



## Complete Summary

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### GUIDELINE TITLE

Evidence-based guidelines for nutritional support of the critically ill: results of a Bi-National Guideline Development Conference.

### BIBLIOGRAPHIC SOURCE(S)

Doig GS. Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Carlton (Australia): Australian and New Zealand Intensive Care Society (ANZICS); 2005. 282 p. [387 references]

### GUIDELINE STATUS

This is the current release of the guideline.

## COMPLETE SUMMARY CONTENT

SCOPE  
METHODOLOGY - including Rating Scheme and Cost Analysis  
RECOMMENDATIONS  
EVIDENCE SUPPORTING THE RECOMMENDATIONS  
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS  
CONTRAINDICATIONS  
QUALIFYING STATEMENTS  
IMPLEMENTATION OF THE GUIDELINE  
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES  
IDENTIFYING INFORMATION AND AVAILABILITY  
DISCLAIMER

## SCOPE

### DISEASE/CONDITION(S)

Critical illness that would normally or usually require care in an intensive care unit

### GUIDELINE CATEGORY

Assessment of Therapeutic Effectiveness  
Management

### CLINICAL SPECIALTY

Critical Care  
Nutrition

## **INTENDED USERS**

Advanced Practice Nurses  
Dietitians  
Nurses  
Physician Assistants  
Physicians

## **GUIDELINE OBJECTIVE(S)**

To develop or update and validate an evidence-based feeding guideline for critically ill patients

## **TARGET POPULATION**

Critically ill patients who would normally or usually be cared for in an intensive care unit for two days or longer

## **INTERVENTIONS AND PRACTICES CONSIDERED**

1. Enteral nutrition vs. standard care
2. Early enteral nutrition (<24 hours) vs. delayed enteral nutrition
3. Parenteral nutrition compared to standard care
4. Parenteral nutrition compared to enteral nutrition
5. Parenteral nutrition compared to early enteral nutrition (<24 hours)
6. Parenteral nutrition compared to delayed enteral nutrition
7. Gastric vs. post-pyloric enteral nutrition.
8. Use of prokinetics
9. Enteral nutrition and parenteral nutrition compared to enteral nutrition alone
10. Enteral nutrition supplemented with arginine compared to standard enteral nutrition (*considered but no recommendation made*)
11. Enteral nutrition supplemented with arginine vs parenteral nutrition (*considered but no recommendation made*)
12. Parenteral nutrition with glutamine vs. standard parenteral nutrition
13. Enteral nutrition with glutamine vs. standard enteral nutrition
14. Hypocaloric (Dose) of parenteral nutrition
15. Parenteral nutrition composition - Branched Chain Amino Acid (BCAA) content: High BCAA (>40%) vs. Low (<27%) content (*considered but no recommendation made*)

## **MAJOR OUTCOMES CONSIDERED**

Mortality

## **METHODOLOGY**

## **METHODS USED TO COLLECT/SELECT EVIDENCE**

Hand-searches of Published Literature (Primary Sources)  
Hand-searches of Published Literature (Secondary Sources)  
Searches of Electronic Databases

## **DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE**

An extensive literature search was conducted for controlled trials of feeding interventions conducted in critically ill patients. Terms were also specified to identify methodologically rigorous guidelines, overviews, and meta-analyses. A complete listing of search terms is available from the guideline developer on request. On-line searching of Medline and EMBASE, and hand searching the reference lists of retrieved review papers, was undertaken. Recognised experts and industry were contacted for additional references. The final close-out date for this search process was April 2003.

Medline was searched using the PubMed search engine from 1966 to April 2003. EMBASE was searched using OVID from 1980 to April 2003.

The reference lists of several review articles were hand searched. For a complete list see the original guideline document.

Although the literature search itself was not limited to the identification of non-English language publications, the review process focused on English language publications only. Similarly, only studies published full-paper format that could be adequately critically appraised were considered for review.

## **NUMBER OF SOURCE DOCUMENTS**

The Medline/EMBASE search retrieved 2,287 abstracts. Independent review of all abstracts identified approximately 465 papers that may have been controlled trials or review papers on the topic of interest. All 465 papers were retrieved. Review of these 465 papers identified 337 primary studies that evaluated feeding interventions. Detailed review or critical appraisal of the 337 identified primary studies revealed 111 primary feeding studies that were conducted in critically ill patients and reported clinically meaningful outcomes. All 111 were appraised in detail to determine validity.

In addition the literature search identified one evidence-based guideline for nutritional support in the intensive care unit that had previously been validated in a cluster randomised trial.

## **METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE**

Weighting According to a Rating Scheme (Scheme Given)

## **RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE**

### **Levels of Evidence**

**Level I:** adequately powered\* (low false +ve or false -ve), well conducted trials

**Level II:** small, under-powered (high false +ve and false -ve), well conducted trials

**Level III\*\*:** non-randomised concurrent (contemporary) controls

**Level IV\*\*:** non-randomised historical controls

**Level V\*\*:** case series without controls

\*The guideline developers defined power as a measure of the probability that a clinical trial will detect a treatment effect of a given magnitude (X), under the assumption that the treatment effect actually exists. To qualify as a Level I trial (adequately powered), the trialists must have established that it was plausible to assume that the treatment effect of magnitude X actually existed. Data from earlier trials is the best way to establish the plausibility of the magnitude of the expected treatment effect (Halpern, S.D., Karlawish, J.H., and Berlin, J.A. [2002]. The continuing unethical conduct of underpowered clinical trials. *JAMA* 288, 358-362).

\*\* These Levels of Evidence were not considered at this guideline conference.

## **METHODS USED TO ANALYZE THE EVIDENCE**

Meta-Analysis of Randomized Controlled Trials  
Review of Published Meta-Analyses  
Systematic Review

## **DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE**

Fixed effects meta-analysis using the odds ratio metric. Heterogeneity was assessed using the  $I^2$  method.

## **METHODS USED TO FORMULATE THE RECOMMENDATIONS**

Expert Consensus (Consensus Development Conference)

## **DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS**

The evidence-based guidelines development meeting was conducted in accordance with the methodology outlined in Browman's Practice Guideline Development Cycle (PGDC). The PGDC is an explicit process that has been validated for the generation, implementation, and evaluation of evidence-based clinical practice guidelines (see Table 1 in the original guideline document). The PGDC process is employed by Cancer Care Ontario ([www.cancercare.on.ca](http://www.cancercare.on.ca)) to develop patient and practitioner-level evidence-based guidelines.

In short, the PGDC requires the generation of a series of *systematic reviews* covering optimally effective approaches to the diagnosis and treatment of a specific condition. These reviews are synthesised from the best available evidence and then graded to result in *evidence-based recommendations* (EBRs). The EBRs are formally augmented with expert opinion and customised to local settings before being implemented as guidelines.

In advance of the meeting: an extensive literature review was undertaken; all randomized controlled trials were critically appraised for methodological quality; overviews of focused clinical questions were compiled leading to evidence-based recommendations for optimally effective techniques; reprints and summaries of each trial were circulated.

At the meeting; evidence-based recommendations were reviewed and ratified and guideline statements compiled.

## **RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS**

### **Grades of Recommendations**

**A+**: More than one well conducted, adequately powered randomized controlled trial (RCT) with consistent results between studies (no heterogeneity), Level of Evidence Required: I

**A**: At least one well conducted, adequately powered RCT, Level of Evidence Required: I

**A-**: More than one well conducted, adequately powered RCT with inconsistent results (heterogeneity) between studies, Level of Evidence Required: I

**B+**: More than one well conducted RCT with consistent results between studies, Level of Evidence Required: II

**B**: At least one well conducted RCT, Level of Evidence Required: II

**B-**: More than one well conducted RCT with inconsistent results (heterogeneity) between studies, Level of Evidence Required: II

## **COST ANALYSIS**

A formal cost analysis was not performed and published cost analyses were not reviewed.

## **METHOD OF GUIDELINE VALIDATION**

Clinical Validation-Pilot Testing

## **DESCRIPTION OF METHOD OF GUIDELINE VALIDATION**

The final ratified guideline was evaluated in a 27 hospital cluster randomised trial conducted in Australia and New Zealand.

# **RECOMMENDATIONS**

## **MAJOR RECOMMENDATIONS**

The levels of evidence (I-IV) and grades of recommendations identifying the type of supporting evidence (A+, A, A-, B+, B, B-) are defined at the end of the "Major Recommendations" field.

The following evidence-based recommendations were ratified at the guideline development conference.

- **Enteral Nutrition (EN) in preference to Standard Care (nothing by mouth [NPO]), Grade B+ recommendation**

5 Level II randomized controlled trials (RCTs). Ratified by positive meta-analysis and validated evidence-based guideline (Algorithms for Critical Care Enteral and Parenteral Therapy [ACCEPT]).

- **Early EN (<24 hours) in preference to delayed EN, Grade B recommendation**

3 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **Parenteral Nutrition (PN) in preference to Standard Care (Intravenous [IV] Glucose), Grade B recommendation**

5 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **Early EN (<24 hours) in preference to PN, Grade B recommendation**

6 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **Early PN (**

5 Level II RCTs. Ratified by positive meta-analysis and validated evidence-based guideline (ACCEPT). The results of the meta-analysis supporting this evidence-based recommendation (EBR) have been published elsewhere.

- **Post-pyloric feeding when gastric feeding not tolerated, Grade B recommendation**

8 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **Use of prokinetics when gastric feeding not tolerated, Grade B recommendation**

5 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **EN supplemented with PN if 80% of goals not met with EN alone (after attempts at postpyloric feeding and use of prokinetics) by 72 hours, Grade B recommendation**

4 Level II RCTs. Ratified by validated evidence-based guideline (ACCEPT).

- **PN with glutamine vs. standard PN, Grade B- recommendation**

4 Level II RCTs. Ratified by meta-analysis, **heterogeneity present**.

Glutamine *may* be beneficial in select patients. To identify which patients *may* benefit, each constituent RCT should be reviewed and clinical judgement should be exercised.

- **Management of diarrhoea, Grade B recommendation**

Ratified by validated evidence-based guideline (ACCEPT).

- **Gastric residual values and tolerance, Level B evidence**

Ratified by validated evidence-based guideline (ACCEPT).

### **Definitions:**

#### **Levels of Evidence**

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**Level IV\*\*:** non-randomised historical controls

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#### **Grades of Recommendations**

**A+:** More than one well conducted, adequately powered randomized controlled trial (RCT) with consistent results between studies (no heterogeneity), Level of Evidence Required: I

**A:** At least one well conducted, adequately powered RCT, Level of Evidence Required: I

**A-**: More than one well conducted, adequately powered RCT with inconsistent results (heterogeneity) between studies, Level of Evidence Required: I

**B+**: More than one well conducted RCT with consistent results between studies, Level of Evidence Required: II

**B**: At least one well conducted RCT, Level of Evidence Required: II

**B-**: More than one well conducted RCT with inconsistent results (heterogeneity) between studies, Level of Evidence Required: II

### **CLINICAL ALGORITHM(S)**

Algorithms are provided in the original guideline document for:

- Intensive care unit feeding
- Addressing tube feeding associated diarrhea

## **EVIDENCE SUPPORTING THE RECOMMENDATIONS**

### **TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS**

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations" field).

## **BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS**

### **POTENTIAL BENEFITS**

When evaluated in a cluster randomised trial including 499 patients from 14 hospitals, the adoption of this guideline resulted in a 10% reduction in mortality ( $p = 0.058$ ) and an average decrease in hospital stay of 10 days ( $p = 0.003$ ).

### **POTENTIAL HARMS**

Not stated

## **CONTRAINDICATIONS**

### **CONTRAINDICATIONS**

Expected intensive care unit (ICU) length of stay less than 2 days. Expected or scheduled return to oral intake in less than 2 days.

## **QUALIFYING STATEMENTS**

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Some of the critical appraisal summaries included in the original guideline document in the section titled "randomized controlled trials (RCTs) excluded due to major methodological flaws" may appear incomplete. In these randomized controlled trials, the major flaw that was detected was considered so significant that it precluded the trial from consideration in the guidelines development process and thus the appraisal of other issues was considered unnecessary.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

A detailed implementation strategy is available from the guideline developer (see the "Availability of Companion Documents" field in this summary).

### IMPLEMENTATION TOOLS

Clinical Algorithm  
Slide Presentation  
Wall Poster

For information about [availability](#), see the "Availability of Companion Documents" and "Patient Resources" fields below.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Living with Illness

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

Doig GS. Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Carlton (Australia): Australian and New Zealand Intensive Care Society (ANZICS); 2005. 282 p. [387 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

2005

**GUIDELINE DEVELOPER(S)**

Australian & New Zealand Intensive Care Society - Private Nonprofit Organization

**SOURCE(S) OF FUNDING**

Australian & New Zealand Intensive Care Foundation

**GUIDELINE COMMITTEE**

ANZICS CTG Feeding Investigators Group

**COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE**

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**FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST**

Not stated

**GUIDELINE STATUS**

This is the current release of the guideline.

**GUIDELINE AVAILABILITY**

Electronic copies: Available in Portable Document Format (PDF) from the [Evidence Based Decision-Making Web site](#).

**AVAILABILITY OF COMPANION DOCUMENTS**

The following are available:

- Doig GS. Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Implementation strategies. 2005. 81 p. Available in Portable Document Format (PDF) from the [Evidence Based Decision-Making Web site](#).
- Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Clinical algorithms. 2005. 2 p. Available in Portable Document Format (PDF) from the [Evidence Based Decision-Making Web site](#).
- Evidence-based guidelines for nutritional support of the critically ill: results of a bi-national guideline development conference. Wall poster. 2005. 1 p. Available in Portable Document Format (PDF) from the [Evidence Based Decision-Making Web site](#).

## **PATIENT RESOURCES**

None available

## **NGC STATUS**

This NGC summary was completed by ECRI on October 11, 2005. The information was verified by the guideline developer on October 18, 2005.

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