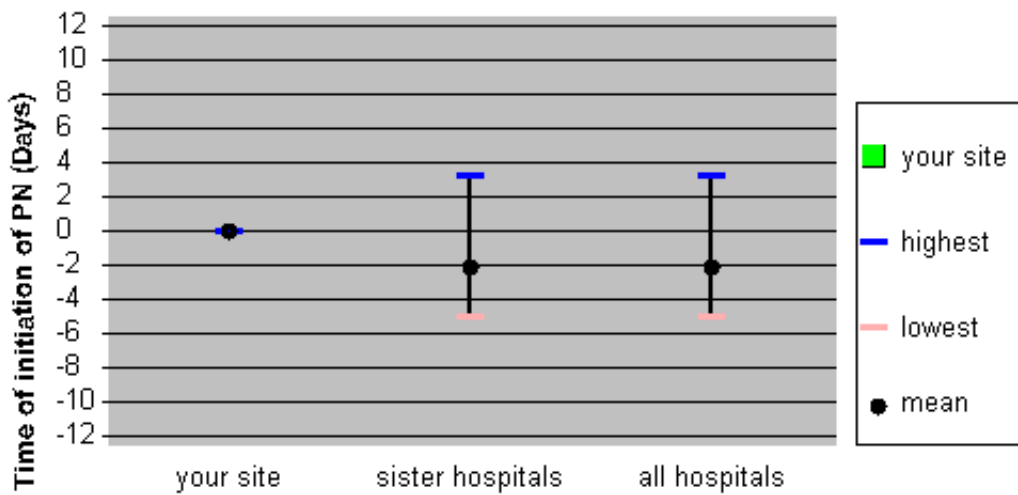


**Figure 2.2 Type Of Nutrition Support: Compared To All Hospitals**



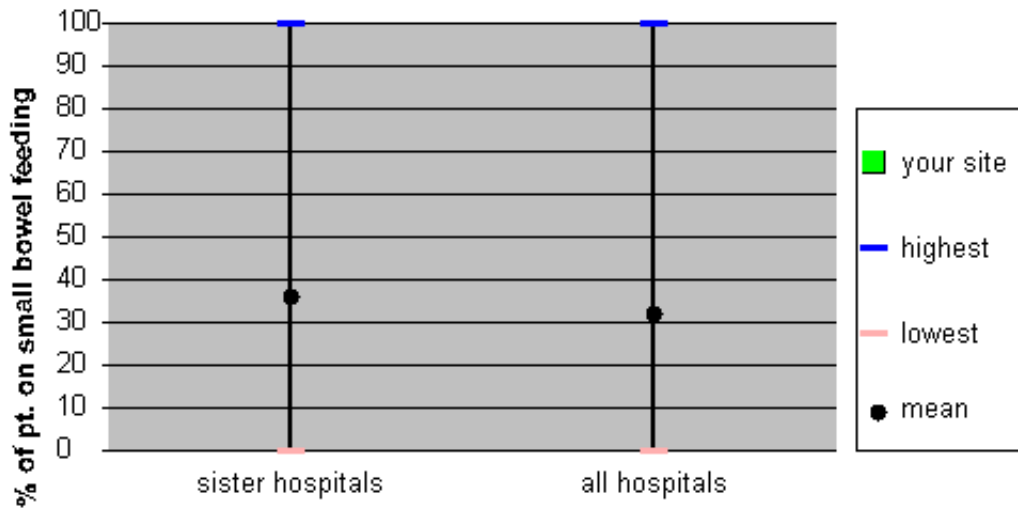
**Figure 2.3 Timing Of Initiation Of PN From EN In Those Receiving Comb EN + PN**

**There was NO patient on combination EN + PN from your site.**



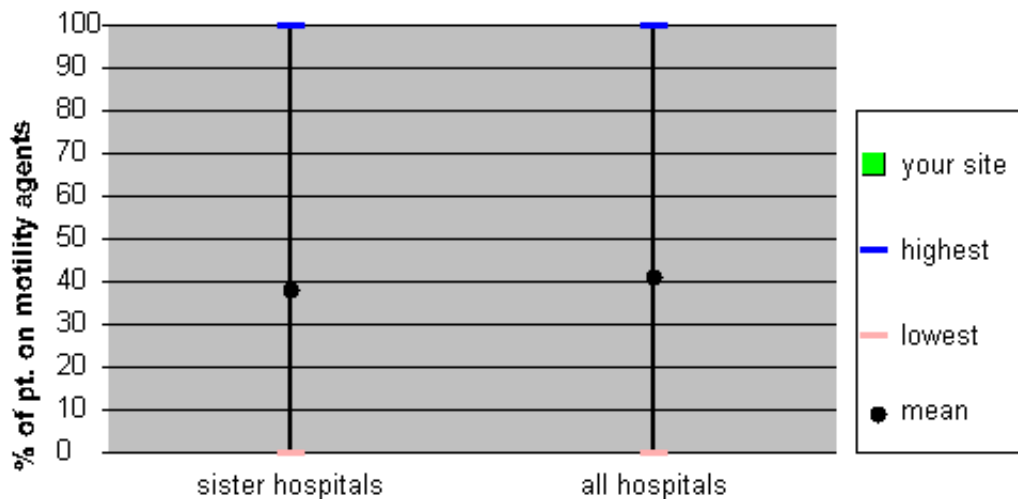
**Figure 2.4 Of The Patients That Received PN In Combination With EN, The Proportion That Received Small Bowel Feeding (As A Strategy To Maximize EN Prior To Start Of PN).**

**There was either no patient on combination EN+PN or of those that are on EN+PN, none received Small Bowel Feeding.**



**Figure 2.5 Of The Patients That Received PN In Combination With EN, The Proportion That Received Motility Agents (As A Strategy To Maximize EN Prior To Start Of PN).**

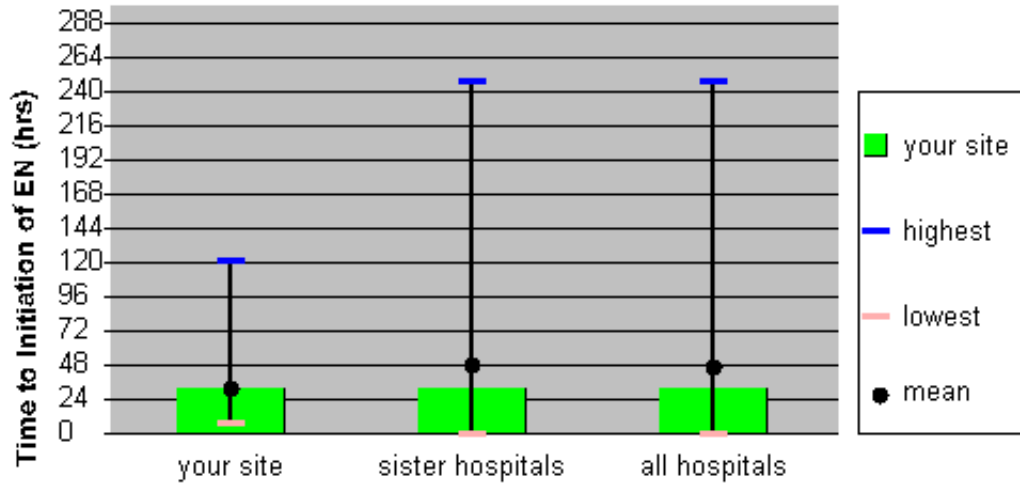
**There was either no patient on combination EN+PN or of those that are on EN+PN, none received Motility Agents.**



### 3. Early vs. Delayed Enteral Nutrition

*Recommendations: We recommend early enteral nutrition (within 24-48 hrs following admission) in critically ill patients.*

**Figure 3.1 Timing Of Initiation Of EN**



**4. Composition of EN: Immune enhancing Diets: Arginine, fish oils/borage oil and Glutamine Containing Diets:**

**Recommendations:**

*a) We recommend that diets supplemented with arginine and other selected nutrients **not be used for critically ill patients.***

*b) The use of an enteral formula with fish oils, borage oils, and antioxidants **should be considered in patients with acute respiratory distress syndrome (ARDS).***

*c) Enteral glutamine **should be considered in burn and trauma patients.** There are **insufficient data** to support the routine use of enteral glutamine in other critically ill patients.*

*d) When initiating enteral feeds, we **recommend** the use of whole protein formula (polymeric) in critically ill patients.*

**Table 4.1 Use of Arginine, Oxepa, Glutamine and Polymeric formula**

*n = Number of sites*

*Mean = Average number of patients on a specific diet per site*

<b>Enteral Formulas / supplements Used</b>	<b>Your site (Number of patients = 13)</b>	<b>Sister Hospitals mean % (range) n = 37</b>	<b>All Hospitals Mean % (range) n = 63</b>
Arginine containing	0 (0%)	3.1% (0% - 40%)	3.1% (0% - 40%)
Use of Oxepa in all patients	0 (0%)	0.6% (0% - 11.1%)	0.5% (0% - 11.8%)
Use of Oxepa in ARDS patients	0 (0%)	7.4% (0% - 100%)	5.2% (0% - 100%)
Supplemental Glutamine in all patients	3 (23.1%)	1% (0% - 23.1%)	0.7% (0% - 23.1%)
Supplemental Glutamine in burns patients	0 (0%)	0% (0% - 0%)	0% (0% - 0%)
Supplemental Glutamine in trauma patients	0 (0%)	0% (0% - 0%)	0% (0% - 0%)
Polymeric formulas	13 (100%)	92.3% (50% - 100%)	94.7% (50% - 100%)

5. Strategies to optimize delivery and minimize risks of EN:

**Recommendations:** There are **insufficient data** from randomized trials to recommend the use of a feeding protocol in critically ill patients. If a feeding protocol is to be used, a protocol that incorporates prokinetics (metaclopramide) at initiation and tolerates a higher gastric residual volume (250 mls) **should be considered** as a strategy to optimize delivery of enteral nutrition in critically ill adult patients.

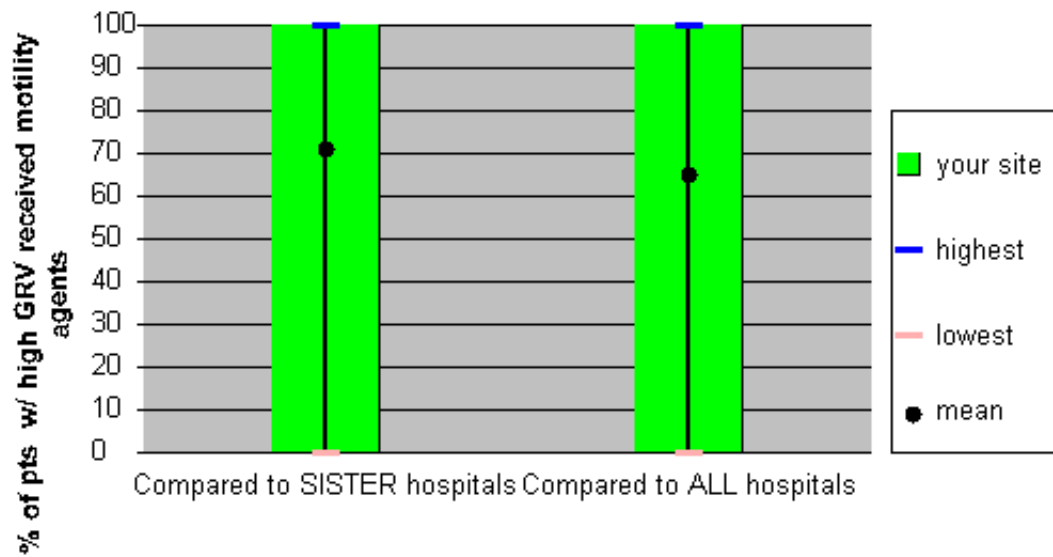
**Table 5.1. Feeding Protocols**

	<b>Your Site</b>	<b>Sister hospitals (%) (n = 37)</b>	<b>All hospitals (%) (n = 63)</b>
Use of Feeding Protocol (yes)	Yes	29(78%)	50(79%)
Threshold for gastric residual volume in mls (range)	200	219(150-300)	205(100-300)
Feeding protocol that specifies:			
Motility agents	Yes	18(62%)	33(66%)
Small Bowel Feeding	No	14(48%)	25(50%)
Withholding for procedures	No	14(48%)	18(36%)
HOB elevation	Yes	22(76%)	40(80%)

## Motility agents

*Recommendations: In critically ill patients who experience feed intolerance (high gastric residuals, emesis), the use of metoclopramide as a motility agent should be considered.*

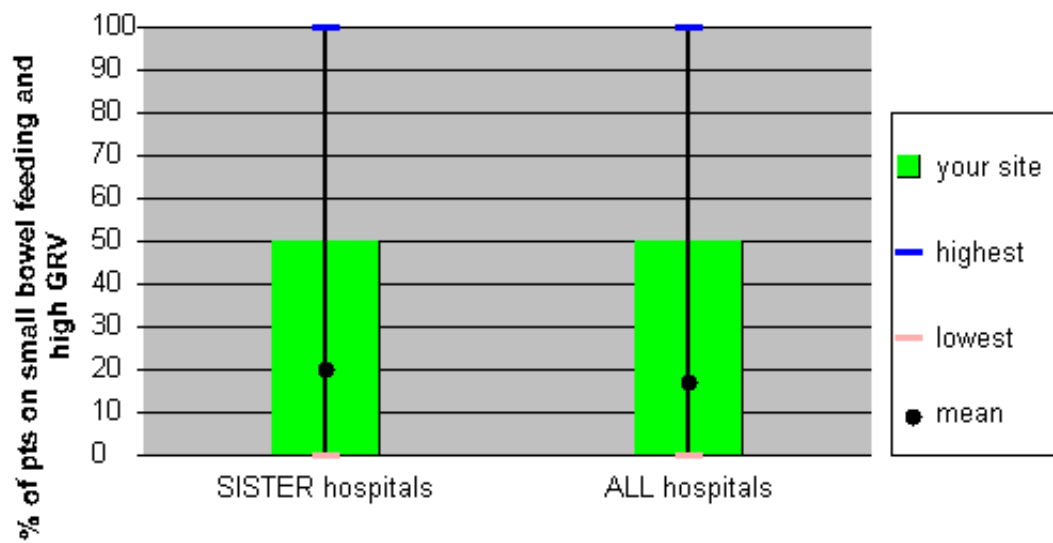
**Figure 5.2 Motility Agents In Those On EN And High GRV**



## Small Bowel feeding

**Recommendations:** Small bowel feeding compared to gastric feeding maybe associated with a reduction in pneumonia in critically ill patients. In units where obtaining small bowel access is feasible, we **recommend** the routine use of small bowel feedings. In units where obtaining access involves more logistical difficulties, small bowel feedings **should be considered** for patients at high risk for intolerance to EN (on inotropes, continuous infusion of sedatives, or paralytic agents, or patients with high nasogastric drainage) or at high risk for regurgitation and aspiration (nursed in supine position). Finally, in units where obtaining small bowel access is not feasible (no access to fluoroscopy or endoscopy and blind techniques not reliable), small bowel feedings **should be considered** for those select patients who repeatedly demonstrate high gastric residual volumes and are not tolerating adequate amounts of EN delivered into the stomach.

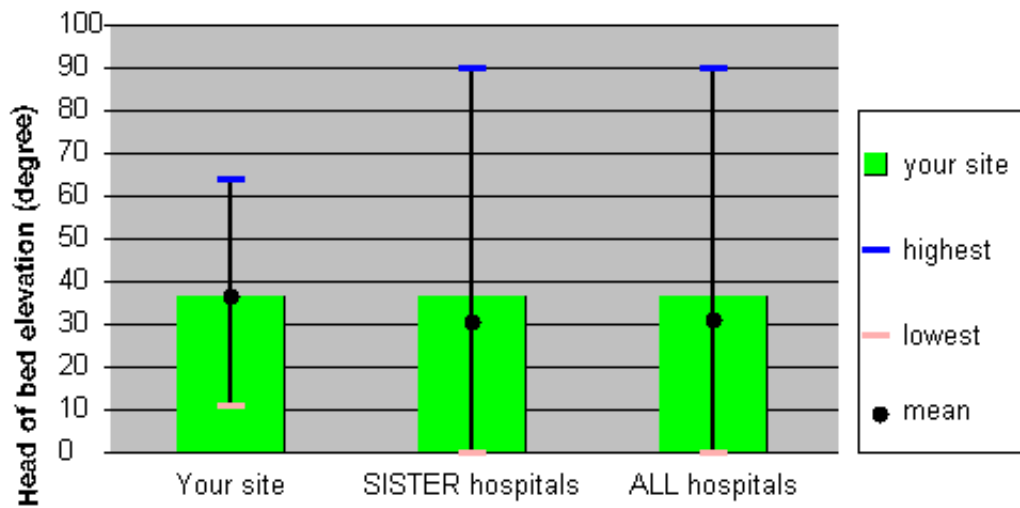
Figure 5.3 Small Bowel Feeding In Those With High Gastric Residual Volumes



## Body position

**Recommendation:** We recommend that critically ill patients receiving enteral nutrition have the head of the bed elevated to 45 degrees. Where this is not possible, attempts to raise the head of the bed as much as possible should be considered.

**Figure 5.4 Body Position In Patients Receiving EN**



## 6. Composition of PN: Glutamine

**Recommendation:** When parenteral nutrition is prescribed to critically ill patients, parenteral supplementation with glutamine, where available, is **recommended**. There are **insufficient data** to generate recommendations for intravenous glutamine in critically ill patients who are receiving enteral nutrition.

**Table 6. Use of Supplemental Glutamine (Enteral or IV/PN) in patients receiving PN**

*n = number of sites that ever had patients receiving PN*

*Mean = Average number of PN patients used Supplemental Glutamine per site*

Your site average n = 1	Sister Hospitals Mean (range) n = 26	All Hospitals Mean (range) n = 47
100%	3.8% (0% - 100%)	2.1% (0% - 100%)

**Figure 6.1. Route Of Supplemental Glutamine (IV/PN Or EN)**



## 7. Strategies to optimize benefits and minimize risks of PN:

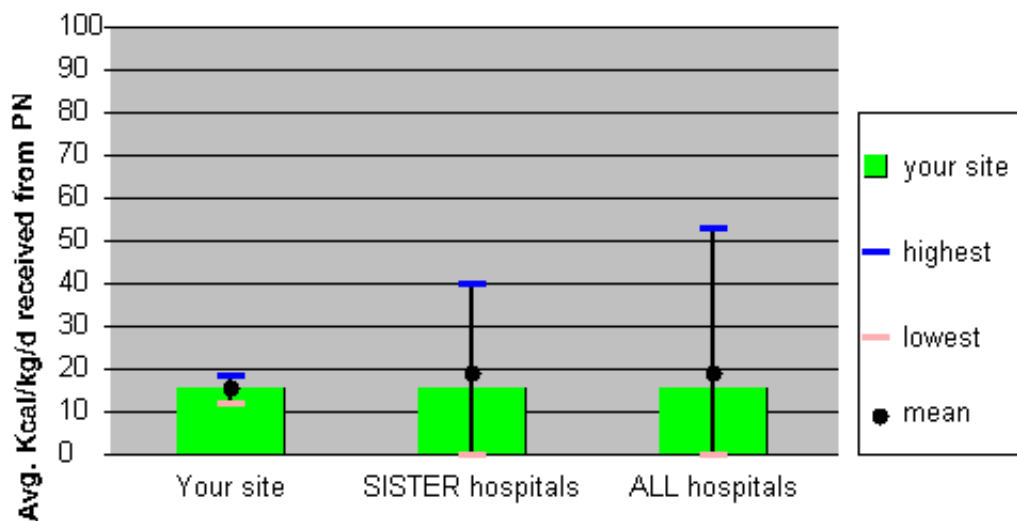
### DOSE OF PN

**Recommendation:** In critically ill patients who are not malnourished, are tolerating some EN, or when parenteral nutrition is indicated for short term use (< 10 days), low dose parenteral nutrition **should be considered**. There are **insufficient data** to make recommendations about the use of low dose parenteral nutrition or withholding lipids in the following patients: those requiring PN for long term (> 10 days), obese critically ill patients, and malnourished critically ill patients. Practitioners will have to weigh the safety and benefits of low dose PN/withholding lipids on an individual case-by-case basis in these latter patient populations.

### Use of lipids:

**Recommendation:** In critically ill patients who are not malnourished, are tolerating some EN, or when parenteral nutrition is indicated for short-term use (< 10 days), withholding lipids **should be considered**. There are **insufficient data** to make a recommendation about withholding lipids in critically ill patients who are malnourished or those requiring PN for long term (> 10 days). Practitioners will have to weigh the safety and benefits of withholding lipids on an individual case-by-case basis in these latter patient populations.

Figure 7.1 Calories Received From PN (Kcal/Kg/Day)



## Figure 7.2 Lipid Free PN Days

*Your site used PN for 11 patient days.*

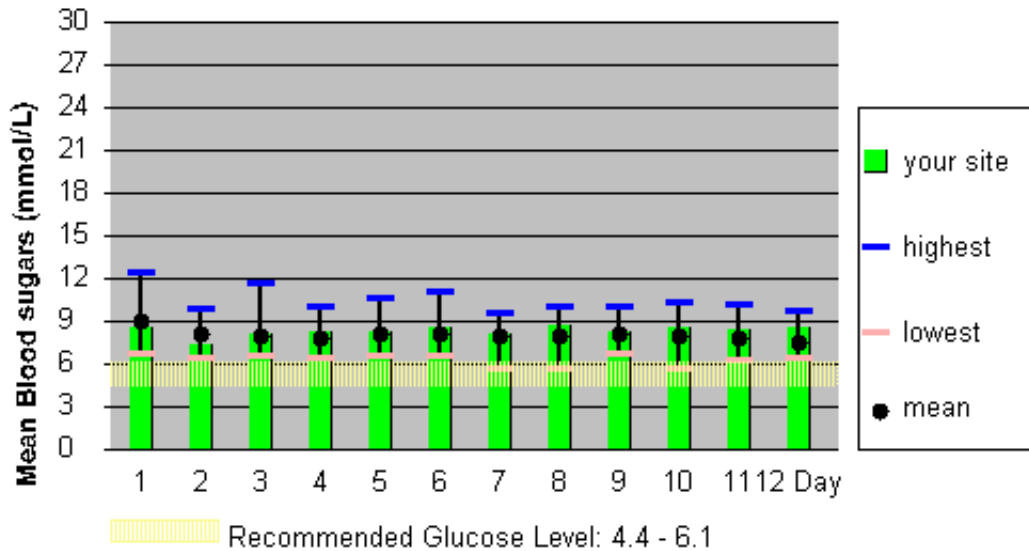
*Lipids were provided for 4 patient days.*



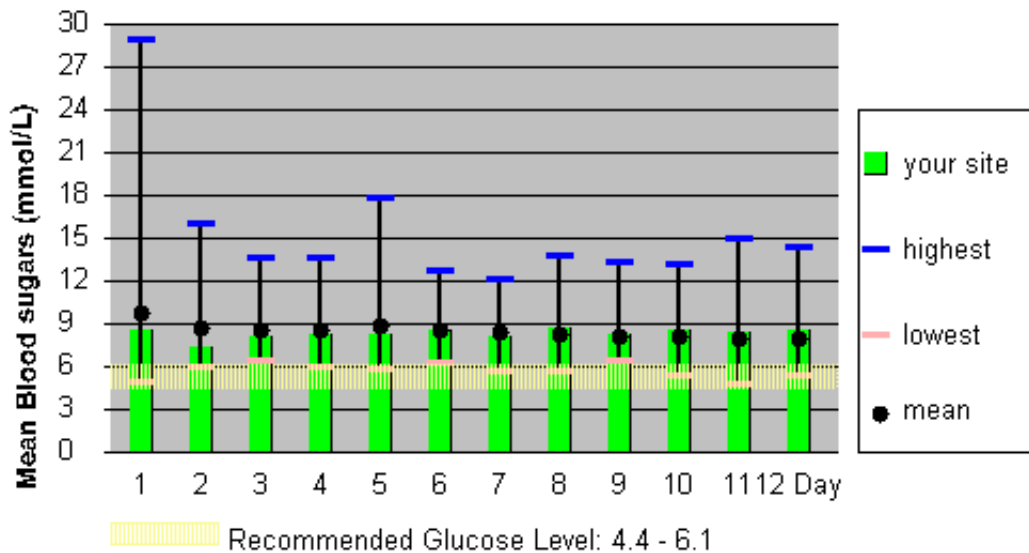
## Intensive insulin therapy

*Recommendations: In surgical critically ill patients receiving nutrition support, intensive insulin therapy to tightly control blood sugars between 4.4-6.1 should be considered. There are insufficient data to make a recommendation regarding intensive insulin therapy in other critically ill patients.*

**Figure 7.3 Blood Glucose Levels Compared To Sister Hospitals**



**Figure 7.4 Blood Glucose Levels Compared To All Hospitals**



**Table 7.5 Glycemic Control Protocol = YES**

*n = number of sites*

<b>Your site n = 1</b>	<b>Sister Hospitals n = 37</b>	<b>All Hospitals n = 63</b>
Yes	28 (75.68%)	42 (66.67%)