Critical Care Nutrition

www.criticalcarenutrition.com

Final Site Report

Improving the Practice of Nutrition Therapy in the Critically ill: An International Quality Improvement Project

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Interpreting Your Site Report

The International Nutrition QI project is a point-prevalence survey of nutrition practices in Intensive Care Units (ICUs) throughout the World. Since January 2007, your ICU has been involved in collecting data for this project. This site report summarizes your site's performance and will allow you to compare your nutrition practices to other ICUs within your own country or region ('Sister Sites') and all the ICUs in the database ('All Sites'). You will also be able to compare your performance to the recommendations of the Canadian Nutrition Support Clinical Practice Guidelines (CPGs) (1).

The first few pages describe ICU and patient characteristics. This helps you to identify the similarities and differences in the structure and patient case-mix of your ICU compared to other ICUs and will help you to interpret your site report in the context in which you work.

Pages 7-10, outlines the adequacy of nutrition support and enteral nutrition at your site and provides an overall assessment or summary of your performance in providing nutrition.

Subsequent pages outline the 17 recommendations of the Canadian Nutrition Support CPGs. After each recommendation is stated, a figure or table illustrates how your site performed for every nutrition practice related to that specific recommendation. The language of summary recommendations should be interpreted as follows:

"Strongly recommended"	If there was no reservations about endorsing an intervention.
"Recommended"	If evidence was supportive but there were minor uncertainties about the safety, feasibility, or costs of the intervention.
"Should be considered"	If the supportive evidence was weak and/or there were major uncertainties about the safety, feasibility, or costs of an intervention.

Glossary of terms

Your site:	this represents the average (mean / median) of all the data from your site. This is often depicted in the figures by a clear block and --- dissecting the sister and all sites range bar.
Sister sites:	refers to the average (mean) of all the data from ICUs within your own country or region.
All sites:	refers to the average of all the data from all the ICUs in the database.
Highest:	refers to the highest data point from either your / sister / all sites.
Lowest:	refers to the lowest data point from either your / sister / all sites.
N:	number of ICU sites / patients / ICU days as indicated.
NA:	not applicable, no relevant data entered for this data point.
IQR:	Inter Quartile Range, the middle range between the first and third quartile.
PCT:	percent.
n/N:	number of observations per total observations for your / sister / all sites.

(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. For current version of the Guidelines, see www.criticalcarenutrition.com

Table 1. Characteristics of Participating ICUs

Number of ICUs	Your Site n=1	Sister Sites n=48	All Sites n=156
Hospital Type			
Teaching	Yes	33 (68.8%)	120 (77.4%)
Non-teaching	-	15 (31.3%)	35 (22.6%)
Size of Hospital (beds)			
mean (range)	400	510 (138-1275)	642 (138-4000)
Multiple ICUs in Hospital			
	No	22 (45.8%)	78 (50.0%)
ICU Structure			
Open	-	3 (6.3%)	30 (19.2%)
Closed	Yes	43 (89.6%)	123 (78.8%)
Other	-	2 (4.2%)	3 (1.9%)
Case Types			
Medical	Yes	44 (91.7%)	136 (87.2%)
Surgical	Yes	44 (91.7%)	140 (89.7%)
Trauma	Yes	21 (43.8%)	98 (62.8%)
Pediatrics	Yes	4 (8.3%)	26 (16.7%)
Neurological	Yes	26 (54.2%)	103 (66.0%)
Neurosurgical	Yes	17 (35.4%)	78 (50.0%)
Cardiac Surgery	Yes	11 (22.9%)	51 (32.7%)
Burns	Yes	8 (16.7%)	28 (17.9%)
Other	No	4 (8.3%)	18 (11.5%)
Presence of Medical Director			
	Yes	47 (97.9%)	146 (93.6%)
Size of ICU (beds)			
mean (range)	21	17 (8-42)	18 (4-75)
Presence of Dietitian(s)			
	Yes	47 (97.9%)	132 (84.6%)
Full Time Equivalent Dietitian (per 10 beds)			
mean (range)	0.2	0.4 (0.1-1.1)	0.4 (0.1-1.7)

Legend

Type of Hospital: A teaching hospital is a hospital that provides training to medical students and residents. Hospitals that have only occasional medical students/residents, are considered non-teaching hospital.

ICU Structure: Open ICUs are sites where patients are under the care of an attending physician (e.g. internist, family physician, surgeon) with intensivists (i.e. physician with training in critical care) consulted as necessary. Closed ICUs are sites in which patients are under the care of an intensivist, or care is shared between the intensivist and another attending physician.

Full Time Equivalent Dietitian: This is a measure of the amount of time the dietitian is dedicated to the ICU relative to a full-time position e.g. a FTE of 1.0 means that the dietitian works in a 10 bedded ICU full-time and a FTE of 0.5 means that the dietitian is in the ICU half-time, or two and a half days a week.

Table 2. Patient Characteristics

Number of Patients	Your Site n=20	Sister Sites n=868	All Sites n=2946
	Personal Information		
Age (years)			
mean (range)	66.4 (24-82)	62.6 (18-93)	59.7 (12-99)
Sex			
Male	10 (50.0%)	483 (55.6%)	1729 (58.7%)
Female	10 (50.0%)	385 (44.4%)	1217 (41.3%)
	Admission Information		
Admission Category			
Medical	15 (75.0%)	570 (65.7%)	1785 (60.6%)
Surgical: Elective	3 (15.0%)	108 (12.5%)	419 (14.2%)
Surgical: Emergency	2 (10.0%)	189 (21.8%)	741 (25.2%)
Admission Diagnosis			
Cardiovascular / Vascular	6 (30.0%)	174 (20.1%)	565 (19.2%)
Respiratory	7 (35.0%)	267 (30.8%)	780 (26.5%)
Pancreatitis	0	11 (1.3%)	52 (1.8%)
Gastrointestinal	1 (5.0%)	123 (14.2%)	411 (14.0%)
Neurologic	2 (10.0%)	94 (10.8%)	359 (12.2%)
Sepsis	4 (20.0%)	83 (9.6%)	253 (8.6%)
Trauma	0	55 (6.3%)	284 (9.6%)
Metabolic	0	20 (2.3%)	62 (2.1%)
Hematologic	0	6 (0.7%)	17 (0.6%)
Renal	0	8 (0.9%)	39 (1.3%)
Gynecologic	0	1 (0.1%)	3 (0.1%)
Orthopedic	0	6 (0.7%)	11 (0.4%)
Bariatric Surgery	0	1 (0.1%)	3 (0.1%)
Burns	0	4 (0.5%)	18 (0.6%)
Other	0	14 (1.6%)	88 (3.0%)
Apache II Score			
mean (range)	22.7 (11-37)	21.8 (2-48)	21.5 (1-50)
Presence of ARDS			
n/N (PCT)	3/20 (15.0%)	78/866 (9.0%)	379/2944 (12.9%)
	Outcome		
Length of ICU Stay (days)			
median [IQR]	12.2 [5.9-32.5]	11.2 [6.7-21.2]	10.4 [6.2-18.4]
Length of Hospital Stay (days)			
median [IQR]	31.2 [19.7-40.1]	24.3 [14.8-39.5]	23.2 [14.0-37.0]
Length of Mechanical Ventilation (days)			
median [IQR]	22.2 [15.4-40.5]	10.6 [4.7-20.9]	7.5 [3.6-15.8]
Patient Died (within 60 days)			
n/N (PCT)	6/20 (30.0%)	234/816 (28.7%)	800/2724 (29.4%)

Table 3. Patient Nutrition Assessment Information

Number of Patients	Your Site n=20	Sister Sites n=868	All Sites n=2946
Height (meters)			
mean (range)	1.69 (1.50-1.85)	1.68 (1.00-1.98)	1.69 (1.00-2.03)
Weight (kg)			
mean (range)	87.3 (55.0-154.5)	79.5 (30.0-239.0)	78.5 (30.0-310.5)
BMI (kg|m2)			
mean (range)	31.0 (20.2-66.7)	28.2 (13.7-85.7)	27.5 (12.5-102.0)
Weight Used in Calculate of Nutrition Prescription			
Actual (ABW)	12 (60.0%)	417 (48.0%)	1345 (45.7%)
Estimated	4 (20.0%)	158 (18.2%)	589 (20.0%)
Ideal (IBW) based on Hamwi formula	0	15 (1.7%)	100 (3.4%)
Ideal (IBW) based on BMI 20-25 Kg/m2	0	87 (10.0%)	385 (13.1%)
Adjusted by 25% (ABW x 0.25 + IBW)	3 (15.0%)	107 (12.3%)	256 (8.7%)
Adjusted by 40% (ABW x 0.4 + IBW)	0	6 (0.7%)	26 (0.9%)
Adjusted average ((ABW + IBW) x 0.5)	0	16 (1.8%)	71 (2.4%)
No weight used in assessment	0	2 (0.2%)	20 (0.7%)
No assessment	0	9 (1.0%)	34 (1.2%)
More than one method used	0	4 (0.5%)	10 (0.3%)
Other	1 (5.0%)	47 (5.4%)	110 (3.7%)
Method used to calculate Energy Requirements			
Harris Benedict Equation	2 (10.0%)	224 (25.8%)	388 (13.2%)
Schofield Equation with no adjustment for stress and activity	0	0 (0.0%)	45 (1.5%)
Schofield Equation with adjustment for stress and/or activity	0	0 (0.0%)	387 (13.1%)
Mifflin-St. Jeor Equation	0	12 (1.4%)	19 (0.6%)
Ireton-Jones Equation	15 (75.0%)	152 (17.5%)	349 (11.8%)
10-18 Kcal/Kg	0	5 (0.6%)	15 (0.5%)
19-21 Kcal/Kg	0	50 (5.8%)	241 (8.2%)
20-25 Kcal/Kg	2 (10.0%)	64 (7.4%)	156 (5.3%)
>25-30 Kcals/kg	0	263 (30.3%)	938 (31.8%)
>30-35 Kcal/Kg	1 (5.0%)	9 (1.0%)	41 (1.4%)
Provide 1200 – 1500 Kcal as standard	0	2 (0.2%)	34 (1.2%)
Provide >1500-2000 Kcal as standard	0	0 (0.0%)	36 (1.2%)
Indirect calorimetry	0	18 (2.1%)	97 (3.3%)
More than one method used	0	21 (2.4%)	94 (3.2%)
No assessment	0	31 (3.6%)	59 (2.0%)
Other	0	17 (2.0%)	47 (1.6%)

Prescribed Energy Intake (kcals)			
mean (range)	1784.6 (1272-2400)	1770.2 (736-3351)	1796.7 (480-3600)
Prescribed Protein Intake (g)			
mean (range)	83.5 (53-136)	92.27 (30-228)	87.14 (17-248)
Prescribed Energy Intake by Weight (kcals|kg)			
mean (range)	21.7 (10.4-31.4)	23.3 (7.9-47.1)	24.0 (4.1-49.9)
Prescribed Protein Intake by Weight (g|kg)			
mean (range)	1.0 (0.7-2.0)	1.2 (0.4-2.5)	1.2 (0.1-3.9)

Legend

BMI: Body Mass Index.

Prescribed energy/protein intake: kilocalories / grams provided by the goal regimen (i.e. maximum rate/volume determined at the initial assessment) for EN/PN according to the dietitians or physicians recommendation.

Overall Performance at Your Site

Nutritional Adequacy, defined as the amount of calories or protein received divided by the maximum amount prescribed at the initial assessment, expressed as a percentage, is a summary measure of your site's performance. As the recommendations of the Canadian Nutrition Support CPGs focus on use of EN in preference to PN and on strategies to optimize delivery and minimize the risks of EN, Adequacy of Appropriate Nutrition Support and Adequacy of Enteral Nutrition are the primary measures of your success in following the Canadian Nutrition Support CPGs. (See legend for full definition of nutritional adequacy).

Figures 1.1 – 1.4 summarizes your overall performance in providing nutrition by day in the ICU compared to other ICUs. Figure 1.5 summarizes the mean adequacy over the first 12 days of ICU stay compared to other ICUs. For benchmarking purposes, the numbers above the bars in Figure 1.5 tell you where you ranked or were placed out of all the sister and all sites (i.e. 1/156 corresponding to the best performing site). Table 4 provides additional information about your practices by providing data on adequacy of total nutrition support (EN+PN+propofol) and adequacy of EN in EN only patients.

Legend

Figure 1.1 Adequacy of Calories from Appropriate Nutrition Support:
The amount of calories received by EN and appropriate PN (i.e presence of contraindication to EN) and propofol as a percentage of the maximum calories prescribed at baseline assessment in ALL patients.
- Days without EN / appropriate PN are included and are counted as 0% adequacy, regardless of presence of prescription.
- Only days that follow permanent progression to exclusive oral intake are excluded.

Figure 1.2 Adequacy of Protein from Appropriate Nutrition Support
The amount of protein received by EN and appropriate PN (i.e presence of contraindication to EN) as a percentage of the maximum calories prescribed at baseline assessment in ALL patients.
- Days without EN / appropriate PN are included and are counted as 0% adequacy, regardless of presence of prescription
- Only days that follow permanent progression to exclusive oral intake are excluded.

Figure 1.3 Adequacy of Calories from EN
The amount of calories received by EN and propofol as a percentage of the maximum calories prescribed at baseline assessment in ALL patients.
- Days without EN are included and are counted as 0% adequacy, regardless of presence of prescription
- Only days that follow permanent progression to exclusive oral intake are excluded.

Figure 1.4 Adequacy of Protein from EN
The amount of protein received by EN as a percentage of the maximum calories prescribed at baseline assessment in ALL patients.
- Days without EN are included and are counted as 0% adequacy, regardless of presence of prescription
- Only days that follow permanent progression to exclusive oral intake are excluded.

Figure 1.1 Adequacy of Calories from Nutrition Support

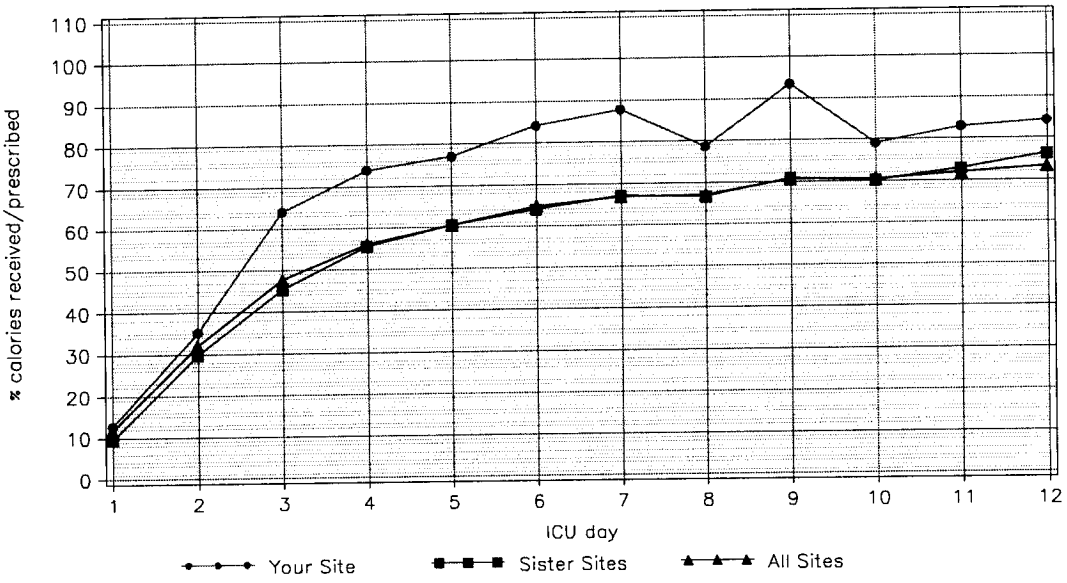


Figure 1.2 Adequacy of Protein from Nutrition Support

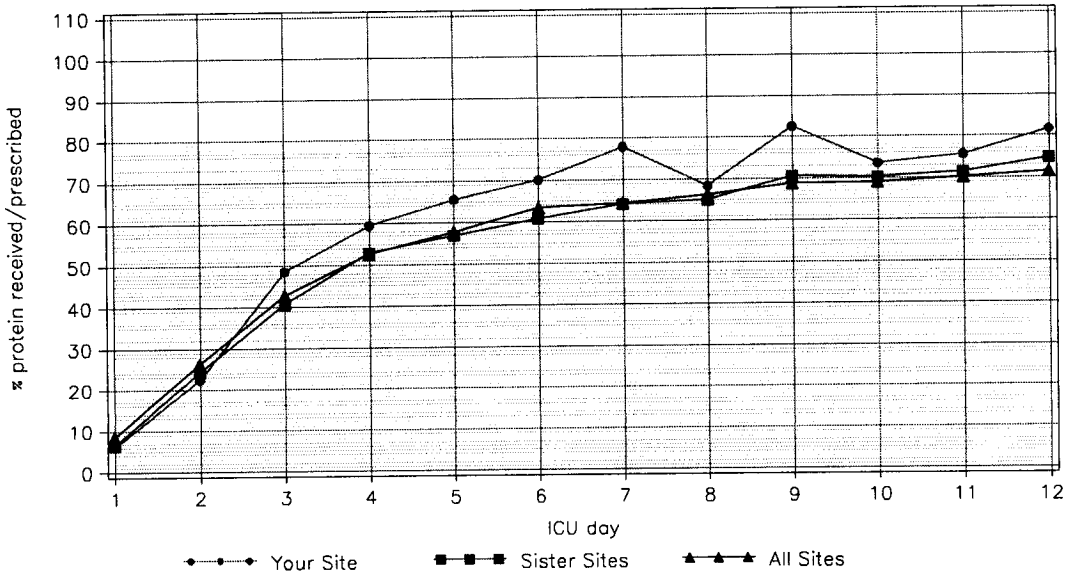


Figure 1.3 Adequacy of Calories from EN

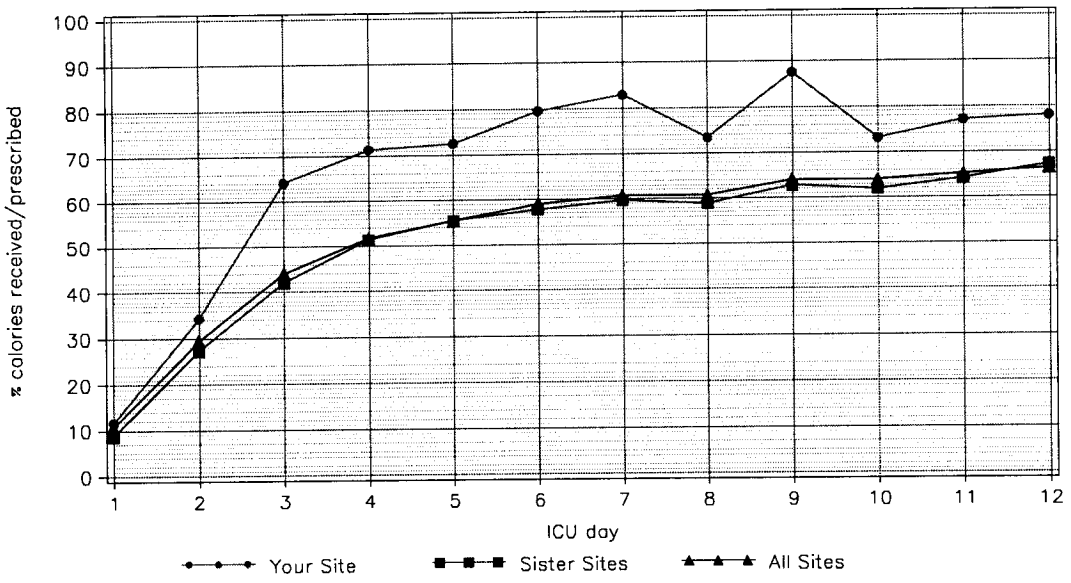
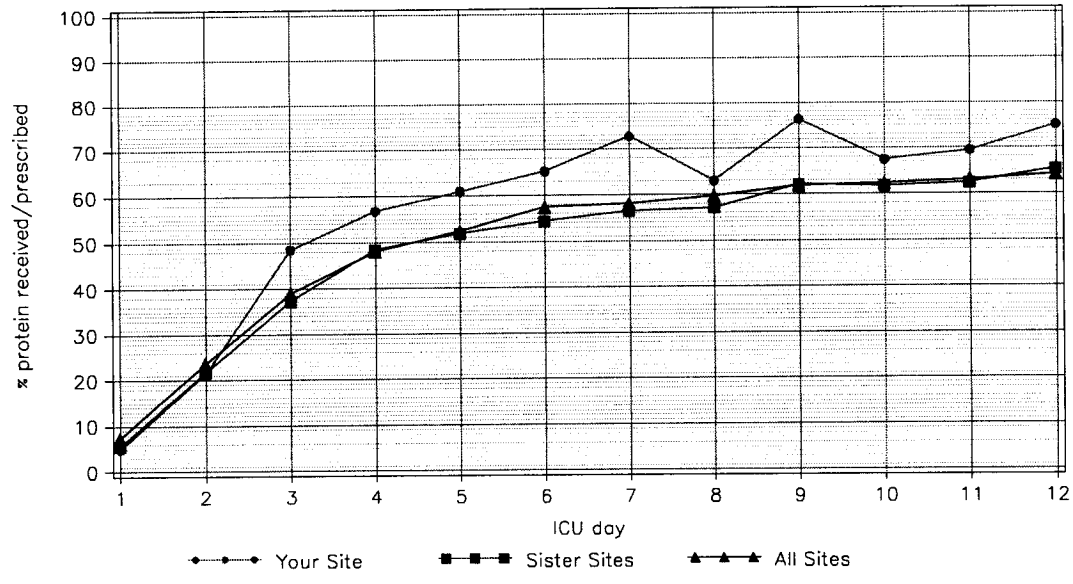


Figure 1.4 Adequacy of Protein from EN



Legend

'n/N': the ranking of your site performance compared to sister or all sites. (i.e. 1/156 corresponding to the best performing site).
'-----': mean of you site.

Figure 1.5 Overall Performance at Your Site

	Calories from NS			Protein from NS			Calories from EN			Protein from EN		
ICU days	Your Site	Sister Sites	All Sites	Your Site	Sister Sites	All Sites	Your Site	Sister Sites	All Sites	Your Site	Sister Sites	All Sites
N	213	7629	25909	213	7629	25902	213	7629	25909	213	7629	25902

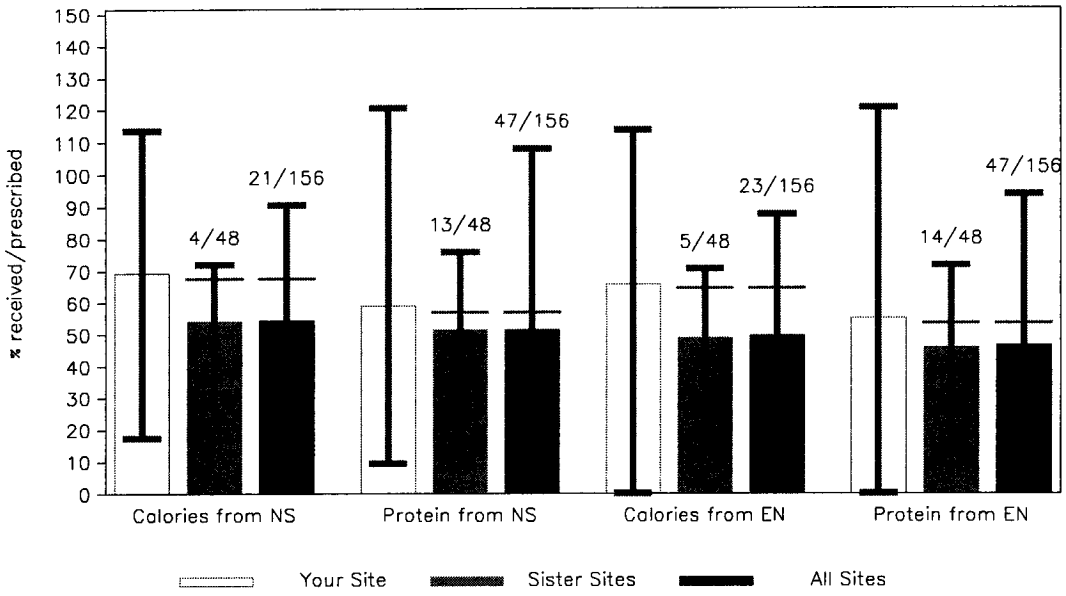


Table 4. Overall Performance

	Your Site	Sister Sites	All Sites
Adequacy of Calories from Total Nutrition Support (EN+PN+propofol)			
mean (range)	69.4%	53.9% (22.8%-71.9%)	54.1% (7.2%-90.6%)
Adequacy of Protein from Total Nutrition Support (EN+PN)			
mean (range)	58.9%	51.1% (17.3%-75.8%)	51.2% (3.5%-108%)
Adequacy of Calories from EN in EN Only Patients			
mean (range)	69.6%	54.2% (29.2%-76.2%)	54.4% (7.8%-95.4%)
Adequacy of Protein from EN in EN Only Patients			
mean (range)	58.3%	51.0% (24.8%-80.9%)	51.2% (4.4%-93.7%)

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.

Dose of EN

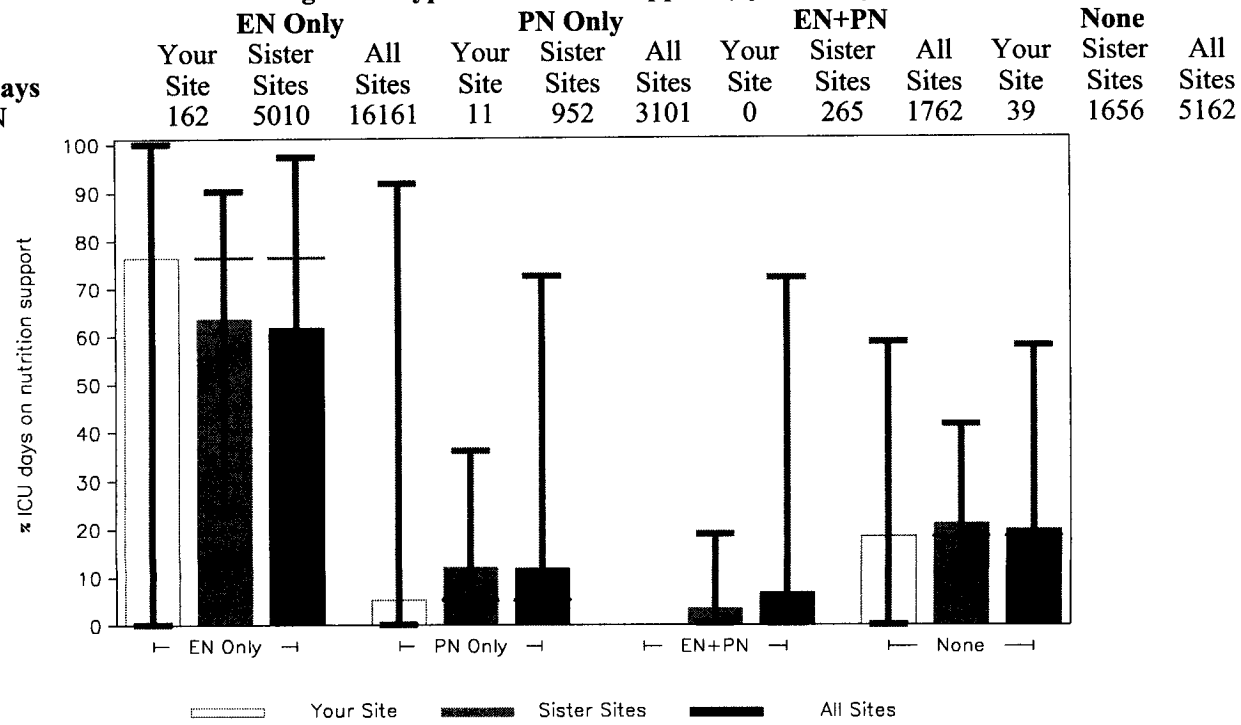
Recommendation:
When initiating enteral nutrition in head injured patients strategies to optimize delivery of nutrition (starting at target rate, higher threshold of gastric residual volume and use of small bowel feedings) should be considered. In other critically ill patients, there are insufficient data to make a recommendation.

Table 5. Type of Nutrition Support

Number of Patients	Your Site n=20	Sister Sites n=853	All Sites n=2908
Type of Nutrition Support			
EN Only	19 (95.0%)	595 (69.8%)	1950 (67.1%)
PN Only	1 (5.0%)	69 (8.1%)	221 (7.6%)
EN+PN	0	107 (12.5%)	489 (16.8%)
None	0	82 (9.6%)	248 (8.5%)

Legend
Figure 2. Type of Nutrition Support
Of all the patient days, the % on EN alone, PN alone, EN + PN and No nutrition support
- Days on oral intake+EN are counted as EN, oral intake+PN as PN & EN+PN+oral as EN+PN
- Days on oral intake alone are excluded

Figure 2. Type of Nutrition Support (by ICU days)



PN vs. Standard Care

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

Table 6. Contraindication to EN in those receiving PN

Number of Patients on PN	**Your Site** n=1	**Sister Sites** n=176	**All Sites** n=710
No contraindication	0	55 (31.3%)	357 (50.3%)
Contraindication to EN			
Mechanical bowel obstruction	0	9 (5.1%)	28 (3.9%)
Bowel ischemia	0	15 (8.5%)	56 (7.9%)
Small bowel ileus	0	57 (32.4%)	176 (24.8%)
Small bowel fistulae	1 (100%)	8 (4.5%)	36 (5.1%)
GI perforation	0	4 (2.3%)	12 (1.7%)
Short gut syndrome	0	1 (0.6%)	2 (0.3%)
Other reasons EN not provided			
Hemodynamic instability	0	12 (6.8%)	108 (15.2%)
Proximal bowel anastomosis	0	40 (22.7%)	95 (13.4%)
Not tolerating EN (High gastric residuals / emesis)	0	12 (6.8%)	34 (4.8%)
No access to small bowel / feeding tube blockage	0	5 (2.8%)	17 (2.4%)
Pancreatitis	0	6 (3.4%)	15 (2.1%)
GI Bleed	0	10 (5.7%)	20 (2.8%)
GI Surgery	0	7 (4.0%)	23 (3.2%)
Other	0	17 (9.7%)	60 (8.5%)

Legend
Of all the patients that ever received PN (or EN+PN), the number of patients (%) EVER having a contraindication to EN.

Early vs. Delayed EN

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

Table 7. Initiation of EN

Number of Patients on EN	Your Site n=19	Sister Sites n=691	All Sites n=2387
Initiation of EN			
Prior to ICU admission	3 (15.8%)	38 (5.5%)	163 (6.8%)
0-24	4 (21.1%)	266 (38.5%)	948 (39.7%)
>24-48	8 (42.1%)	175 (25.3%)	579 (24.3%)
>48-72	1 (5.3%)	99 (14.3%)	302 (12.7%)
>72	3 (15.8%)	113 (16.4%)	395 (16.5%)

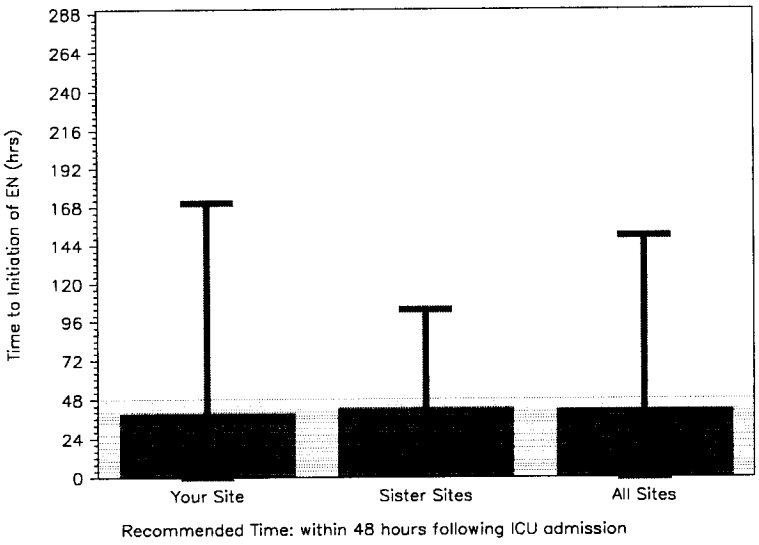
Legend
Non-finalized patients are excluded

Legend
Figure 3.1. Timing of Initiation of EN

The timing of start of EN from admission to ICU (in hours) in patients on EN
• For patients that were started on EN before admission to ICU, the time to EN start is changed to date of admission to ICU and the timing of initiation of EN becomes zero.
• Non-finalized patients are excluded

Figure 3.1. Timing of Initiation of EN

Patients	Your Site	Sister Sites	All Sites
N	19	691	2387



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.

Legend

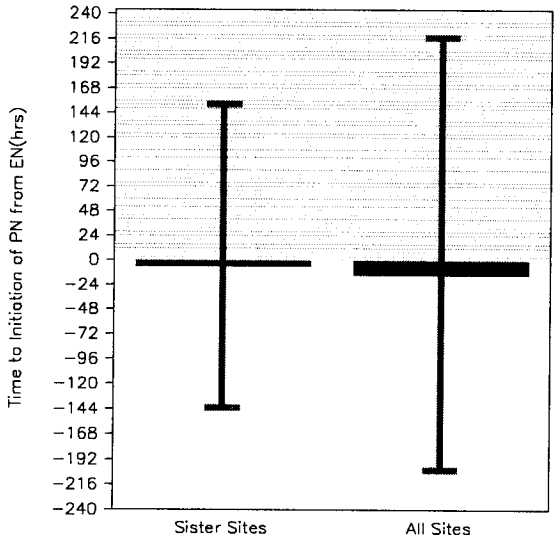
Figure 3.2. Timing to Initiation of PN from EN in Those Receiving EN+PN

Of all the patients that EVER received combination EN+PN, how many days after EN, was PN started.

- Time EN initiated is 0
- EN or PN started before admission to ICU is changed to ICU admission date.
- EN or PN started after first 12 days of observation (from admit date) is excluded.
- If PN started before EN, this will show up as a negative number.
- Non-finalized patients are excluded.

Figure 3.2. Timing to Initiation of PN from EN in Those Receiving EN+PN

Patients	Your Site	Sister Sites	All Sites
N	0	106	485



Legend

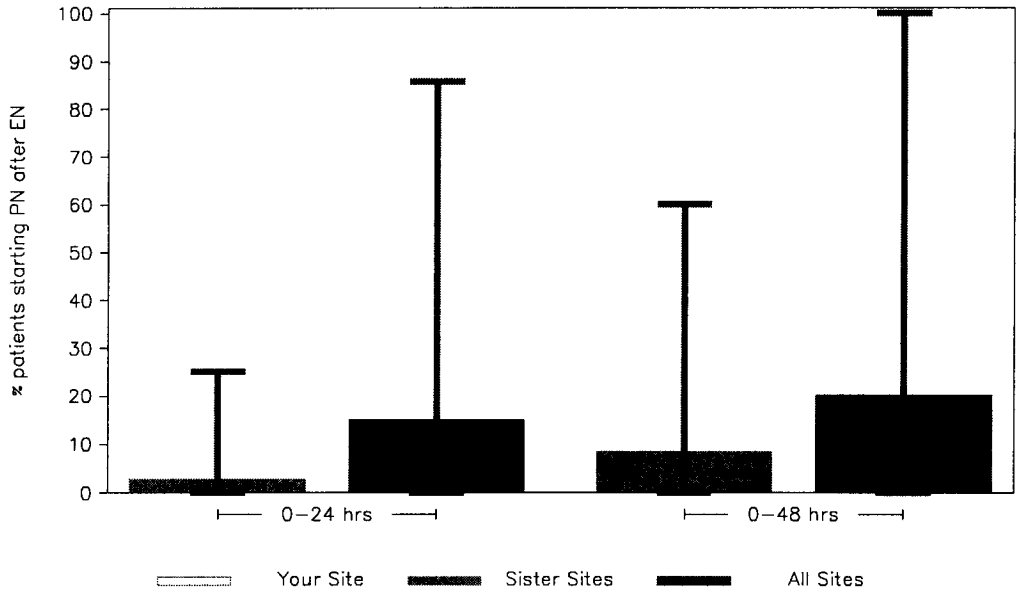
Figure 3.3. Patients that started PN within 24 and 48 hours of initiation of EN

Of the patients receiving combined EN+PN for whom initiation of PN was after EN, the proportion that received PN within 24 and 48 hours.

- Non-finalized patients are excluded.

Figure 3.3. % Patients that started PN within 24 and 48 hours of initiation of EN

	0-24 hrs			0-48 hrs		
Patients	Your Site	Sister Sites	All Sites	Your Site	Sister Sites	All Sites
N	0	60	349	0	65	372



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

Recommendation:

a) We recommend that diets supplemented with arginine and other selected nutrients NOT BE USED for critically ill patients.

b) We recommend the use of an enteral formula with fish oils, borage oils, and antioxidants in patients with acute respiratory distress syndrome (ARDS).

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

Table 8.1. Composition of Eneral Formulas

Enteral Formulas	Your Site	Sister Sites	All Sites
Arginine enriched formula	0	1.3% (0.0%-11.8%)	5.2% (0.0%-92.3%)
Oxepa (all patients)	0	1.3% (0.0%-16.7%)	1.5% (0.0%-40.0%)
Oxepa (ARDS patients)	0	7.5% (0.0%-100%)	4.5% (0.0%-100%)
Glutamine enriched Formula (all patients)	0	0.4% (0.0%-11.8%)	0.5% (0.0%-13.3%)
Polymeric formulas	19/19 (100%)	99.9% (94.4%-100%)	99.3% (78.9%-100%)

Legend

Of the patients EVER on EN (or EN+PN), the average number (or %) of patients EVER receiving these formulas

- Arginine Enriched Formulas
- OXEPA in all patients
- OXEPA in ARDS patients
- Glutamine Enriched Formulas in all patients
- Polymeric Formulas in all patients

Glutamine Supplementation

Recommendation:

a) 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.

b) 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 8.2. Glutamine Supplementation

Glutamine supplementation	Your Site	Sister Sites	All Sites
All glutamine supplementation	4/20 (20.0%)	1.6% (0.0%-20.0%)	5.9% (0.0%-100%)
EN glutamine supplementation	4/20 (20.0%)	1.6% (0.0%-20.0%)	3.6% (0.0%-95.0%)
IV/PN glutamine supplementation	0	0	2.7% (0.0%-100%)
EN Patients			
All glutamine supplementation	3/19 (15.8%)	1.9% (0.0%-22.2%)	6.3% (0.0%-100%)
EN glutamine supplementation	3/19 (15.8%)	1.9% (0.0%-22.2%)	4.1% (0.0%-100%)
IV/PN glutamine supplementation	0	0	2.6% (0.0%-100%)
PN Patients			
All glutamine supplementation	1/1 (100%)	2.7% (0.0%-100%)	13.3% (0.0%-100%)
EN glutamine supplementation	1/1 (100%)	2.7% (0.0%-100%)	4.0% (0.0%-100%)
IV/PN glutamine supplementation	0	0	10.8% (0.0%-100%)
Burn Patients			
All glutamine supplementation	NA	75.0% (0.0%-100%)	27.8% (0.0%-100%)
Trauma Patients			
All glutamine supplementation	NA	7.4% (0.0%-66.7%)	7.9% (0.0%-100%)

Legend

Of ALL the patients, the average number (or %) of patients EVER receiving glutamine supplementation.
Of ALL the patients, the average number (or %) of patients EVER receiving EN glutamine supplementation.
Of ALL the patients, the average number (or %) of patients EVER receiving IV/PN glutamine supplementation.
EN PATIENTS
Of ALL the patients EVER on EN (or EN+PN), the average number (or %) of patients EVER receiving glutamine
Of ALL the patients EVER on EN (or EN+PN), the average number (or %) of patients EVER receiving EN glutamine supplementation.
Of ALL the patients EVER on EN (or EN+PN), the average number (or %) of patients EVER receiving IV/PN glutamine supplementation.
PN PATIENTS
Of ALL the patients EVER on PN (or EN+PN), the average number (or %) of patients EVER receiving glutamine
Of ALL the patients EVER on PN (or EN+PN), the average number (or %) of patients EVER receiving EN glutamine supplementation.
Of ALL the patients EVER on PN (or EN+PN), the average number (or %) of patients EVER receiving IV/PN glutamine supplementation.
BURN PATIENTS
Of ALL the BURNS patients the average number (or %) of patients EVER receiving glutamine supplementation.
TRAUMA PATIENTS
Of ALL the TRAUMA patients, the average number (or %) of patients EVER receiving glutamine supplementation.

Strategies to optimize delivery and minimize risks of EN

Recommendation:
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 (metoclopromide) 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 9. Feeding Protocols

Number of ICUs	Your Site n=1	Sister Sites n=48	All Sites n=156
Feeding Protocol			
Yes	Yes	39 (81.3%)	126 (80.8%)
Gastric Residual Volume Tolerated in Protocol			
mean (range)	200	224 (100-300)	217 (50-500)
Algorithms included in Protocol			
Motility agents	Yes	29 (78.4%)	88 (74.6%)
Small bowel feeding	Yes	28 (75.7%)	78 (66.1%)
Withholding for procedures	No	9 (24.3%)	52 (44.1%)
HOB Elevation	Yes	33 (89.2%)	85 (72.0%)
Other	No	13 (35.1%)	18 (15.3%)

Legend
HOB: Head of Bed.

Motility Agents

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

Small Bowel Feeding

Recommendation:
Small bowel feeding compared to gastric feeding may be 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.

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.

Legend

Motility Agents in Those on EN with Feeds Interrupted Due to High Gastric Residual Volumes

Of ALL the patients that were EVER on EN (or EN + PN) and EVER had feeds interrupted due to high gastric residual volumes during the study period, the percentage that received motility agents.

Small Bowel Feeding in Those on EN with Feeds Interrupted Due to High Gastric Residual Volumes

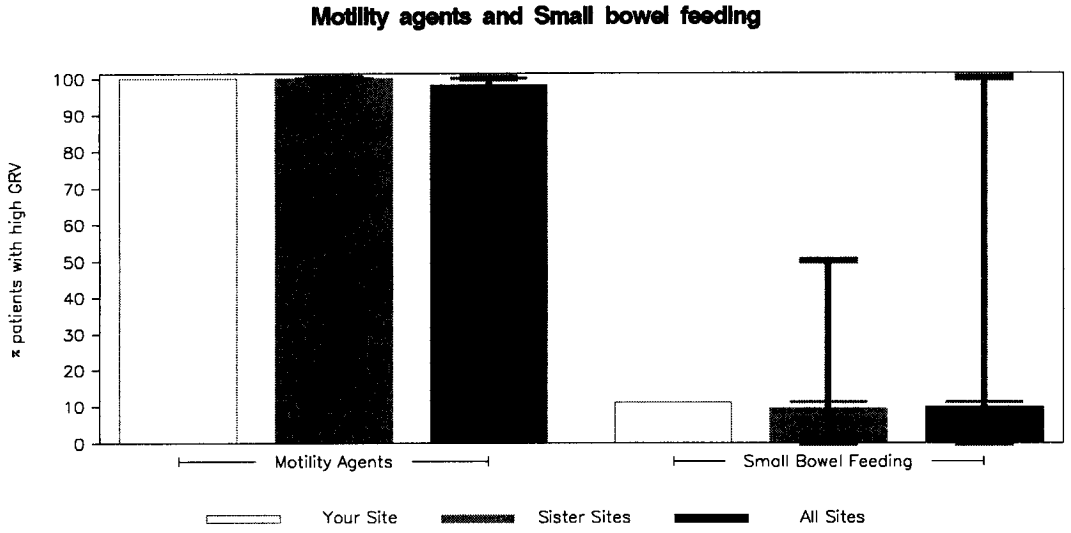
Of ALL the patients that were EVER on EN (or EN + PN) and EVER had feeds interrupted due to high gastric residual volumes during the study period, the percentage that received small bowel feeding.

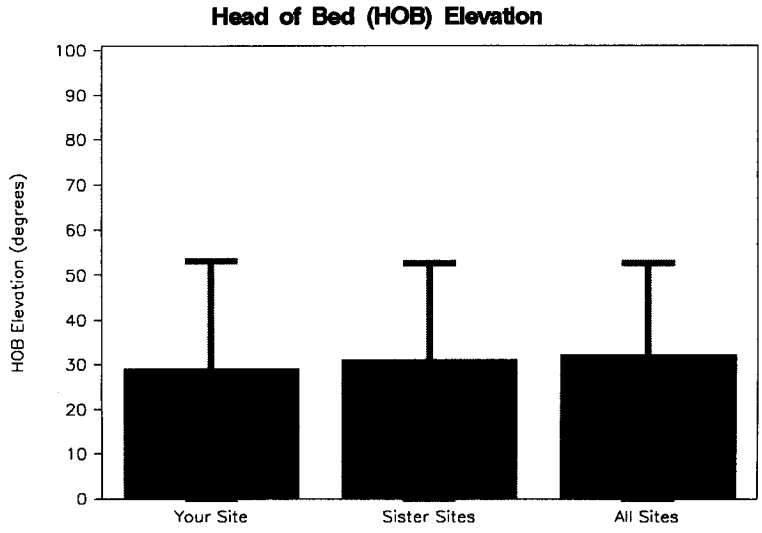
Body Position in Patients Receiving EN

Of ALL the patients that were EVER on EN (or EN + PN), the average of all the head of the bed elevation measurements.

Figure 4. Strategies to optimize delivery and minimize risks of EN

	Motility Agents			Small Bowel Feeding			HOB Elevation (degrees)		
Patients	Your Site	Sister Sites	All Sites	Your Site	Sister Sites	All Sites	Your Site	Sister Sites	All Sites
N	9	212	782	9	212	782	19	702	2439





Strategies to optimize benefits and minimize risks of PN

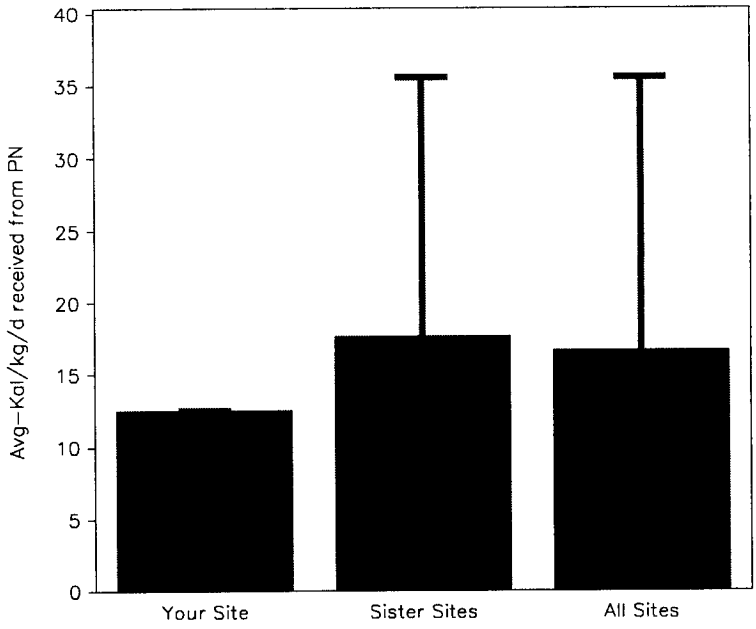
Dose of PN

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.

Legend
Calories Received from PN (Kcal/kg/day)
In those patients that were EVER on PN (or EN + PN), the average Kcals received from PN per kilogram per day.

Figure 5. Calories Received from PN (Kcal|Kg|Day)

Patients	Your Site	Sister Sites	All Sites
N	1	176	710



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 high in soybean oil should be considered. There are insufficient data to make a recommendation about withholding lipids high in soybean oil 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.

Table 10. Use of Lipids

Number of Patient-days on PN	**Your Site** n=11	**Sister Sites** n=1232	**All Sites** n=4906
Lipids received			
Lipid Free	11 (100%)	225 (18.3%)	1353 (27.6%)
Soybean oil based (LCTs)	0	1006 (81.7%)	2507 (51.1%)
MCT/LCT physical mixture	0	0 (0.0%)	334 (6.8%)
MCT/LCT structured form	0	0 (0.0%)	76 (1.5%)
Olive Oil based	0	0 (0.0%)	515 (10.5%)
Fish Oil based	0	0 (0.0%)	22 (0.4%)
Mixture of soy oil, MCTs, olive oil, and fish oil	0	0 (0.0%)	71 (1.4%)
Other	0	1 (0.1%)	28 (0.6%)

Legend

Type of PN: in those patients ever on PN (or EN+PN) the days on PN receiving specific type of lipids.

Intensive insulin therapy

Recommendation:
In surgical critically ill patients receiving nutrition support, intensive insulin therapy to tightly control blood sugars between 4.4-6.1mmol/l should be considered. There are insufficient data to make a recommendation regarding intensive insulin therapy in other critically ill patients. In all critically ill patients, we recommend avoiding hyperglycemia (blood glucose>10 mmol/l) by minimizing iv dextrose + using insulin administration when necessary.

Table 11. Glycemic Control Protocol

Number of Patient-days	Your Site n=196	Sister Sites n=7589	All Sites n=25036
Glycemic Control Protocol Yes		39 (81.3%)	127 (81.4%)
Target of Blood Glucose: Lower (mmol|l) mean (range)	4.0	4.5 (3.0-7.0)	4.6 (3.0-10.0)
Target of Blood Glucose: Upper (mmol|l) mean (range)	9.0	7.3 (5.1-12.0)	7.5 (5.1-15.0)
Morning Blood Glucose (mmol|l) mean (range)	8.0 (3.5-43.0)	7.5 (1.0-43.0)	7.3 (0.6-50.0)
Insulin Received (units) mean (range)	65.7 (1.0-374.0)	56.9 (0.2-697.0)	56.2 (0.2-1000)
Total Hypoglycemic Events n/N (PCT)	5/216 (2.3%)	313/8442 (3.7%)	978/27944 (3.5%)
Hypoglycemic Blood Glucose (mmol|l) mean (range)	3.3 (3.2-3.5)	2.9 (0.2-3.5)	2.9 (0.2-3.5)

Legend
Figure 6.1: Blood Glucose Levels
Average of all the morning blood sugars from ALL the patients on a daily basis EXCLUDING Day 1 after admission to the ICU.

Figure 6.2: Blood glucose levels (patient days with blood glucose > 10 mmol/l)
Of ALL patients the % of patient days with blood glucose > 10 mmol/l EXCLUDING Day 1 after admission to the ICU.

Figure 6.1 Blood Glucose Levels

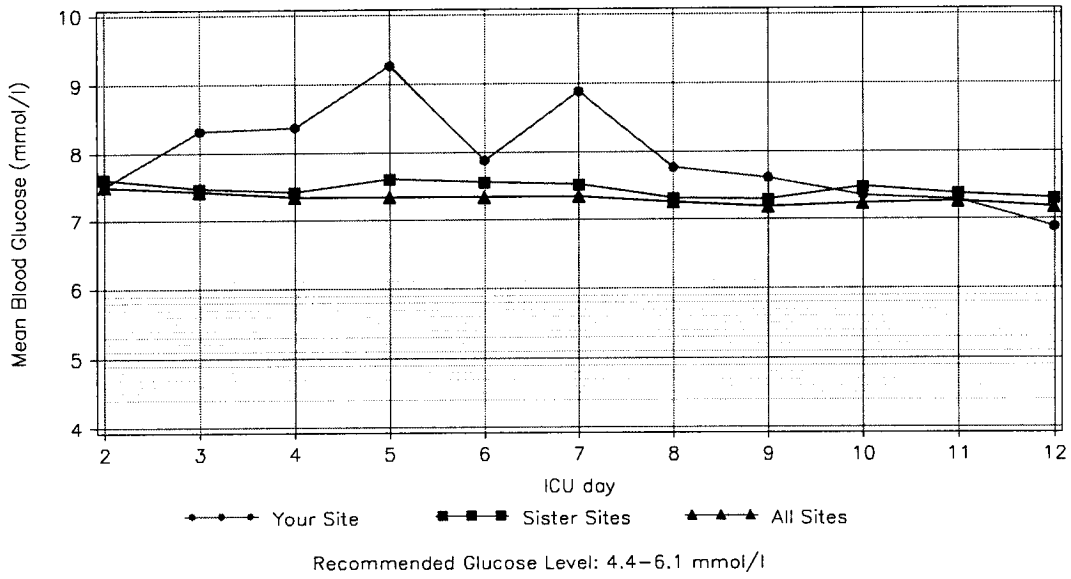
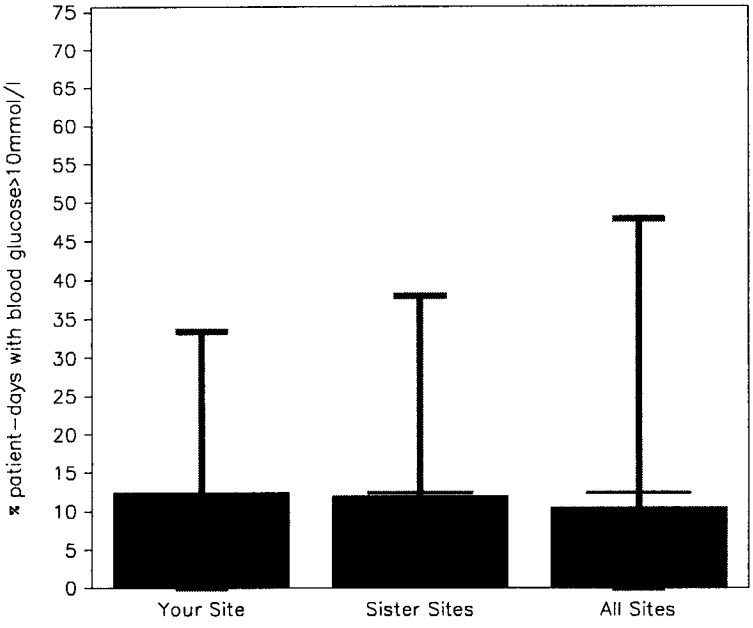


Figure 6.2. % Patient-days with blood glucose>10 mmol|l

Patient-days	Your Site	Sister Sites	All Sites
N	194	7152	23929



Disseminating the Results of Your Site Report

Your ICU has committed a significant amount of time to participate in the International Nutrition QI Project and receive this Site Report. We encourage you to use it as a unique benchmarking opportunity to highlight your strengths and weaknesses, and inform quality improvement initiatives.

The following are a few suggestions of useful forums from which to disseminate the site reports:
- Print off and copy the site report and distribute to key stakeholders.
- Meet with ICU management and/or Hospital administration.
- Lead a small group interactive workshop.
- Produce and post a poster outlining your main strengths and weaknesses and suggested changes.

Various resources designed to assist you in local dissemination of the site report are available under 'Tools and Training Kits' on the Critical Care Nutrition website (www.criticalcarenutrition.com).