



# International Nutrition QI Project 2007:

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## Clinical Nutrition Week

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# Objectives

At the end of the session participants will be able to:

- Name the purpose of the international survey
- Identify the regions of the world surveyed
- Identify 3 nutrition processes measured
- List 3 potential areas for improvement in nutrition practice in ICU's



# Purpose

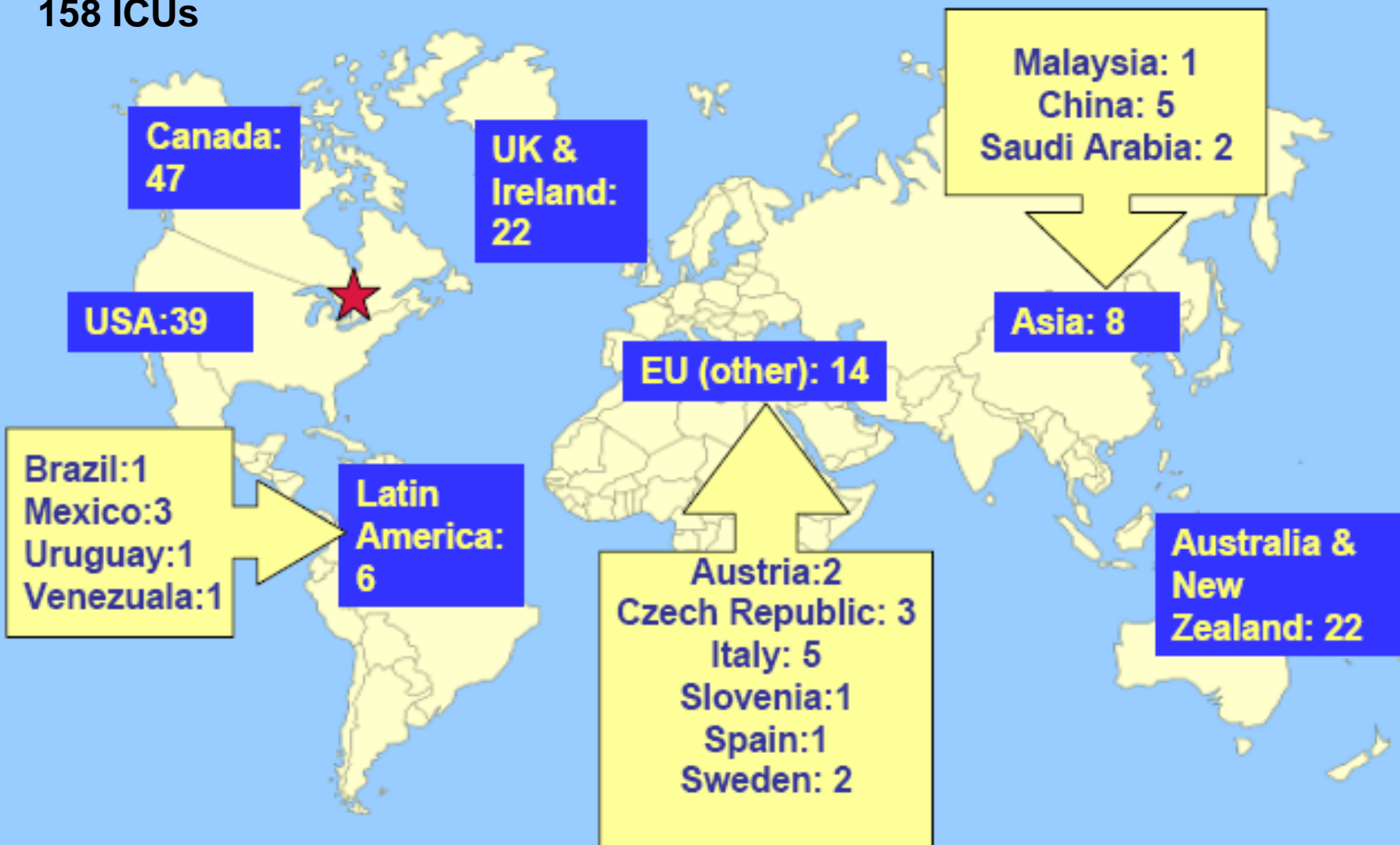
- To describe and compare nutrition practices
- To compare nutrition practices to the Canadian Nutrition Support Clinical Practice Guidelines
- To identify opportunities for improvement
- Illuminate research opportunities





# Who participated?

158 ICUs





# Who participated? Patients

- Number of patients per site
  - 18.9 (9-40)
- Total number of patients
  - 2946
- Days of observation per patient
  - 9.5 (1-12)
- Total number of patient days in ICU
  - 27944 days
- <3% missing data for ALL variables





# ICU Characteristics

| Number of ICUs                                       | USA<br>n=39    | Total<br>n=158 |
|--|----------------|----------------|
| <b>Hospital Type</b>                                 |                |                |
| Teaching   | 30 (76.9%)     | 122 (77.7%)    |
| Non-teaching   | 9 (23.1%)      | 35 (22.3%)     |
| <b>Size of Hospital (beds)</b>                       |                |                |
| mean (range)   | 558 (176-1171) | 638 (138-4000) |
| <b>Multiple ICUs in Hospital</b>                     |                |                |
| Yes  | 30 (76.9%)     | 80 (50.6%)     |
| No   | 9 (23.1%)      | 78 (49.4%)     |
| <b>ICU Structure</b>                                 |                |                |
| Open   | 21 (53.8%)     | 30 (19%)       |
| Closed   | 18 (46.2%)     | 125 (79.1%)    |
| Other  | 0 (0%)         | 3 (1.9%)       |
| <b>Presence of Medical Director</b>                  |                |                |
| Yes  | 34 (87.2%)     | 148 (93.7%)    |
| No   | 5 (12.8%)      | 10 (6.33%)     |
| <b>Size of ICU (beds)</b>                            |                |                |
| mean (range)   | 23 (10-75)     | 17 (4-75)      |
| <b>Presence of Dietitian(s)</b>                      |                |                |
| Yes  | 39 (100%)      | 134 (84.8%)    |
| No   | 0 (0%)         | 24 (15.2%)     |
| <b>Full Time Equivalent Dietitians (per 10 beds)</b> |                |                |
| mean (range)   | 0.4 (0.1-0.9)  | 0.4 (0.1-1.7)  |



# Patient Characteristics

| Number of Patients                             | USA<br>n=730      | Total<br>n=2946   |
|--|-------------------|-------------------|
| <b>Number of Patients (per site)</b>           |                   |                   |
| mean (range)                                   | 18.7 (9.0-26.0)   | 18.6 (9.0-26.0)   |
| <b>Age (years)</b>                             |                   |                   |
| mean (range)                                   | 58.9 (17-99)      | 59.7 (12-99)      |
| <b>Sex</b>                                     |                   |                   |
| Female   | 299 (41%)         | 1217 (41.3%)      |
| Male   | 431 (59%)         | 1729 (58.7%)      |
| <b>Admission Category</b>                      |                   |                   |
| Medical  | 425 (58.2%)       | 1785 (60.6%)      |
| Surgical: Elective                             | 98 (13.4%)        | 419 (14.2%)       |
| Surgical: Emergency                            | 207 (28.4%)       | 741 (25.2%)       |
| <b>Apache II Score</b>                         |                   |                   |
| mean (range)                                   | 22.0 (1-50)       | 21.5 (1-50)       |
| <b>Presence of ARDS</b>                        |                   |                   |
| Yes  | 112 (15.3%)       | 379 (12.9%)       |
| No   | 618 (84.7%)       | 2565 (87.1%)      |
| <b>Length of ICU Stay (days)</b>               |                   |                   |
| median [IQR]                                   | 9.7 [5.9-16.1]    | 10.5 [6.2-18.5]   |
| <b>Length of Hospital Stay (days)</b>          |                   |                   |
| median [IQR]                                   | 17.7 [12.7-30.3]  | 23.3 [14.1-37.1]  |
| <b>Length of Mechanical Ventilation (days)</b> |                   |                   |
| median [IQR]                                   | 6.8 [3.4-12.4]    | 7.5 [3.6-15.8]    |
| <b>Patient Died (within 60 days)</b>           |                   |                   |
| Yes  | 183 (27.4%)       | 803 (29.3%)       |
| No   | 486 (72.6%)       | 1933 (70.7%)      |
| <b>BMI (kg/m<sup>2</sup>)</b>                  |                   |                   |
| mean (range)                                   | 29.3 (12.5-102.0) | 27.5 (12.5-102.0) |



# Overall Performance

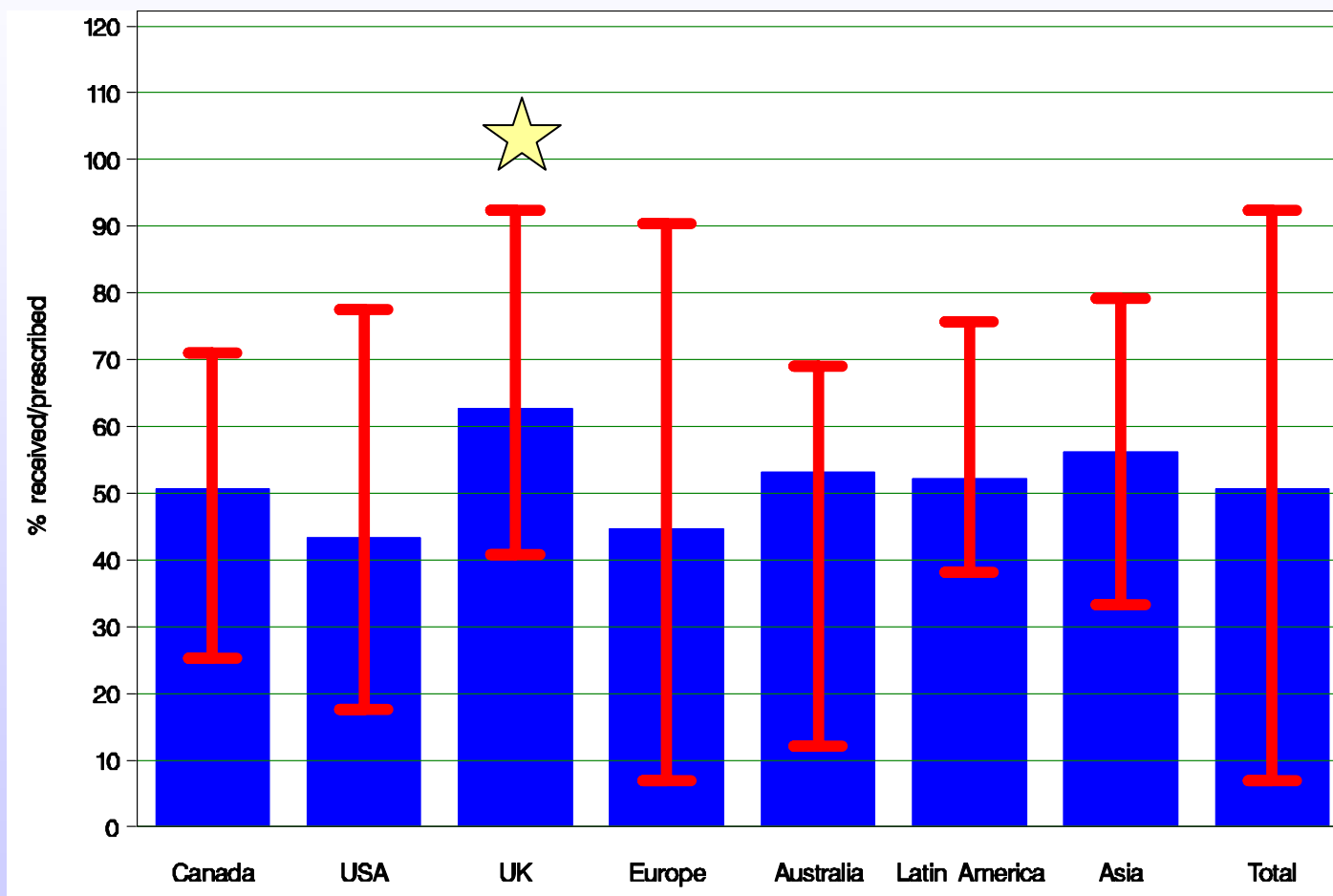
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Adequacy of Nutrition Support =

$$\frac{\text{Calories received from EN \& appropriate PN \& Propofol}}{\text{Calories prescribed}} \times 100$$

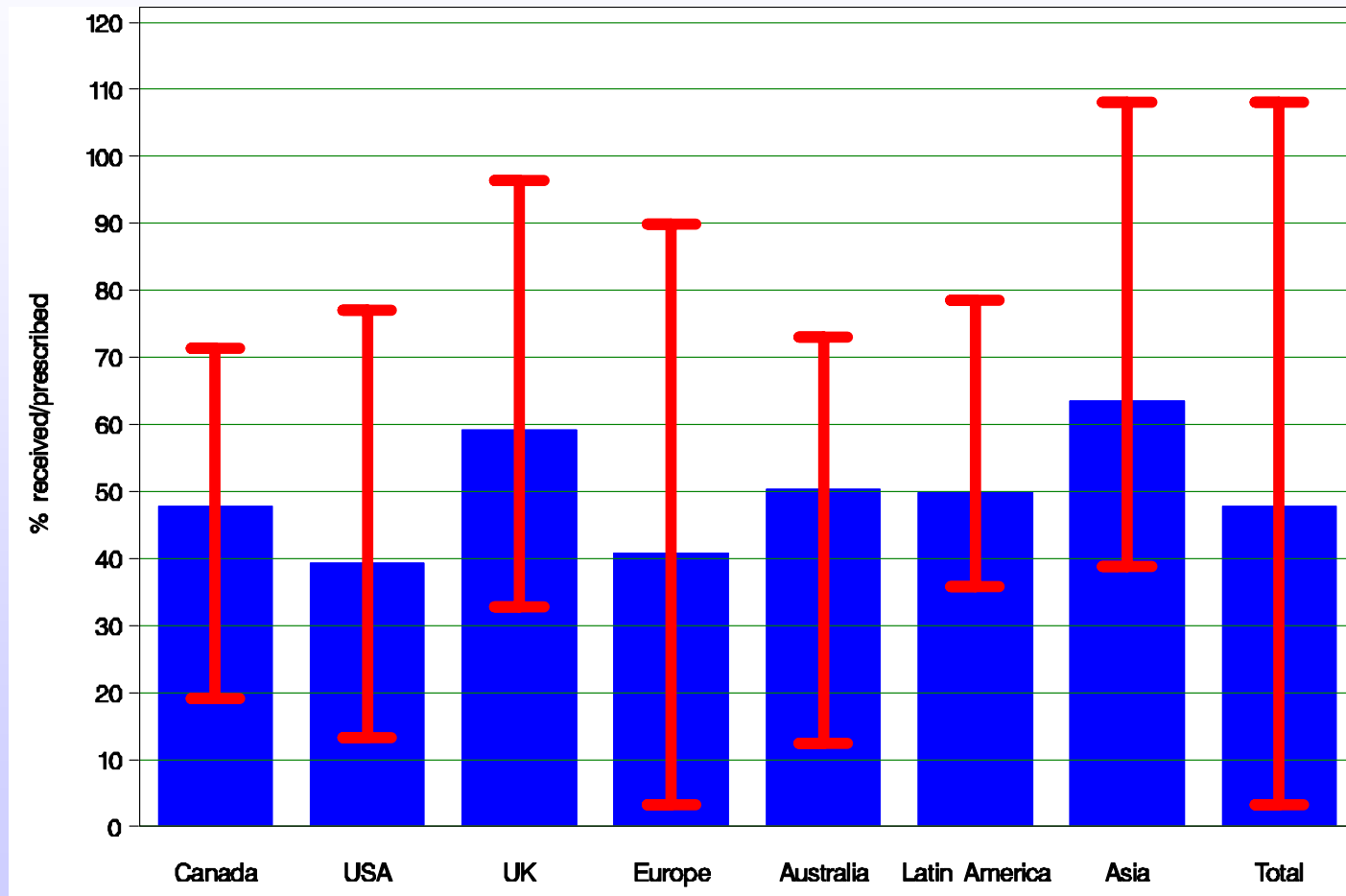


# Overall Performance: Kcals



**Average 50.7% (6.9-92.4%),  
Highest = UK (62.7%) Lowest = USA (43.4%)**

# Overall Performance: Protein

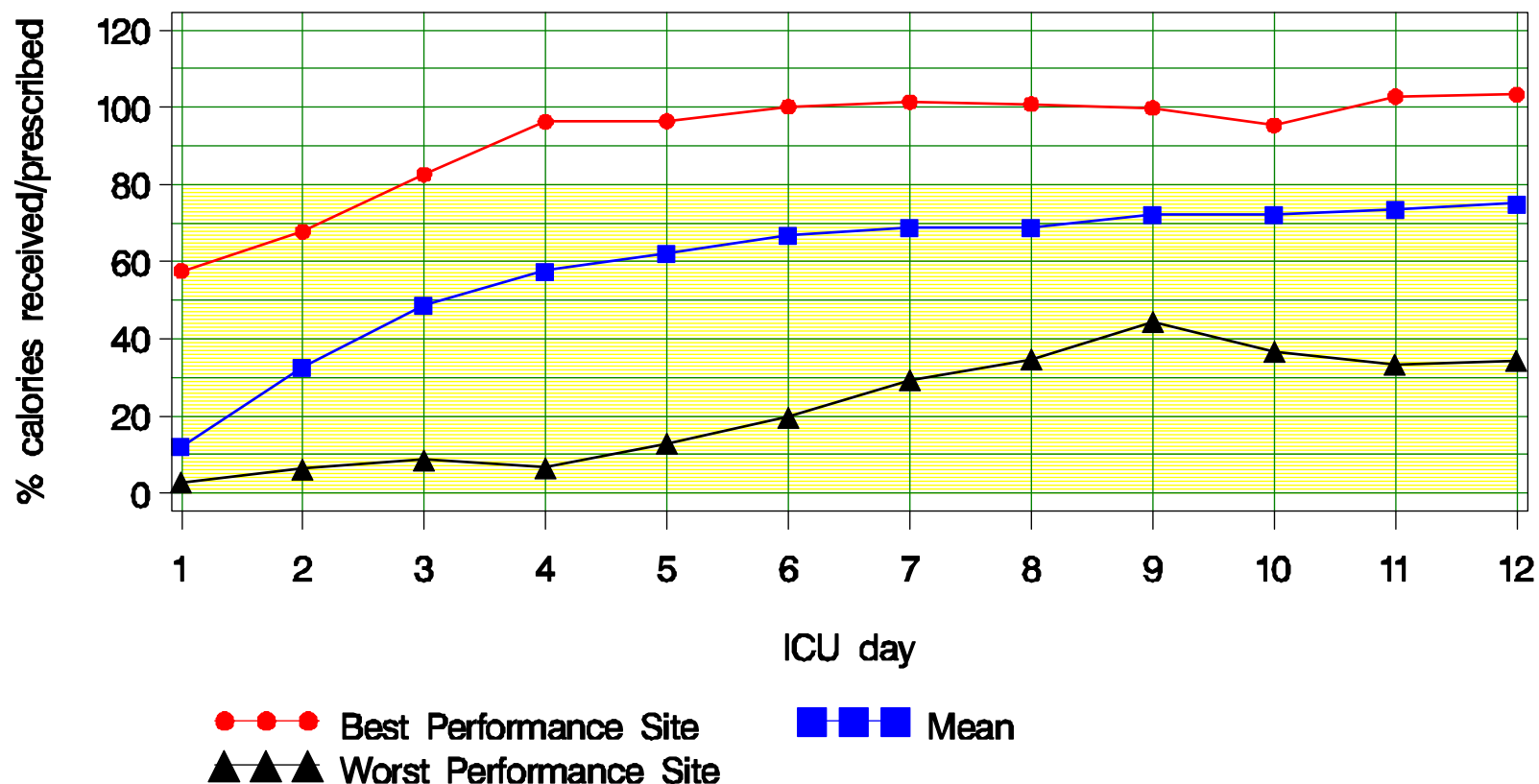


**Average 47.7% (3.3-108%)**

**Highest = Asia (63.5%). Lowest=USA (39.3%).**

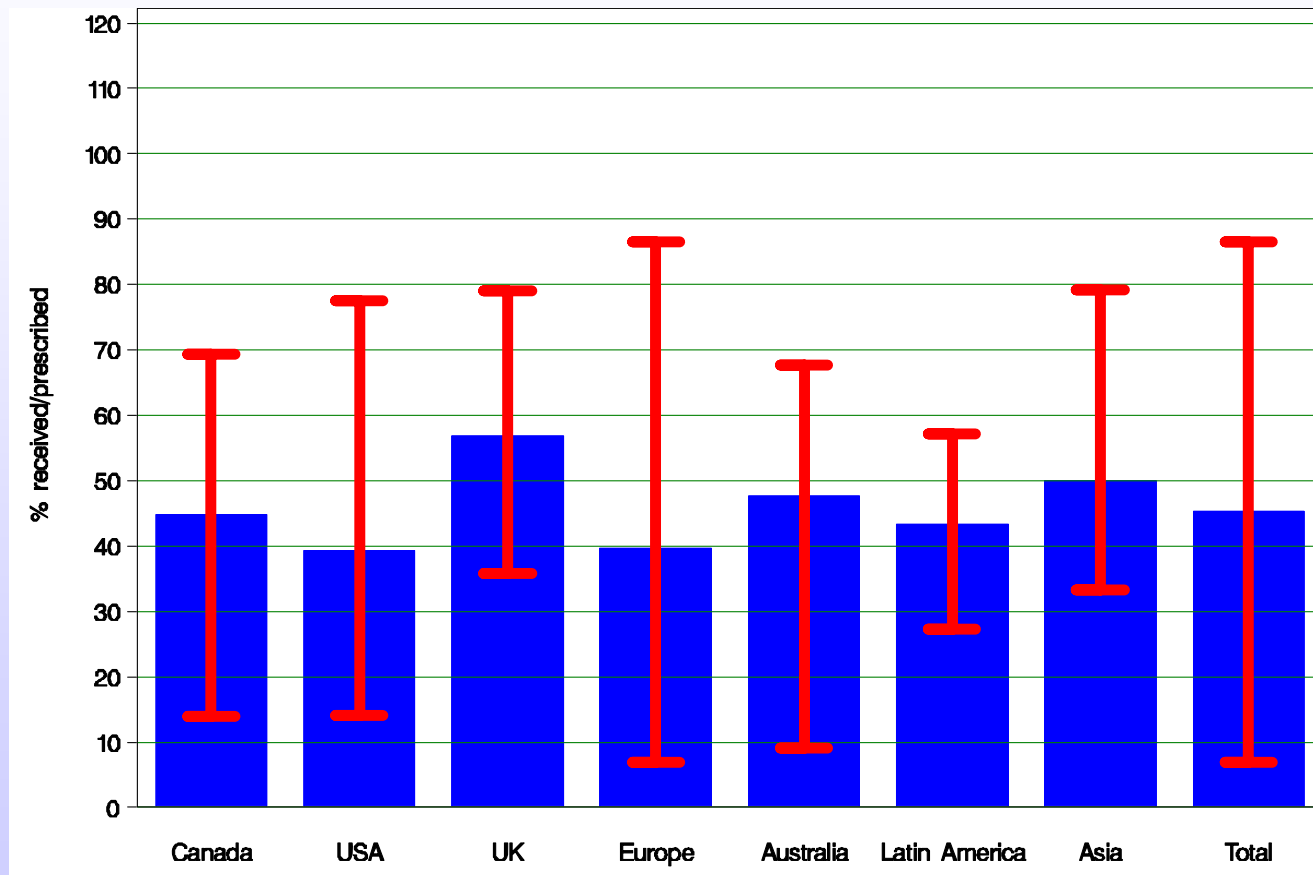


# Overall Performance: Kcals





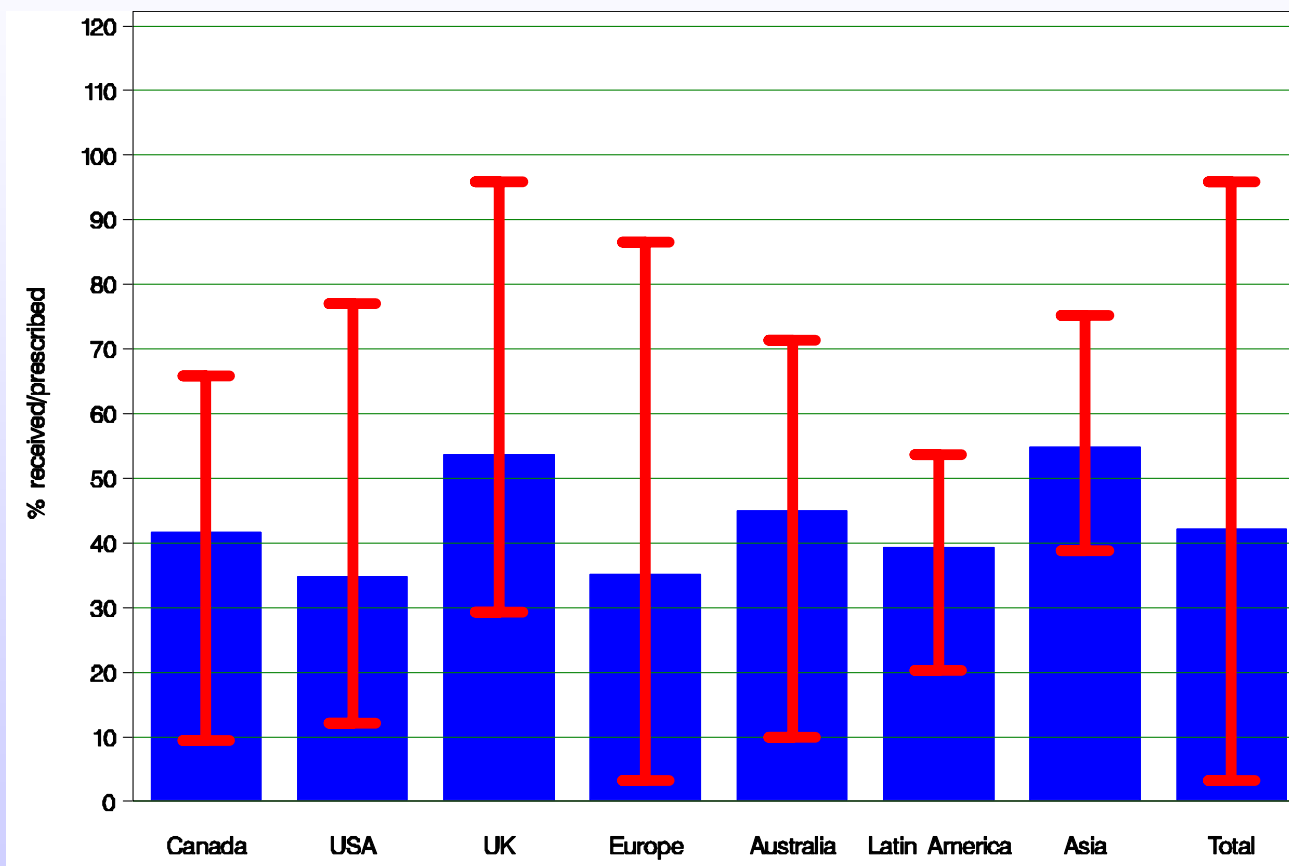
# Adequacy of EN: Kcals



**Average 45.3% (6.9-86.5%),  
Highest = UK (56.8%) Lowest = USA (39.8%)**



# Adequacy of EN: Protein

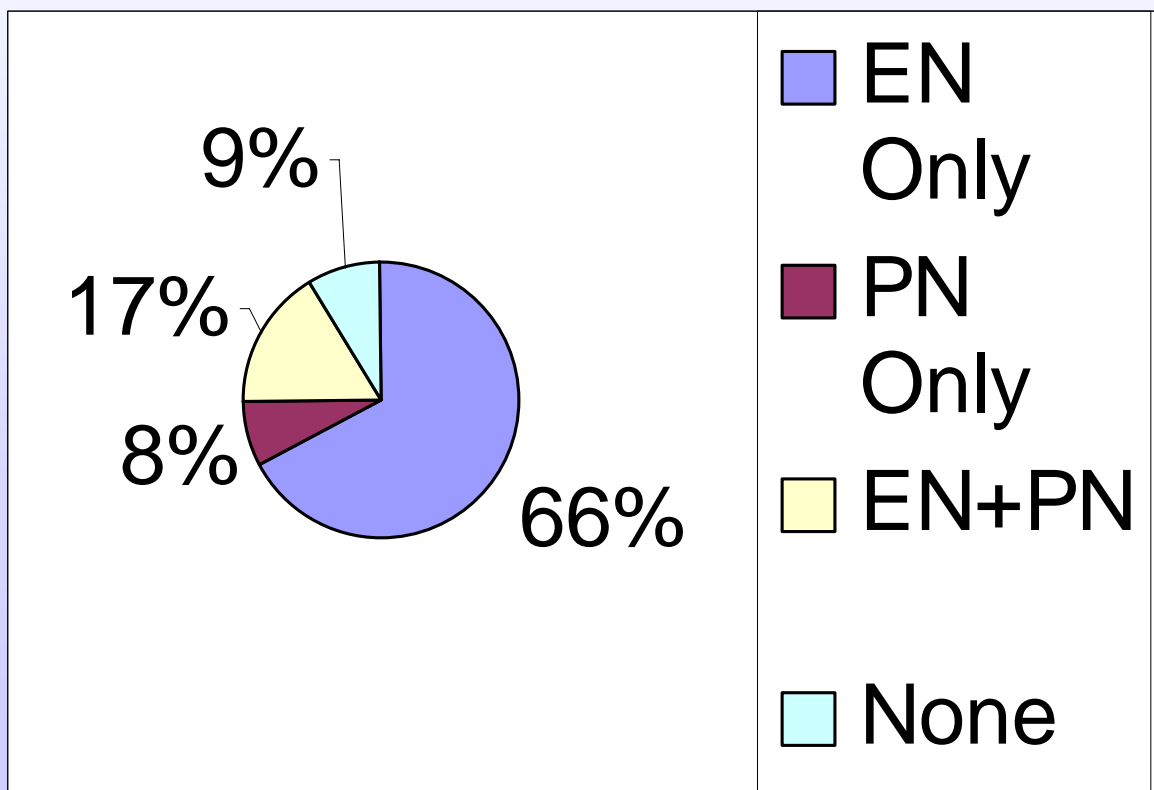


**Average 42.1% (3.3-95.9%),  
Highest = UK (54.7%) Lowest = USA (34.8%)**



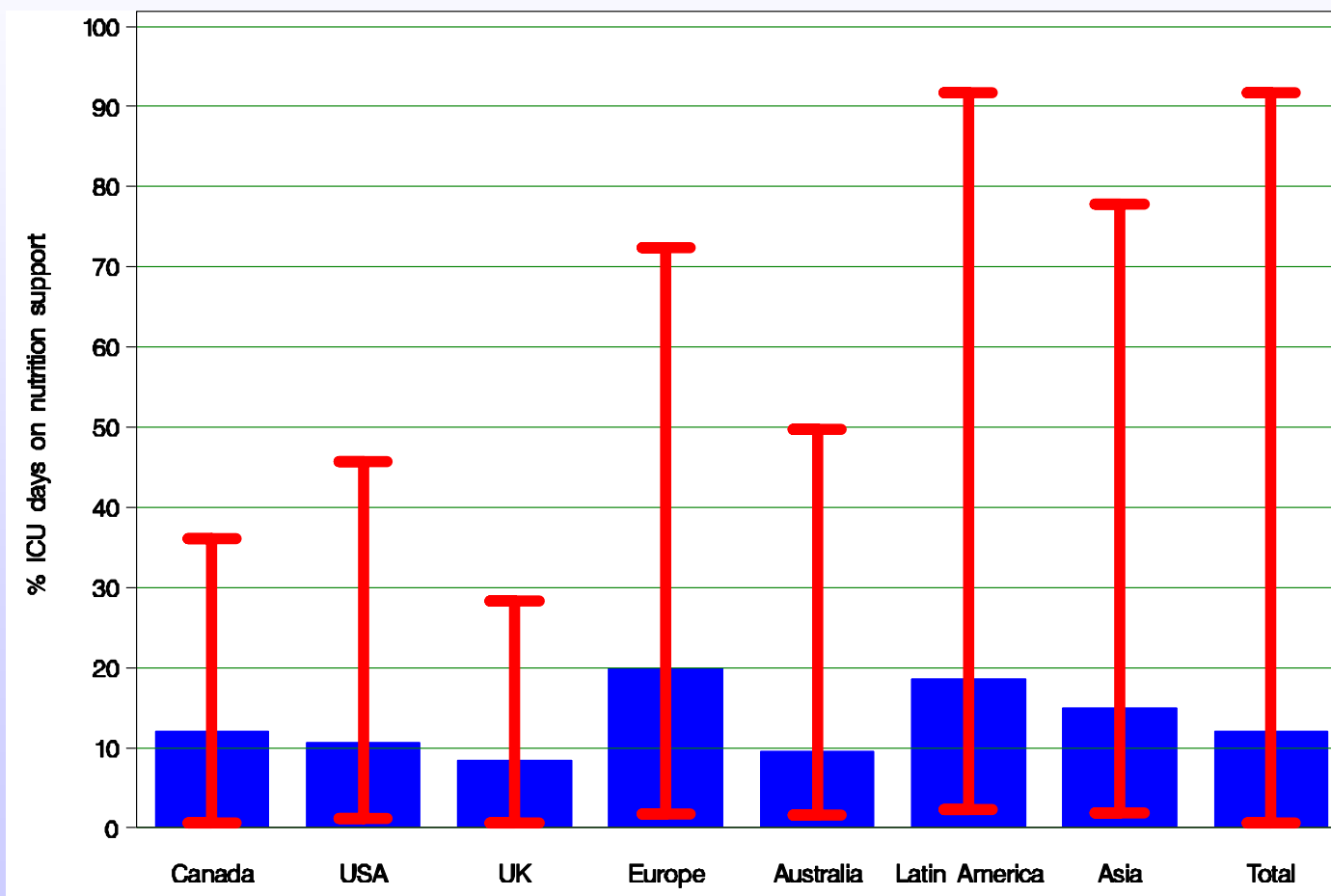
# Type of Nutrition Support

“We strongly recommend the use of EN over PN”





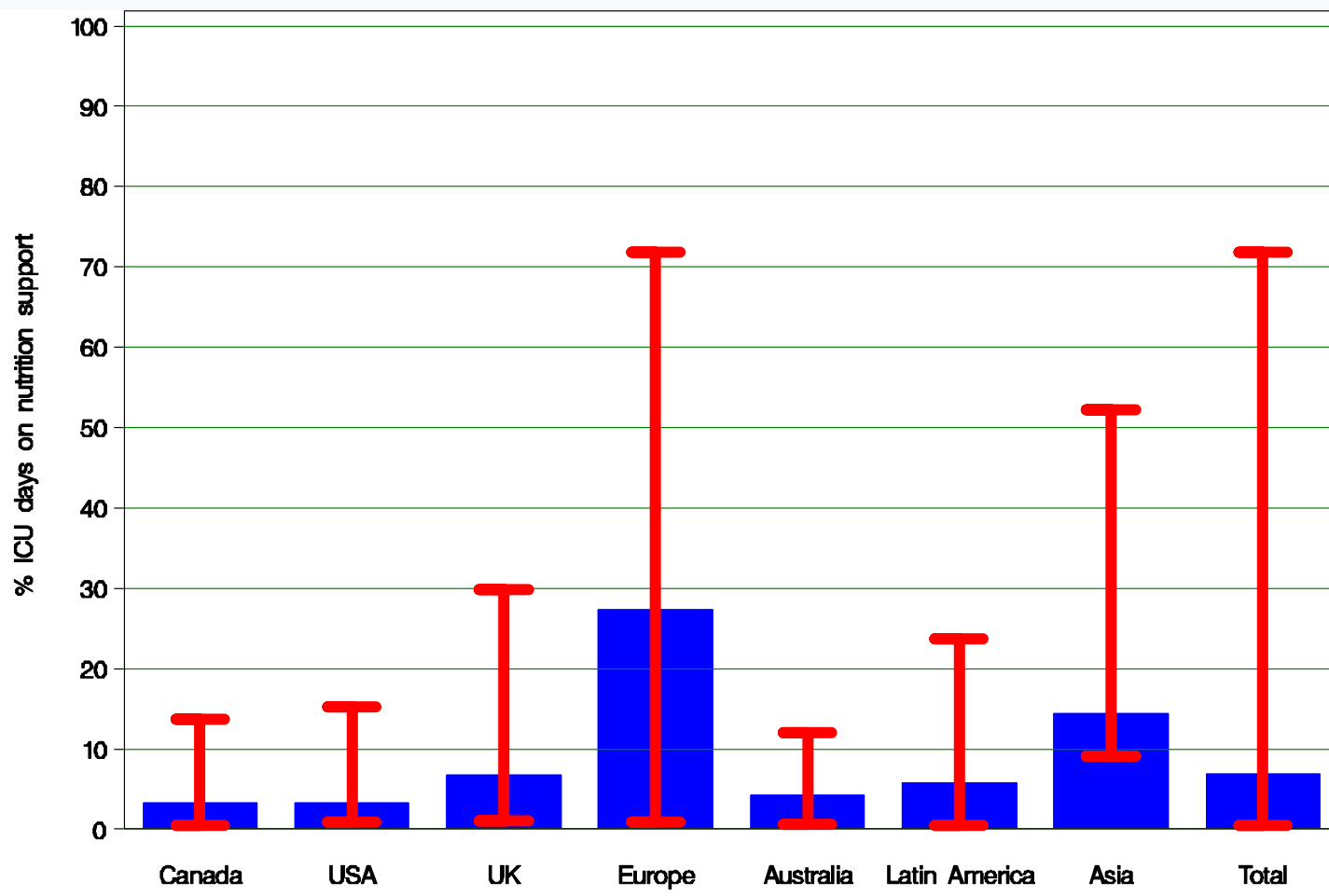
# Type of Nutrition Support: PN Only



**Highest in Europe = 12.6% Patients and 19.8% patient days**



# Type of Nutrition Support: EN + PN

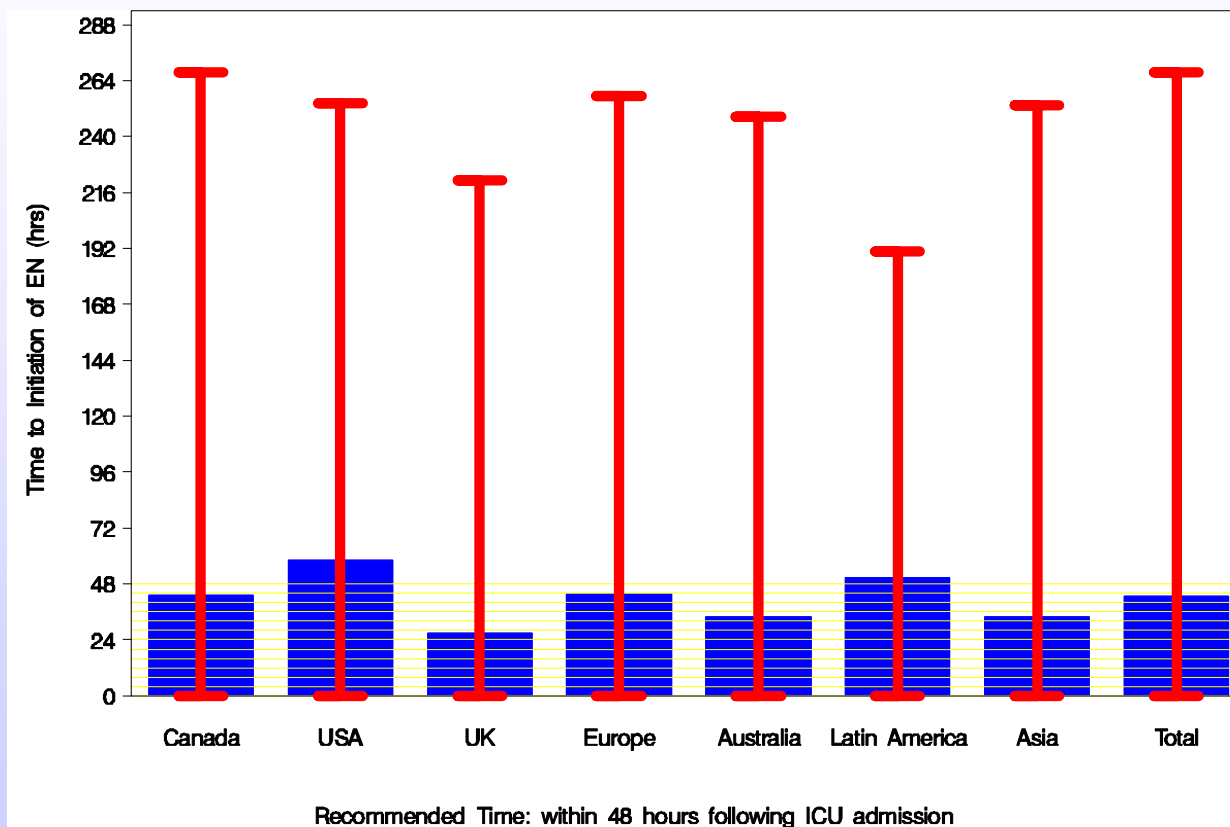


Highest in Europe = 49% Patients and 27.4% patient days



# Early vs Delayed EN

We recommend early EN (within 24-48 hours following admission)



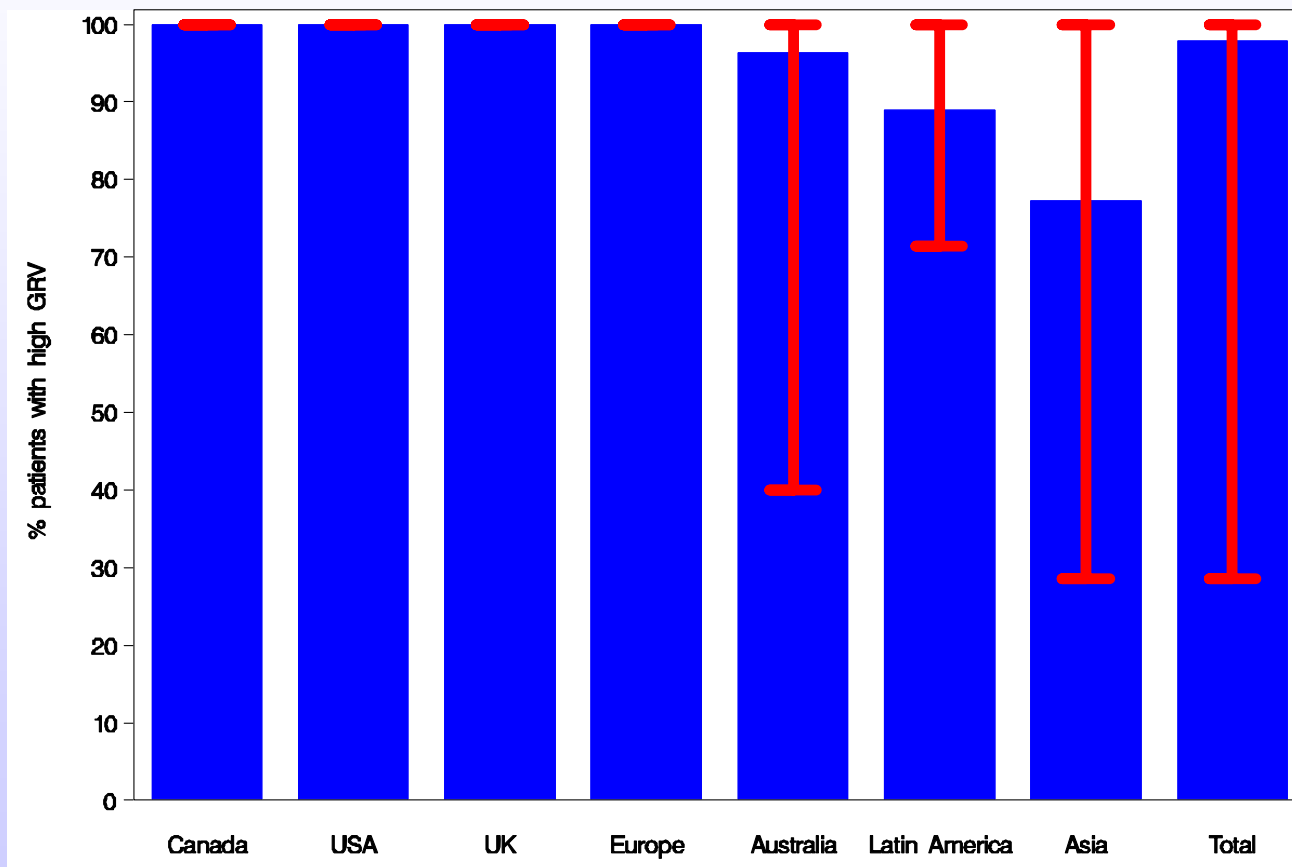
**Mean time to start of EN was 41.2 hours (range 0-267.3).**

**Mean time to start of EN in USA was 59.6hrs**

**A total of 63.9% of patients (49.6% in USA) were started on EN within 48 hrs.**



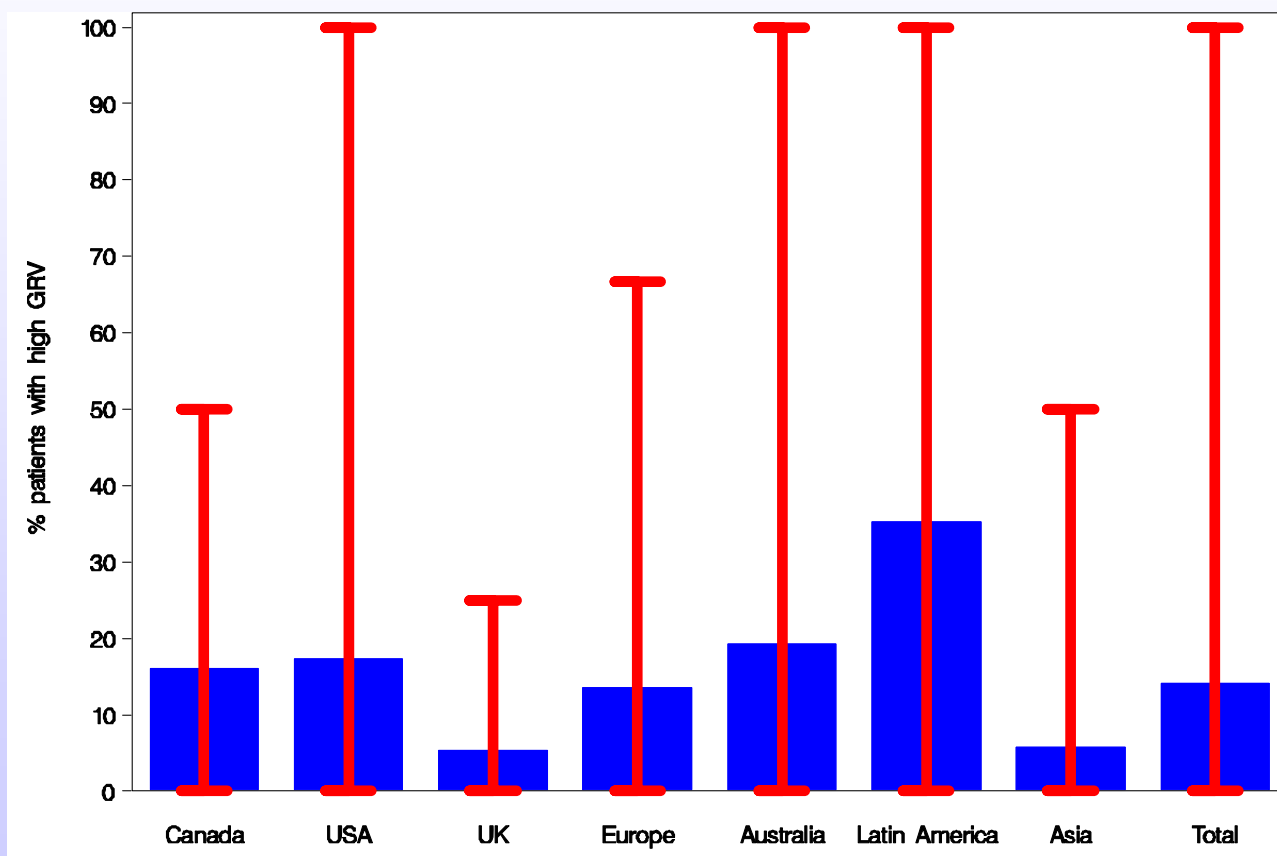
# Strategies to Optimize EN Delivery: Motility Agents



**Of patients with high gastric residual volumes, 98% received motility agents**



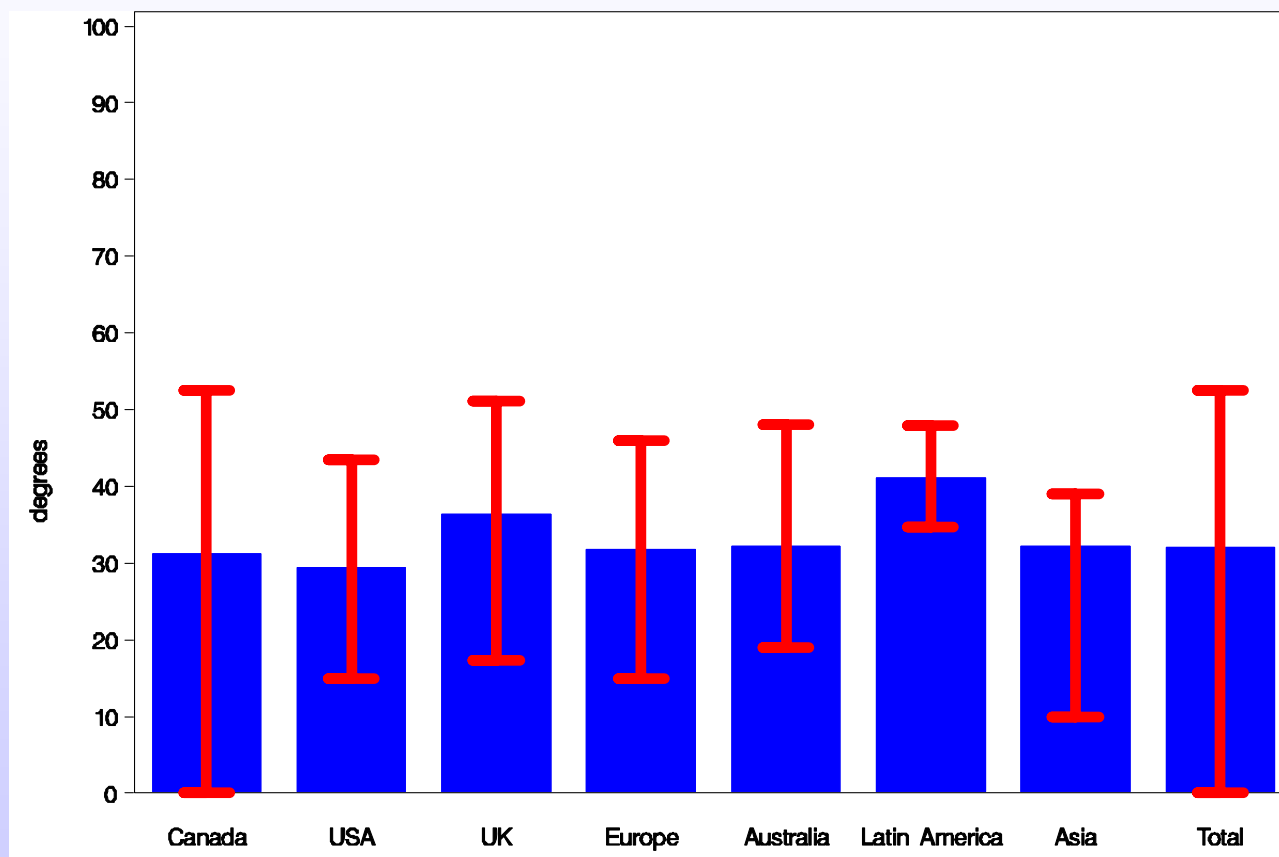
# Strategies to Optimize EN Delivery: Small Bowel Feeding



**Overall, 14.3% (range (0-100%)) of patients with high gastric residual volumes received small bowel feeding. Average in USA was 16.8% of patients.**



# Strategies to Optimize EN: Head of Bed Elevation



**Average HOB elevation was 32 (0-52) degrees.  
In USA, average was 29.4 degrees.**



# Composition of Nutrition Support

Total % Patients Ever on EN receiving formula

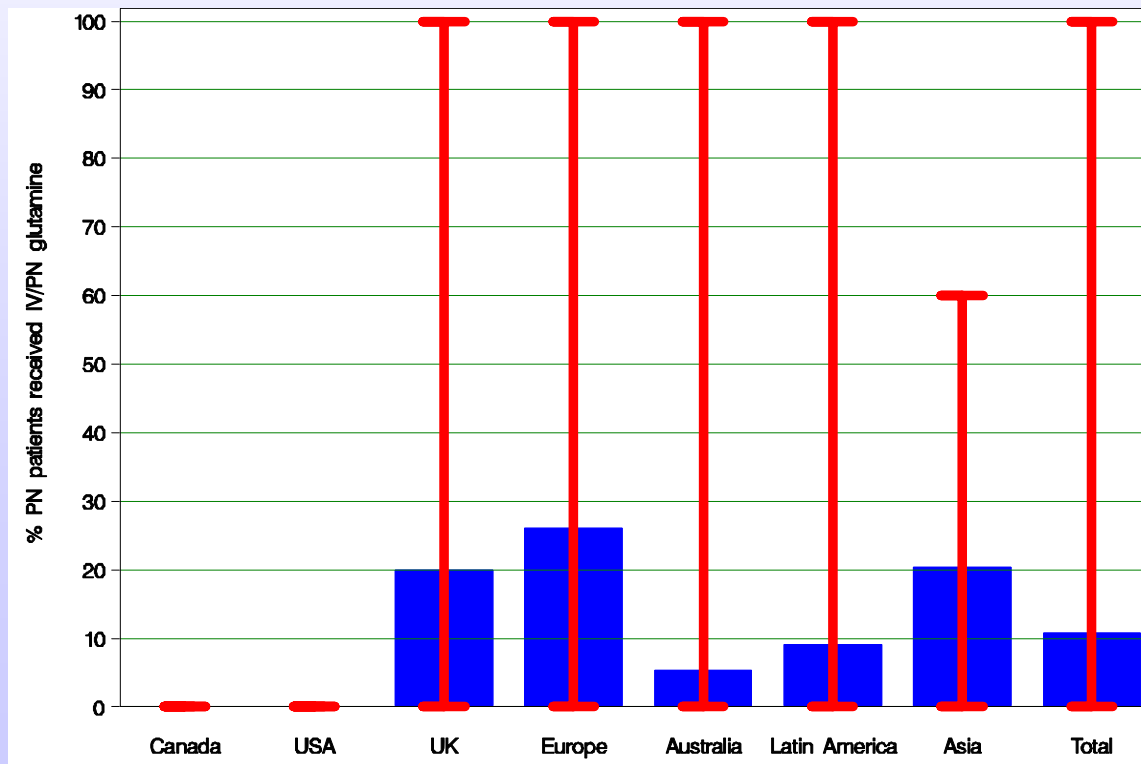
|                     | USA               | All Sites         |
|---------------------|-------------------|-------------------|
| Polymeric Formula   | 99.1% (83.3-100%) | 99.3% (78.9-100%) |
| Arginine Enriched   | 13.3% (0.0-92.3%) | 5.2% (0.0-92.3%)  |
| Fish Oil containing | 2.1% (0.0-20.0%)  | 1.5% (0.0-40.0%)  |
| Fish Oils in ARDS   | 5.0% (0.0-100%)   | 4.5% (0.0-100%)   |



# Composition of Nutrition Support

Of all the patients, 5.9% (0-100%) received glutamine supplementation  
In USA, 5.2% (0-60%) received glutamine supplementation

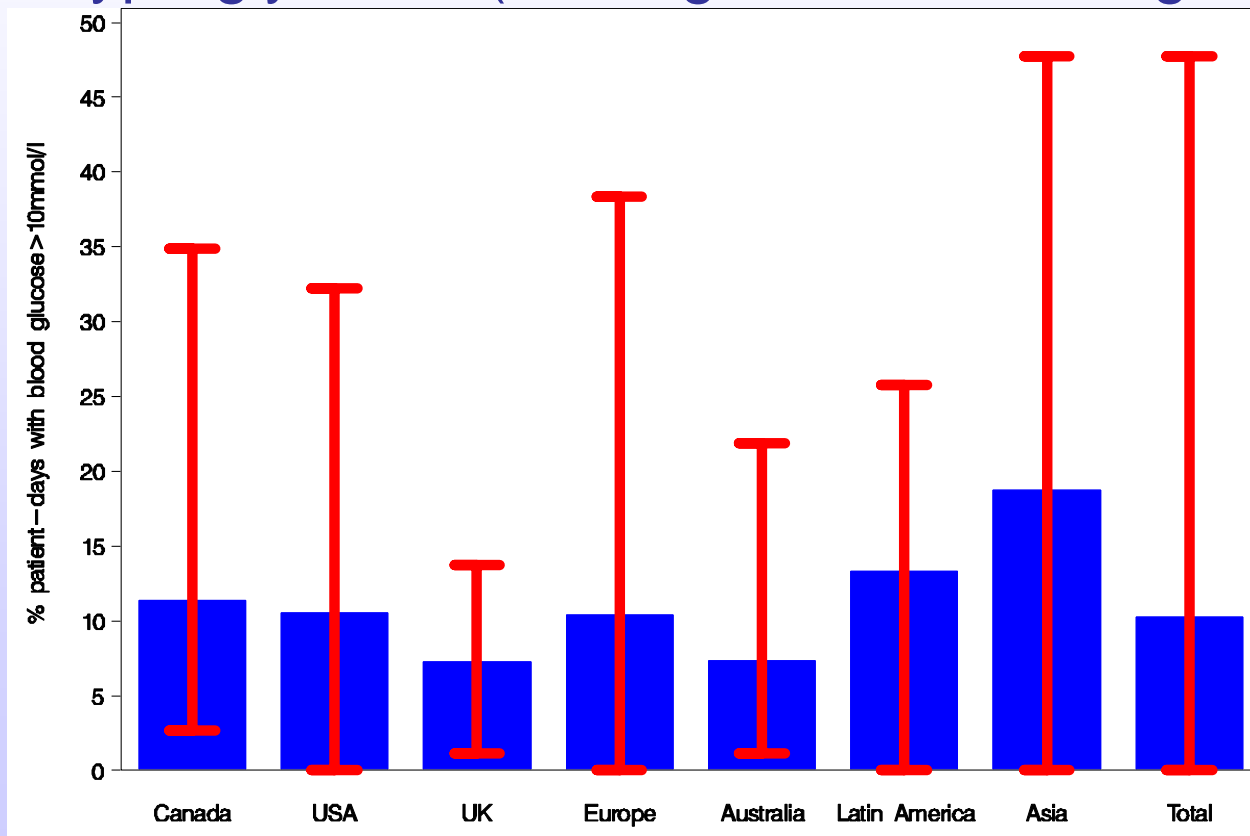
Use of PN glutamine in Patients receiving PN = 10.8%





# Intensive Insulin Therapy

In all critically ill patients, we recommend avoiding hyperglycemia (blood glucose > 180 mg/dl)



Mean morning glucose level was 7.3 (6.8-8.1) mmol/l

Overall, patients were hyperglycemic on 10.7 % (0-47.8%) of patient days



# Summary of Results

## Strengths:

- Limited and appropriate use of PN and arginine enriched formulas
- Use of motility agents is high
- Glycemic control is adequate

## Weaknesses:

- Patients are not receiving adequate amounts of enteral nutrition
- Slow to start enteral nutrition (35% >48 hours)
- Low utilization of small bowel feeding
- Limited use of fish oil containing formulas
- Limited use of glutamine
- Soybean oil based lipids are not being withheld from PN



# Future Research

- Survey of Attitudes towards the Canadian Nutrition Support Clinical Practice Guidelines
- Tailored approach to guideline implementation
  - Development of screening questionnaire and educational toolkit
  - ? Future Cluster Randomized Controlled Trial



**Critical Care  
Nutrition**

International QI Project  
2008 !!



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Thank you