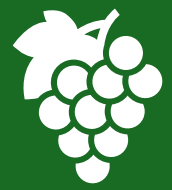
Nutrition en Réanimation

Evolution des concepts et pratiques en parallèle aux essais cliniques majeurs

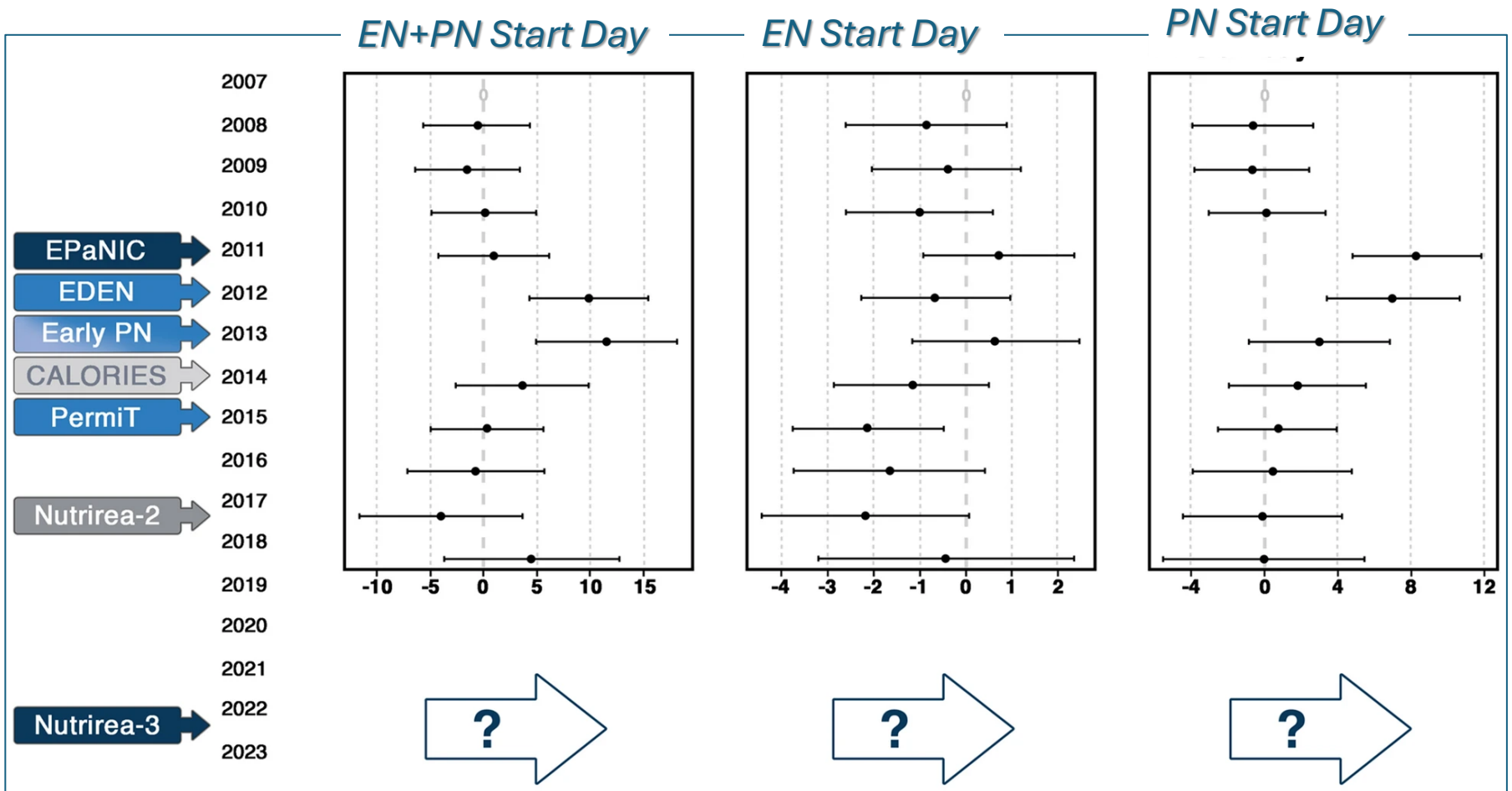
ESPEN Guidelines on Parenteral Nutrition: Intensive care, *Clinical Nutrition August 2009*

Avoid any caloric or protein deficit in critically ill patients,



Start early artificial feeding, especially in patients considered to be at high nutritional risk

Evolution in nutritional practice in relation to large-scale randomized controlled trials

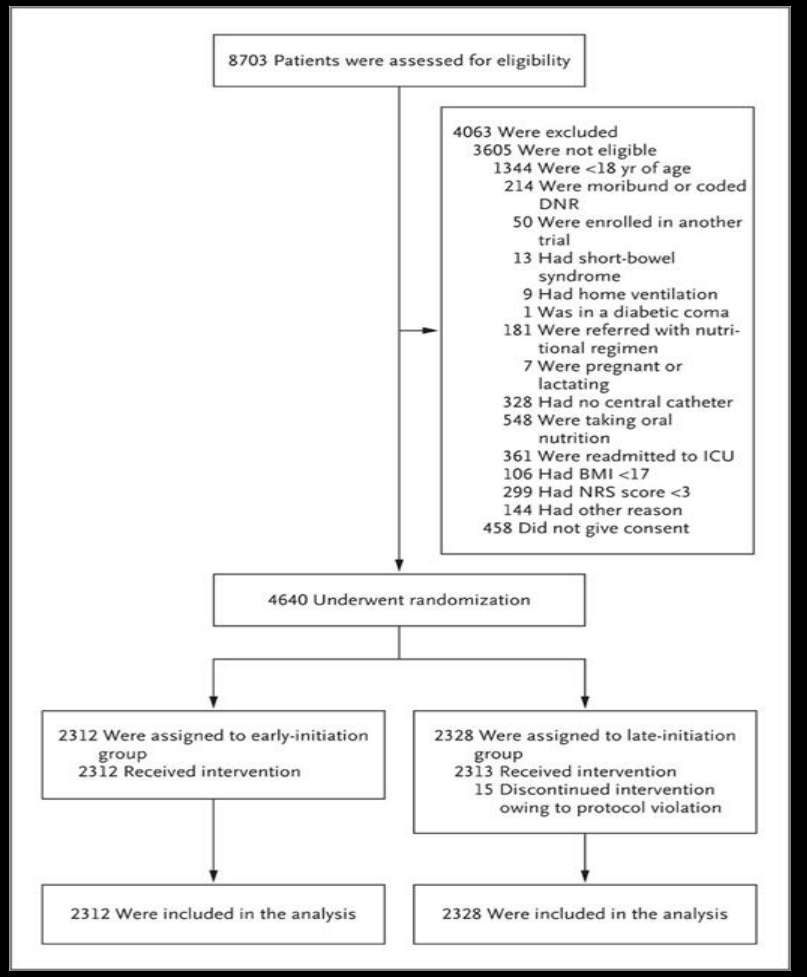


Original Article

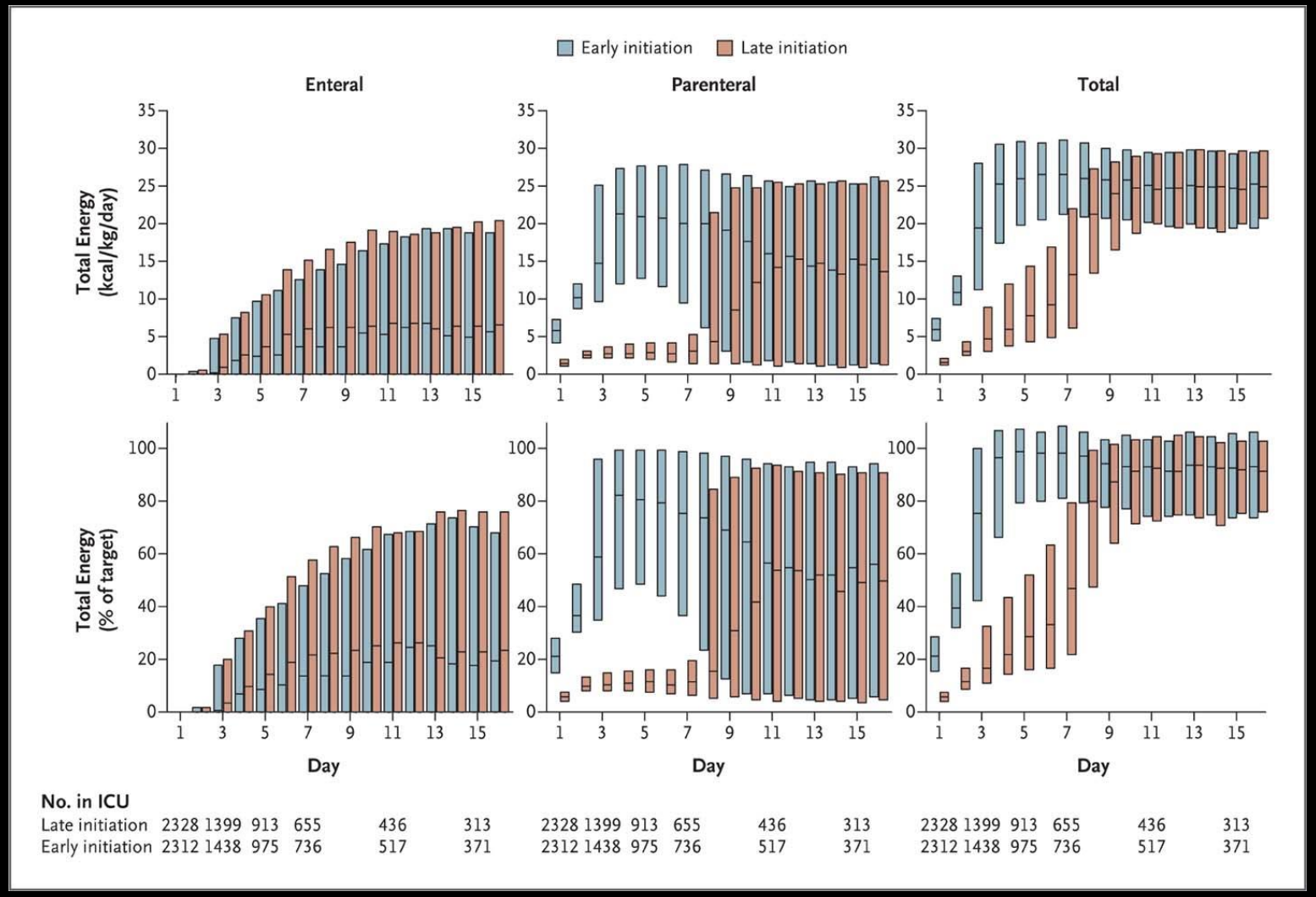
Early versus Late Parenteral Nutrition in Critically Ill Adults (EPaNIC study)

N Engl J Med
Volume 365(6):506-517
August 11, 2011

- This Randomized, Controlled, multicenter Trial (4640 pts) compared early initiation (<2 days) with late initiation (≥8 days) of parenteral nutrition in adults in the intensive care unit.
- Late initiation was associated with less morbidity and enhanced recovery

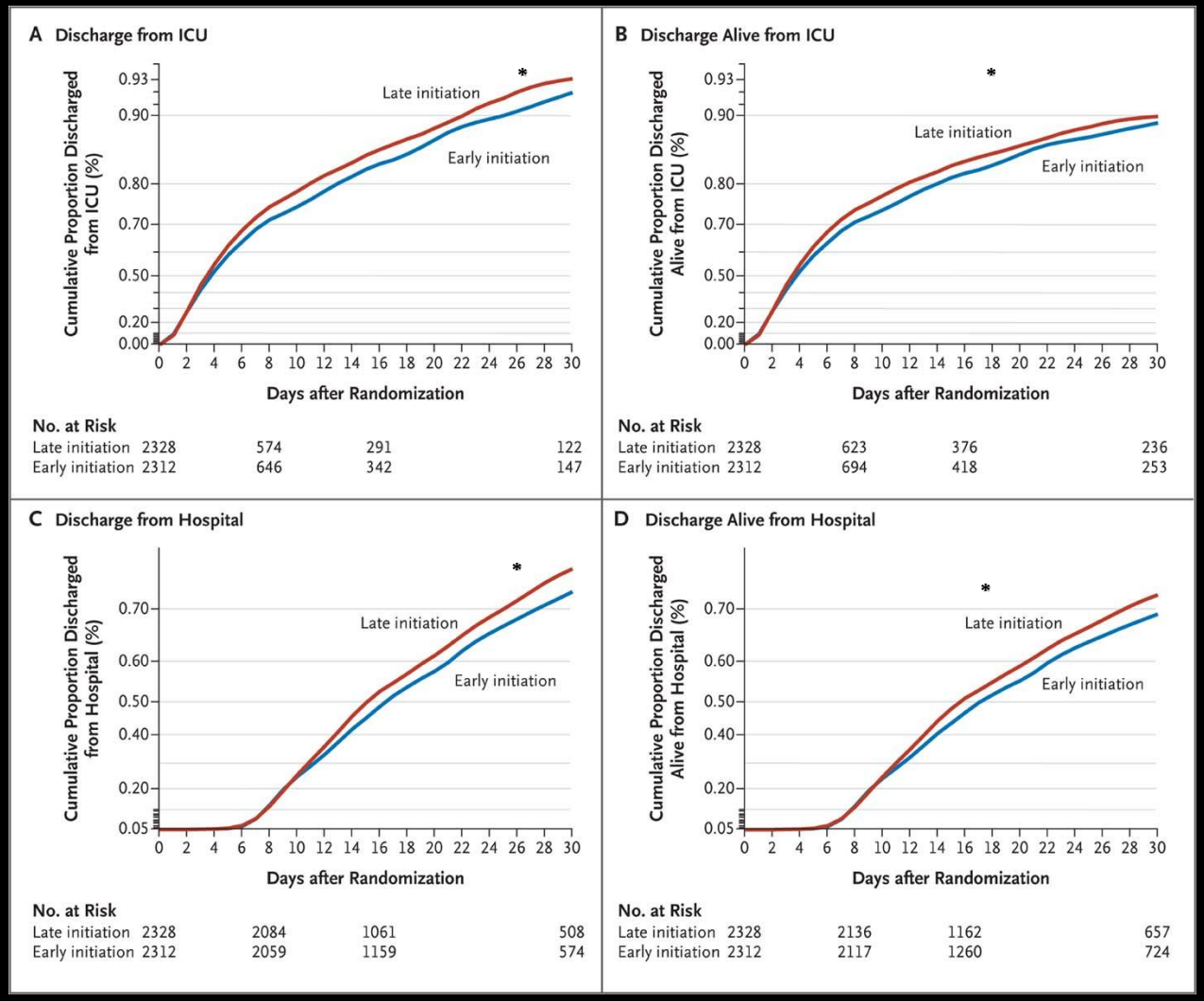


Total Energy Levels.



Casaer MP et al. N Engl J Med 2011;365:506-517

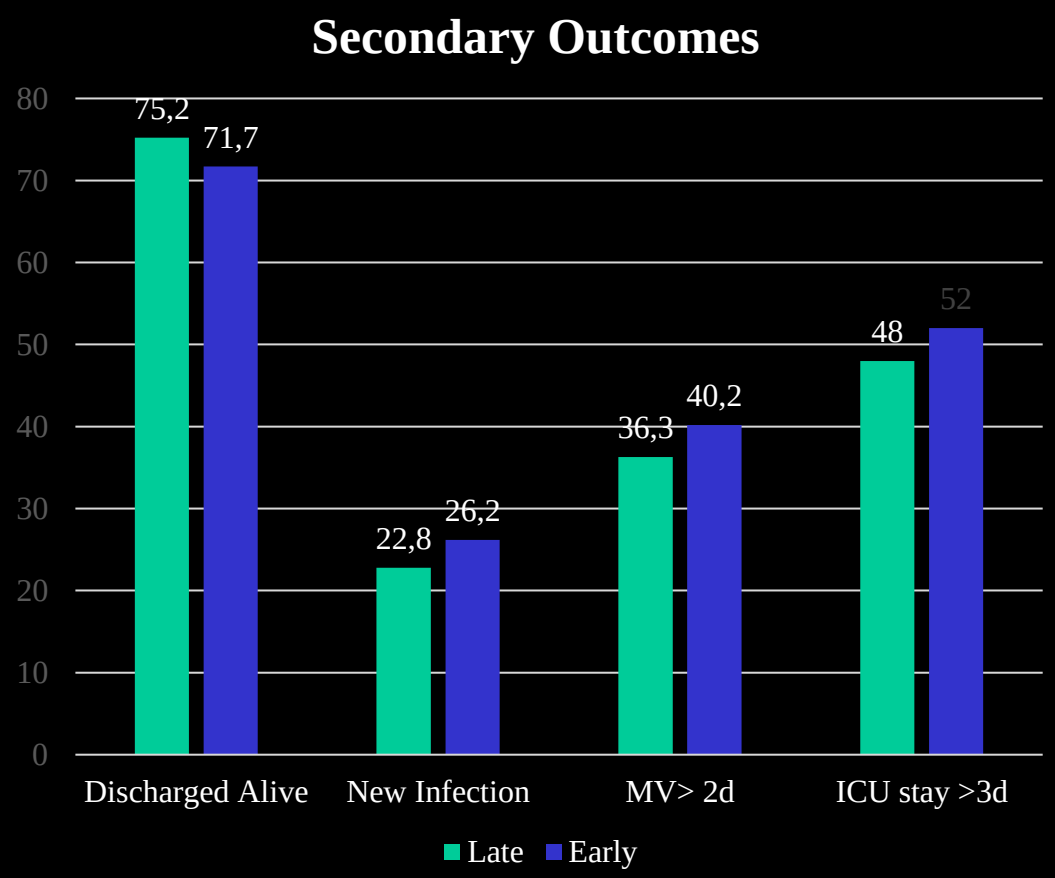
Kaplan–Meier Estimates of the Time to Discharge from the Intensive Care Unit (ICU) and from the Hospital.

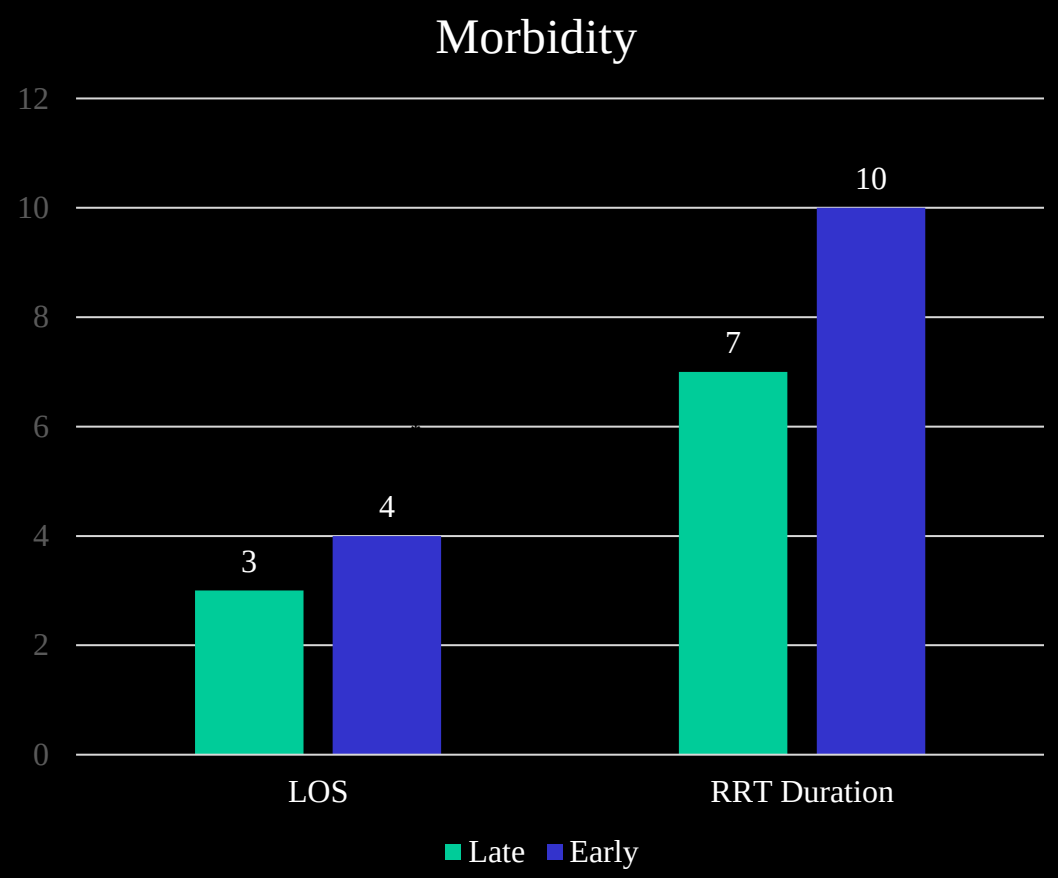


Casaer MP et al. N Engl J Med 2011;365:506-517

The NEW ENGLAND JOURNAL of MEDICINE

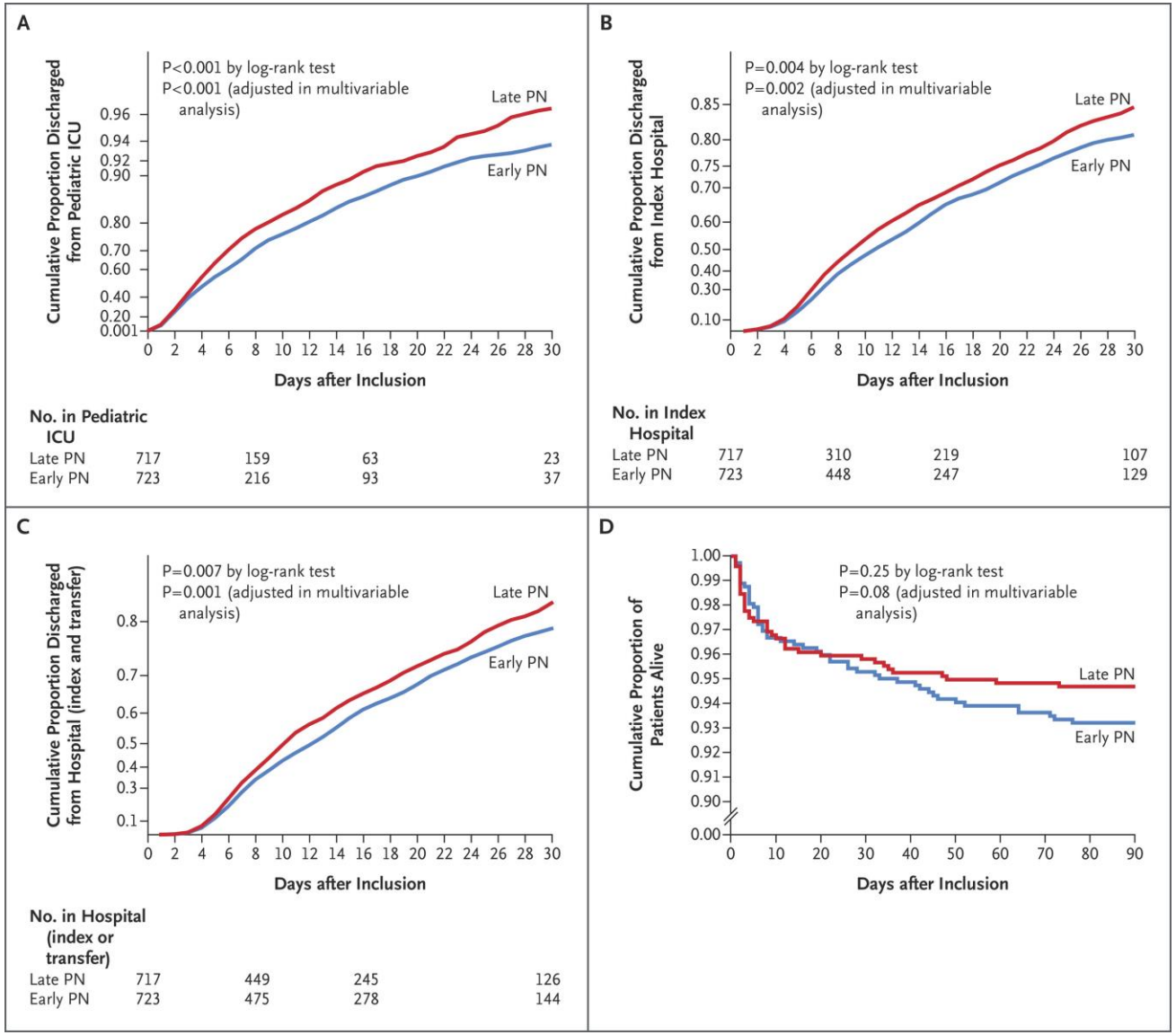
Outcomes


Secondary Outcomes
80
70
60
50
40
30
20
10
0
75,2
71,7
22,8
26,2
36,3
40,2
48
52
Discharged Alive
New Infection
MV> 2d
ICU stay >3d
Late
Early


Morbidity
12
10
8
6
4
2
0
3
4
7
10
LOS
RRT Duration
Late
Early

Early versus Late Parenteral Nutrition in Critically Ill Children

Fivez et al N Engl J Med 2016;374:1111-1122



Dose/Route?

Original Article

Trial of the Route of Early Nutritional Support in Critically Ill Adults

Sheila E. Harvey, Ph.D., Francesca Parrott, M.Sci., David A. Harrison, Ph.D., Danielle E. Bear, M.Res., Ella Segaran, M.Sc., Richard Beale, M.B., B.S., Geoff Bellingan, M.D., Richard Leonard, M.B., B.Chir., Michael G. Mythen, M.D., Kathryn M. Rowan, Ph.D., for the **CALORIES** Trial Investigators

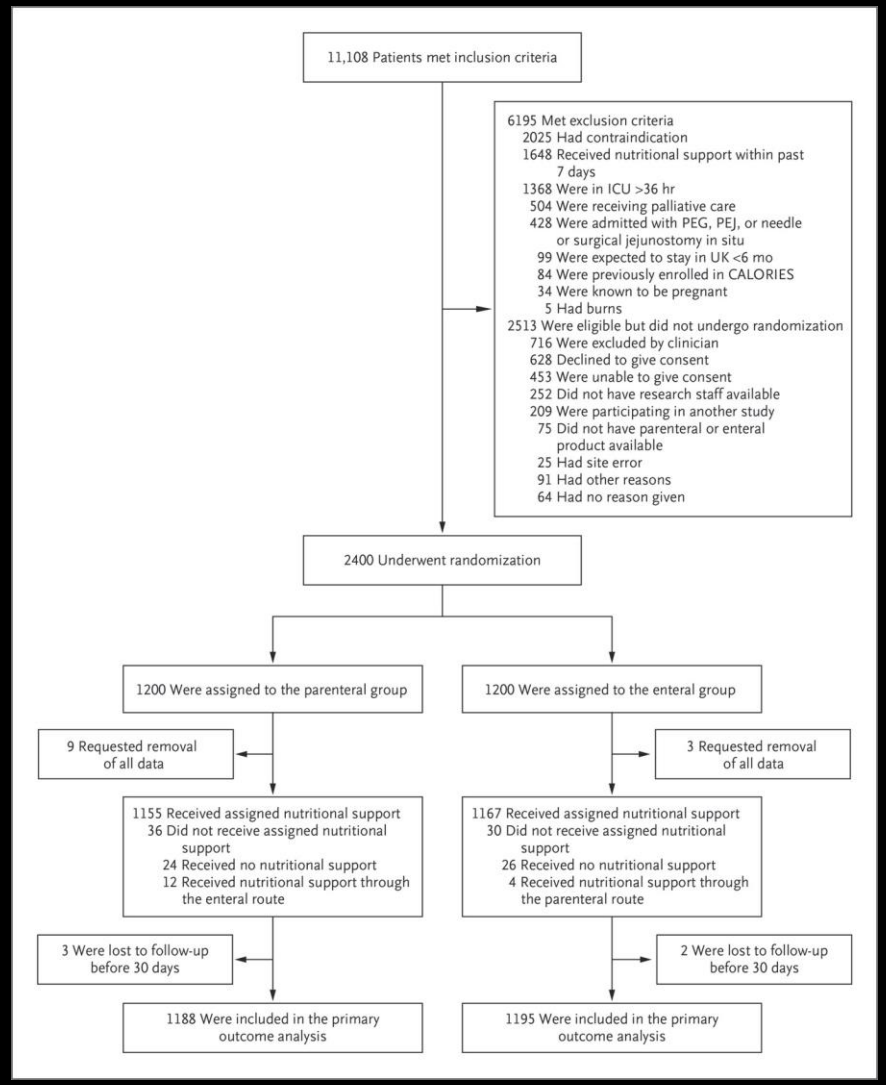
N Engl J Med
Volume 371(18):1673-1684
October 30, 2014

The NEW ENGLAND JOURNAL of MEDICINE

Screening, Randomization, and Follow-up

Harvey SE et al. N Engl J Med 2014;371:1673-1684

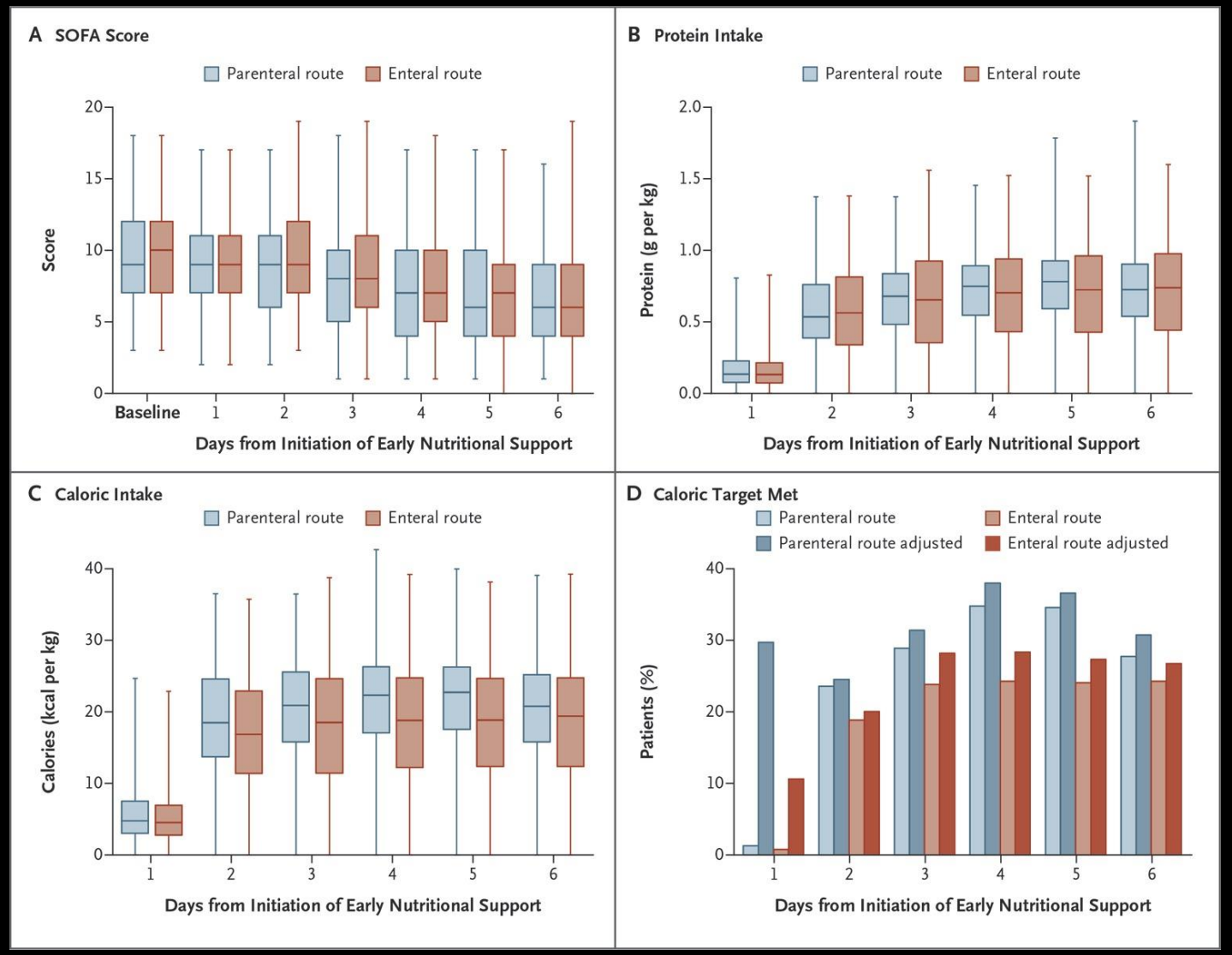
- In this study comparing the delivery of early nutritional support through the ***parenteral route*** with delivery through the ***enteral route*** in critically ill adults, there was no significant difference in 30-day mortality between the groups.



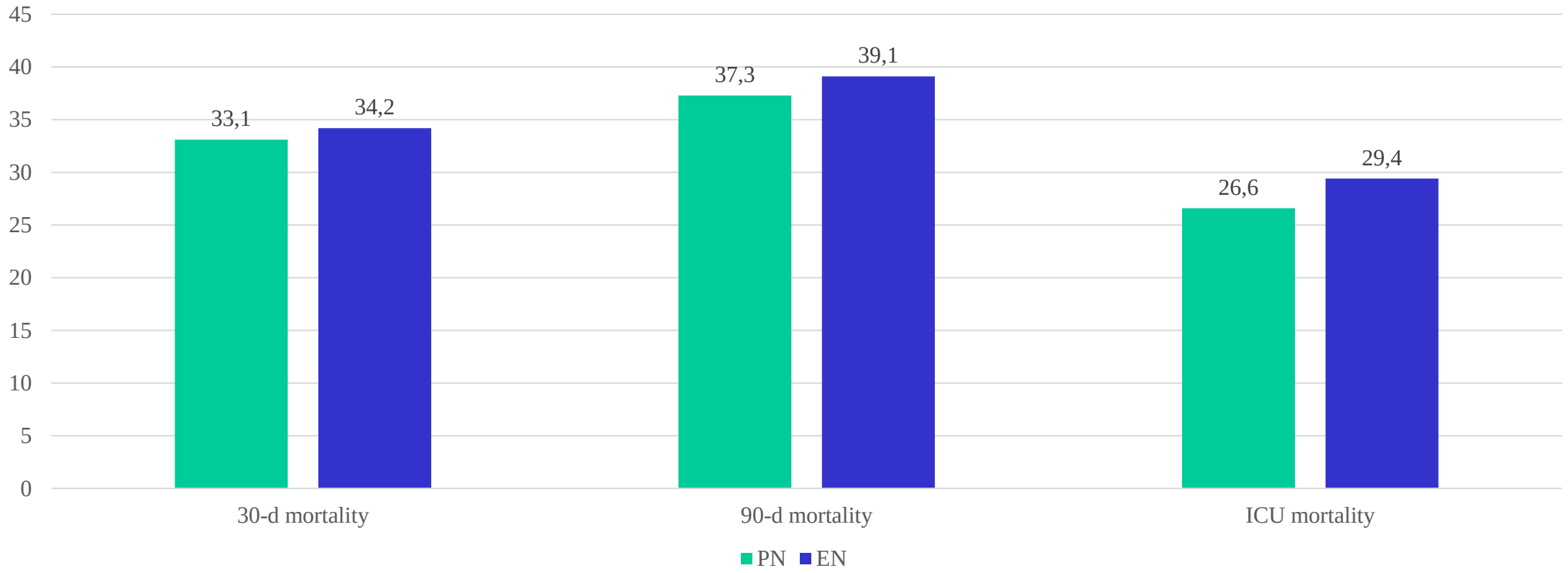
The NEW ENGLAND JOURNAL of MEDICINE

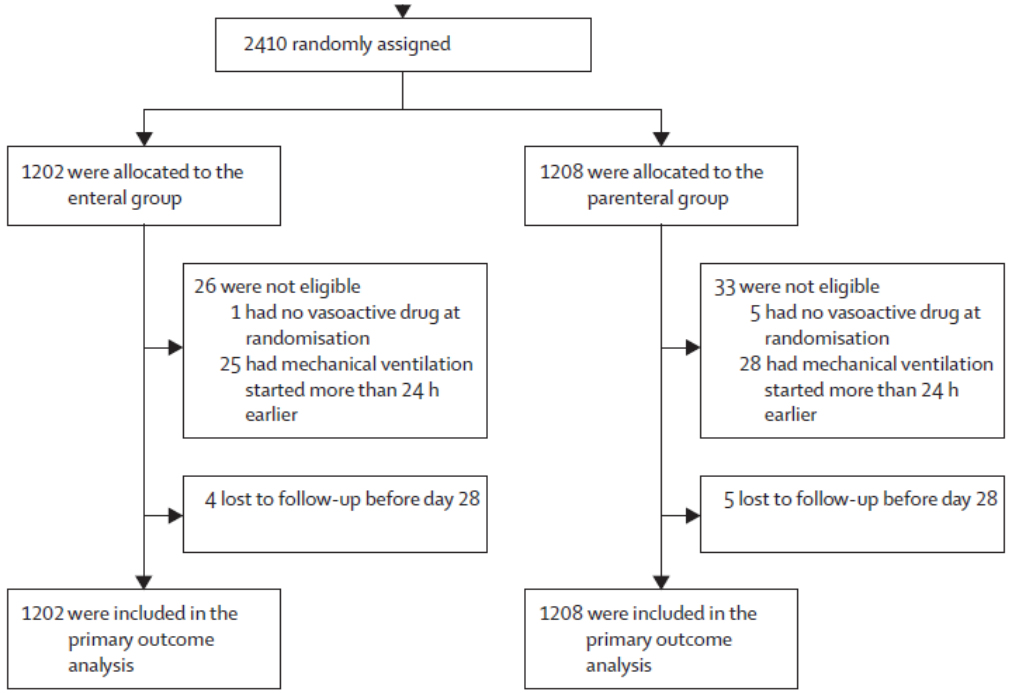
Daily SOFA Score and Protein and Caloric Intake from Days 1 to 6.

Harvey SE et al. N Engl J Med 2014;371:1673-1684



Outcomes


45
40
35
30
25
20
15
10
5
0
33,1
34,2
37,3
39,1
26,6
29,4
30-d mortality
90-d mortality
ICU mortality
PN
EN



Enteral versus parenteral early nutrition in ventilated adults with shock: a randomised, controlled, multicentre, open-label, parallel-group study (NUTRIREA-2)

Jean Reignier, Julie Boisramé-Helms, Laurent Brisard, Jean-Baptiste Lascarrou, Ali Ait Hssain, Nadia Anguel, Laurent Argaud, Karim Asehnoune, Pierre Asfar, Frédéric Bellec, Vlad Botoc, Anne Bretagnol, Hoang-Nam Bui, Emmanuel Canet, Daniel Da Silva, Michael Darmon, Vincent Das, Jérôme Devaquet, Michel Djibre, Frédérique Ganster, Maité Garrouste-Orgeas, Stéphane Gaudry, Olivier Gontier, Claude Guérin, Bertrand Guidet, Christophe Guitton, Jean-Etienne Herbrecht, Jean-Claude Lacherade, Philippe Letocart, Frédéric Martino, Virginie Maxime, Emmanuelle Mercier, Jean-Paul Mira, Saad Nseir, Gael Piton, Jean-Pierre Quenot, Jack Richecoeur, Jean-Philippe Rigaud, René Robert, Nathalie Rolin, Carole Schwebel, Michel Sirodot, François Tinturier, Didier Thévenin, Bruno Giraudeau, Amélie Le Gouge, for the NUTRIREA-2 Trial Investigators and the Clinical Research in Intensive Care and Sepsis (CRICS) group

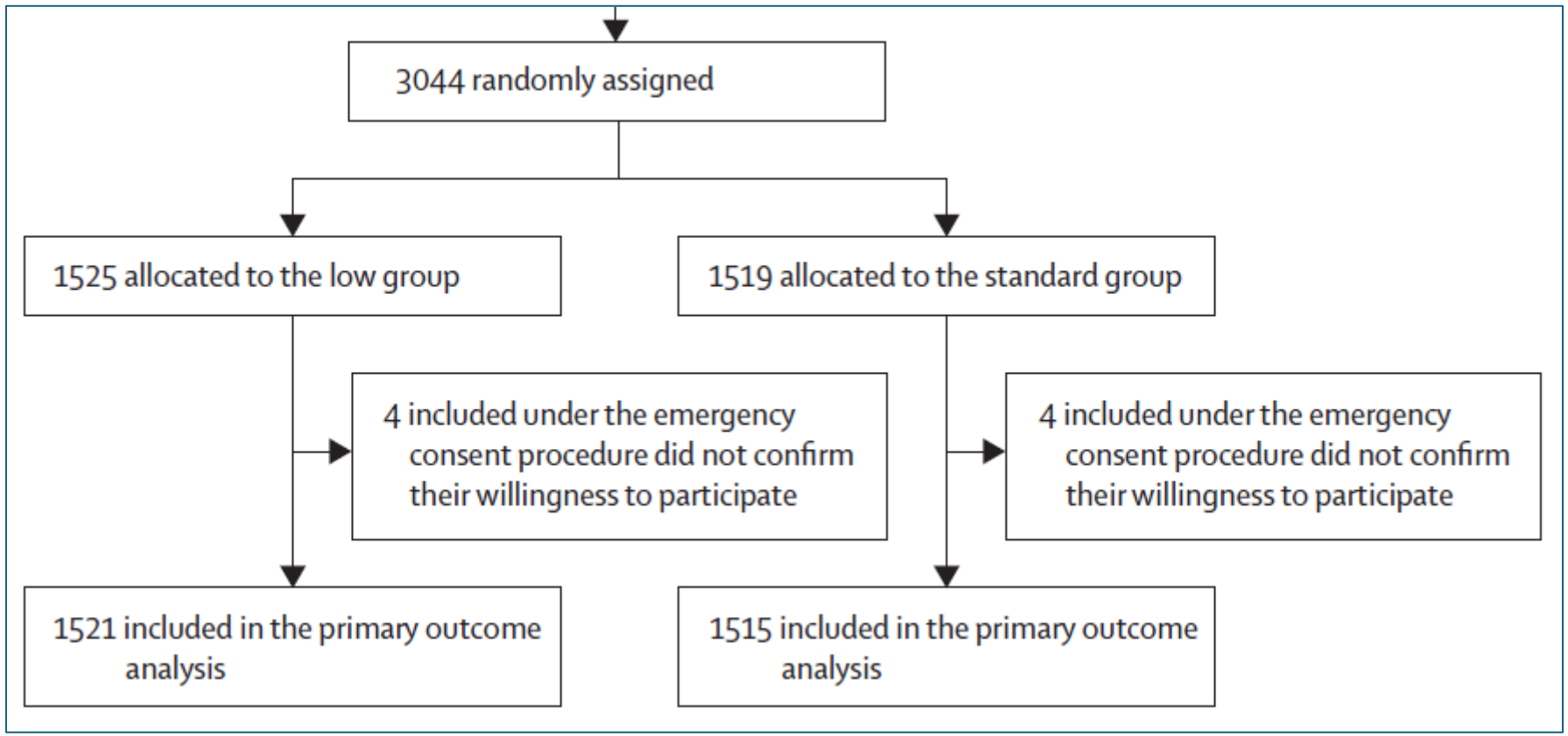
In critically ill adults with shock, early isocaloric enteral nutrition did *not reduce mortality or the risk of secondary infections* but was associated with a greater risk of digestive complications compared with early isocaloric parenteral nutrition.

NUTRIREA3

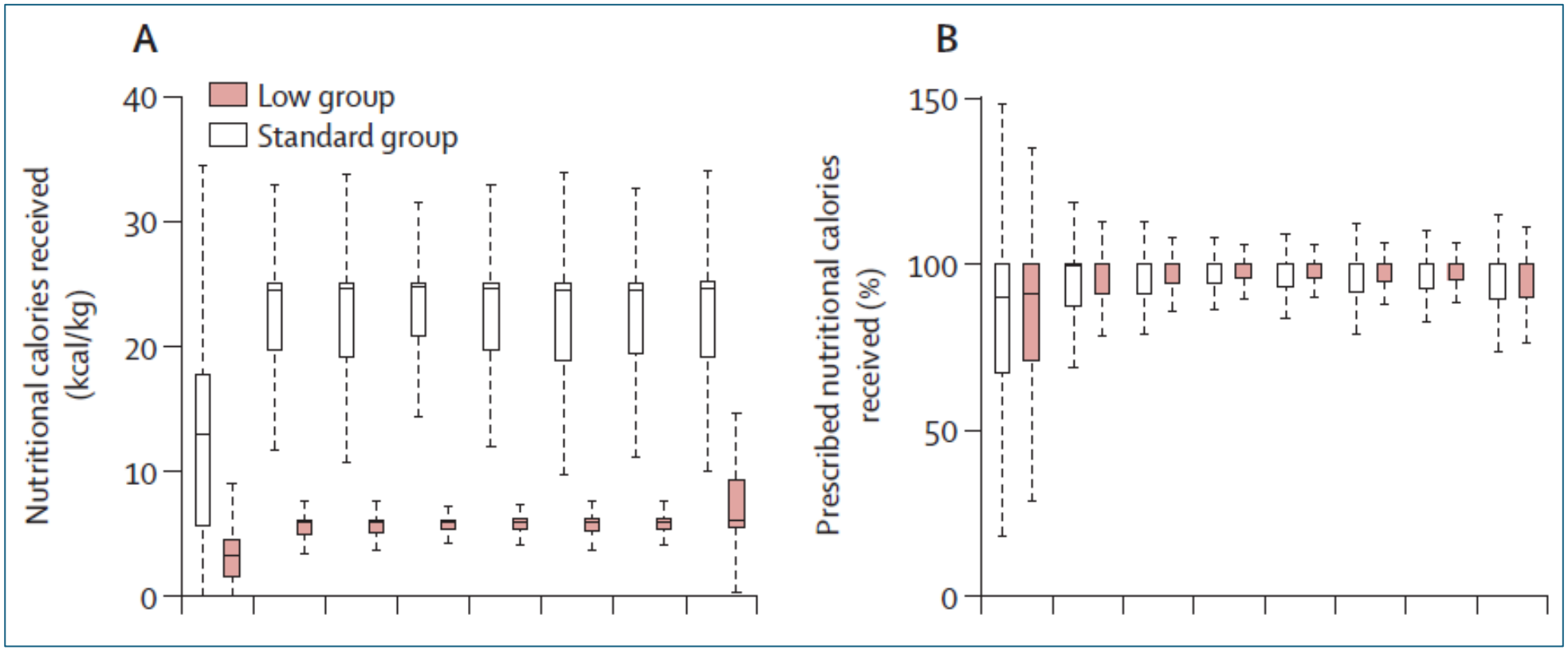
Dose-dependency (6 kcal/kg/day vs 25 kcal/kg/day)

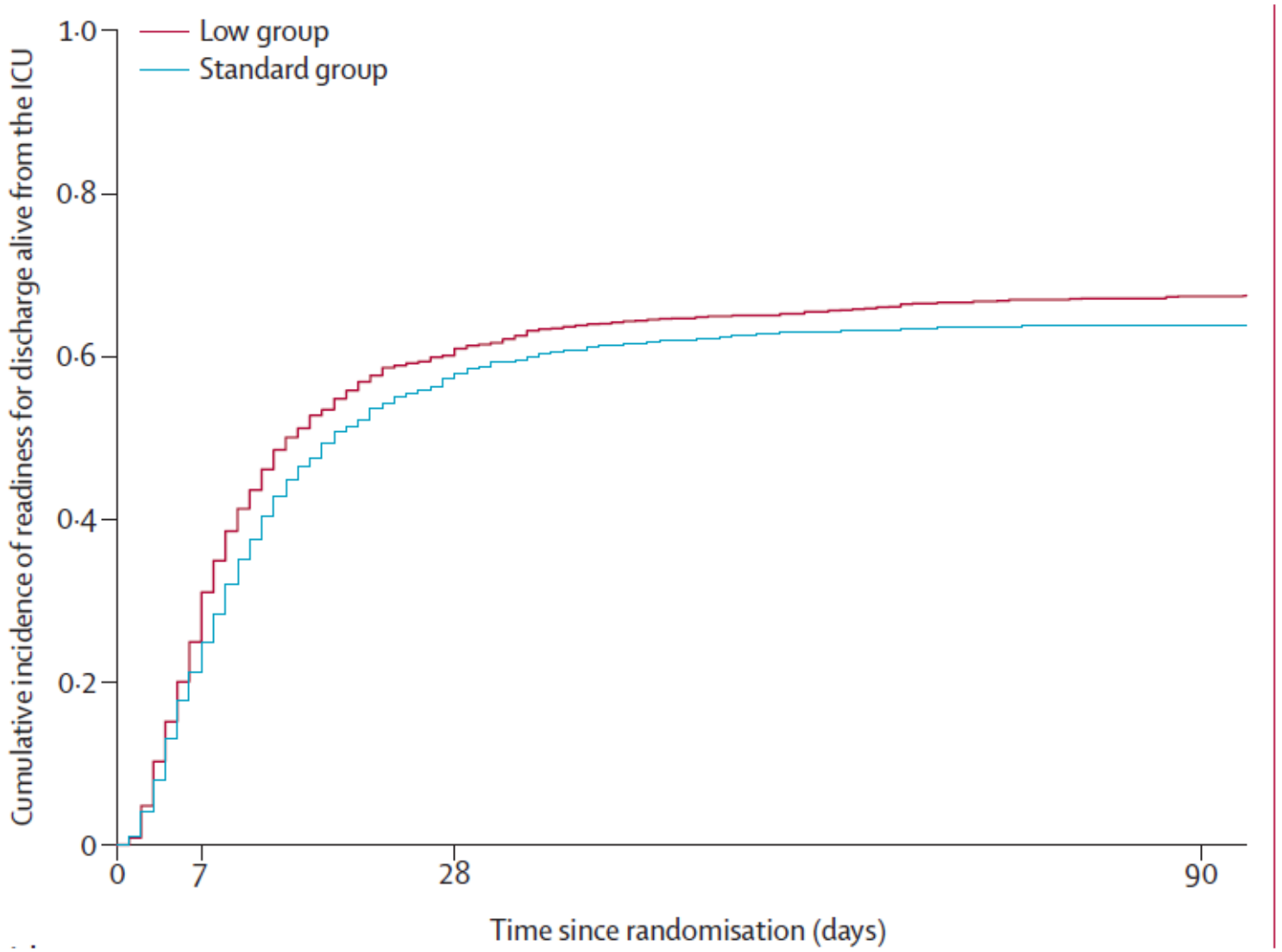
Low versus standard calorie and protein feeding in ventilated adults with shock: a randomised, controlled, multicentre, open-label, parallel-group trial (NUTRIREA-3)

Jean Reignier, Gaetan Plantefeve, Jean-Paul Mira, Laurent Argaud, Pierre Asfar, Nadia Aissaoui, Julio Badie, Nicolae-Vlad Botoc, Laurent Brisard



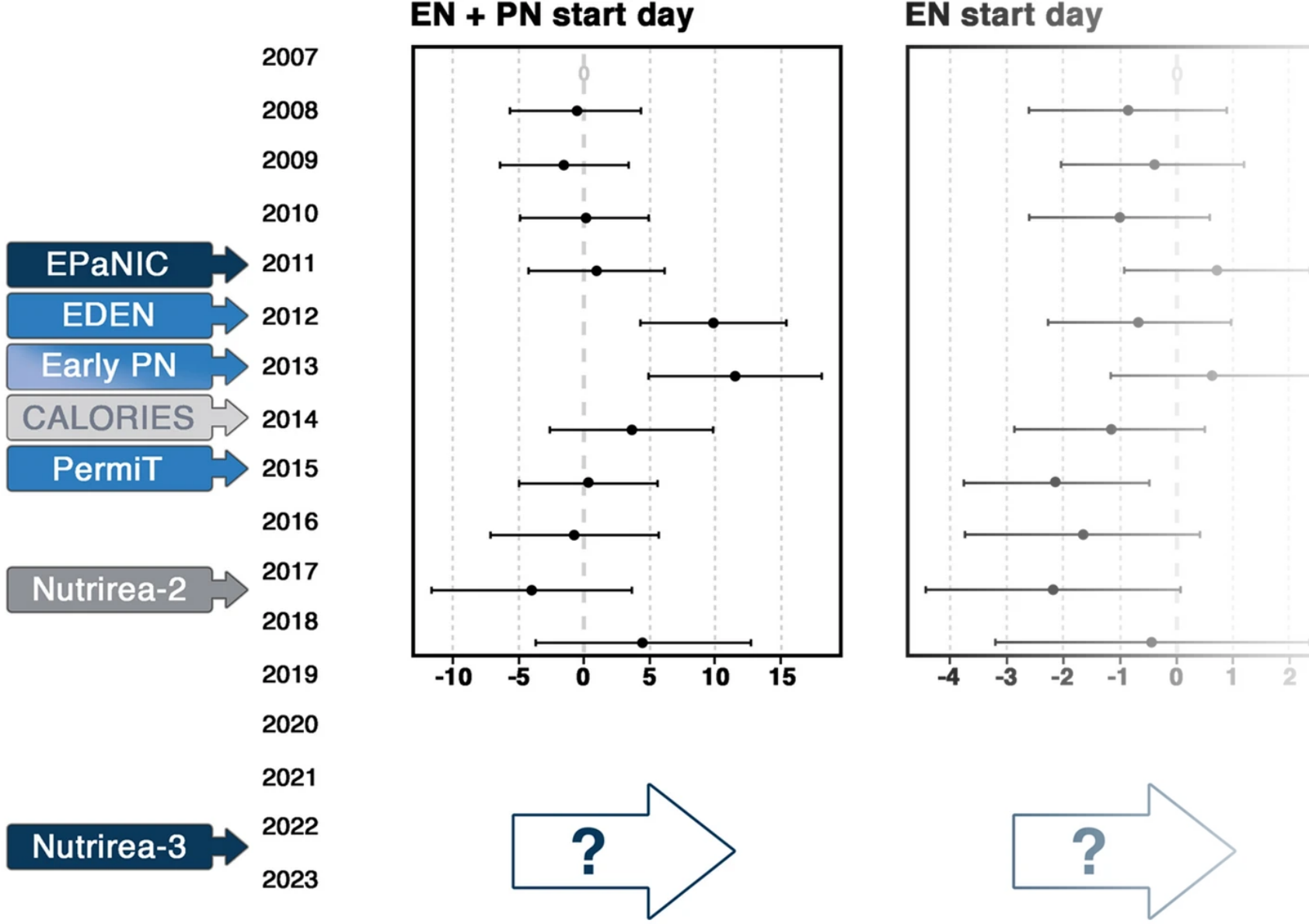
Daily calorie intake





Time to readiness for ICU discharge

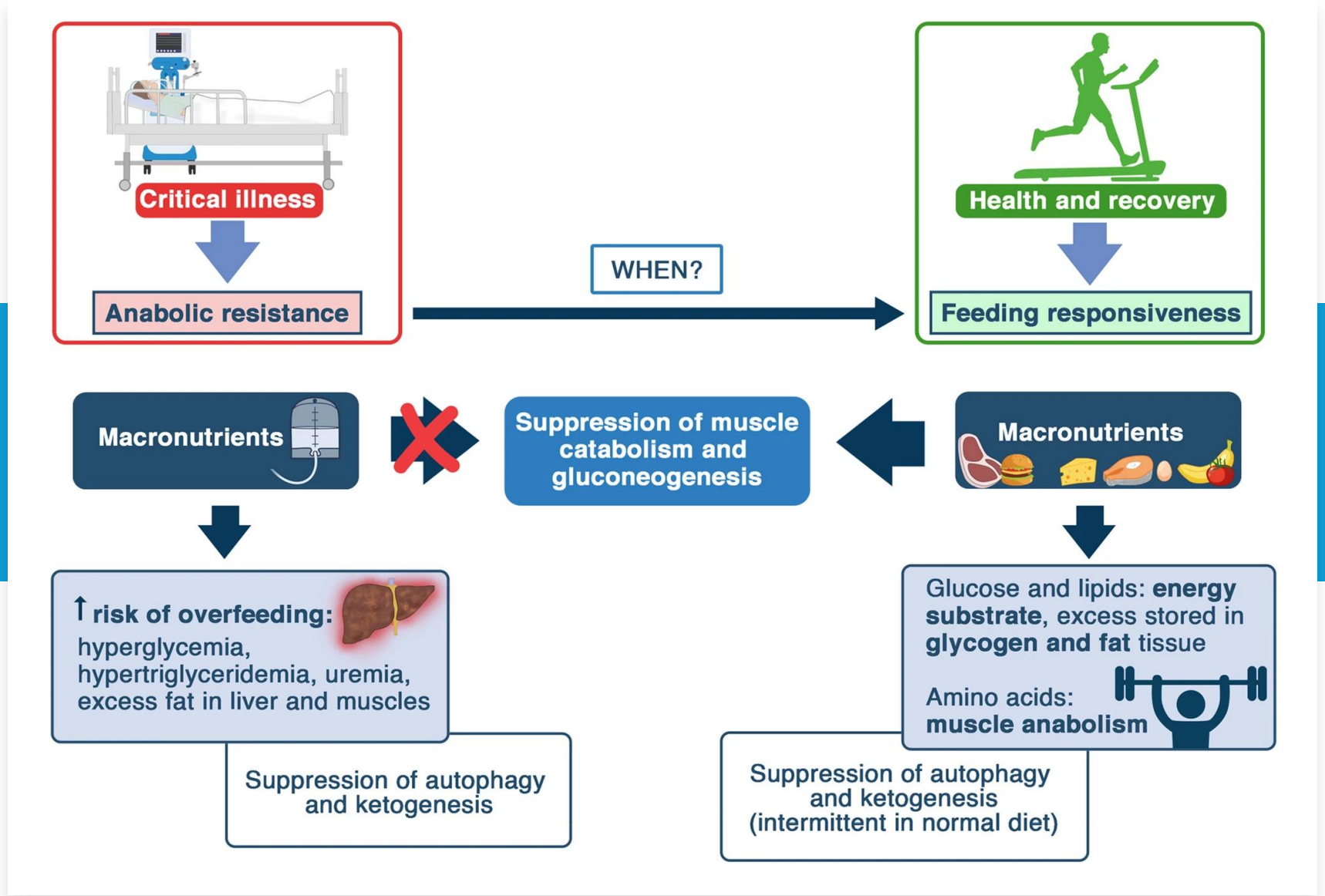
P=0,015



Recent RCTs have shown *dose-dependent* harm by early medical nutrition therapy in critically ill patients, *independent of the route of feeding*

Effect more vs. less calories early (< day 4): negative neutral positive

Effect (early full) EN vs PN: negative neutral



Potential mechanisms for the lack of benefit by early full feeding in critical illness.

ESPEN practical and partially revised guideline: Clinical nutrition in the intensive care unit

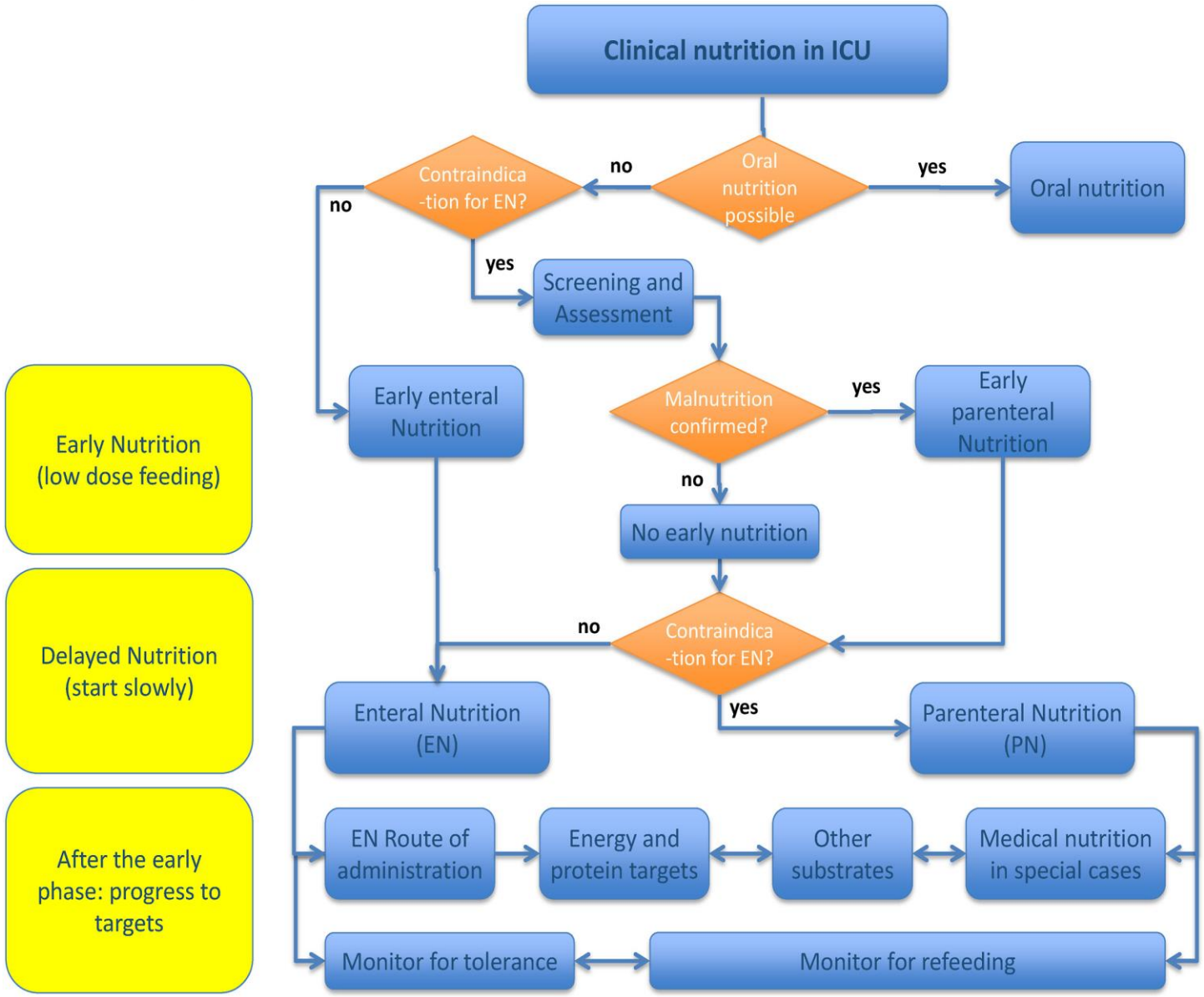
Pierre Singer, Annika Reintam Blaser, Mette M. Berger, Philip C. Calder, Michael Casaer, Michael Hiesmayr, Konstantin Mayer, Juan Carlos Montejo-Gonzalez, Claude Pichard, Jean-Charles Preiser, Wojciech Szczeklik, Arthur R.H. van Zanten, Stephan C. Bischoff

Clinical Nutrition
Volume 42 Issue 9 Pages 1671-1689 (September 2023)
DOI: 10.1016/j.clnu.2023.07.011

2023 guidelines recommend to initiate low-dose enteral nutrition within 48 h after ICU admission, unless contraindicated, and to advance toward energy target within 3–7 days

If enteral nutrition is insufficient, parenteral nutrition is suggested to be initiated between days 4 and 7 instead of within the first 2 days

Clinical Nutrition in the intensive care unit. Overview



Other substrates

Glucose / Carbohydrates

27) The amount of glucose (PN) or carbohydrates (EN) administered to ICU patients should not exceed 5 mg/kg/min. (R23, GPP, 100%)

Lipids

28) The administration of intravenous lipid emulsions should be generally a part of PN. (R24, GPP, 100%)

29) Intravenous lipid (including non-nutritional lipid sources) should not exceed 1.5 g lipids/kg/d and should be adapted to individual tolerance. (R25, GPP, 100%)

Glutamine (GLN)

30) In patients with burns > 20% body surface area, additional enteral doses of GLN (0.3 - 0.5 g/kg/d) should be administered for 10 - 15 days as soon as EN is commenced. (R26, B, 95%)*

31) In critically ill trauma, additional EN doses of GLN (0.2 - 0.3 g/kg/d) can be administered for the first five days with EN. In case of complicated wound healing it can be administered for a longer period of 10 – 15 days. (R27, 0, 91%)

32) In ICU patients except burn and trauma patients, additional enteral GLN should not be administered. (R28, B, 92%)

33) In unstable and complex ICU patients, particularly in those suffering from liver and renal failure, parenteral GLN - dipeptide shall not be administered. (R29, A, 92%)

* recommendation to be revised in the near future

Fish oil (omega-3)

34) High doses of omega-3-enriched EN formula should not be given by bolus administration. (R30, B, 91%)

35) EN enriched with omega-3 FA within nutritional doses can be administered. (R31, 0, 95%)

36) High doses omega-3 enriched enteral formulas should not be given on a routine basis. (R32, B, 90%)

37) Parenteral lipid emulsions enriched with EPA + DHA (Fish oil dose 0.1-0.2 g/kg/d) can be provided in patients receiving PN. (R33, updated, 0, 100%)

Micronutrients

38) To enable substrate metabolism, micronutrients (i.e. trace elements and vitamins) should be provided daily with PN. (R34, B, 100%)

39) Antioxidants as high-dose monotherapy or combination therapy should not be administered without proven deficiency. (R35, updated, A, 100%)

40) Vitamin D (25(OH)D) status can be determined in all patients considered at risk of vitamin D depletion or deficiency. (R36, updated, GPP, 100%)

Micronutrient supplementation / OMEGA3

- ESPEN guidelines, support the use of omega 3 PUFAs
- Recent metaanalyses favor the inclusion of omega-3 PUFAs in nutrition support of patients with ARDS or sepsis.
- Recent trials indicate that omega-3 PUFAs may protect against liver dysfunction and muscle loss in patients in the ICU
- Potential for omega-3 PUFAs s in treatment of COVID-19.
- Evidence for benefits of omega-3 PUFAs in the ICU setting has strengthened through new trials and meta-analyses

Clinical Nutrition
Volume 37, Issue 1, February 2018, Pages 1-18

Review

Lipids in the intensive care unit: Recommendations from the ESPEN Expert Group ☆

Philip C. Calder [a b], Michael Adolph [c], Nicolaas E. Deutz [d], Teodoro Grau [e], Jacqueline K. Innes [a], Stanislaw Klek [f], Shaul Lev [g], Konstantin Mayer [h], Adina T. Michael-Titus [i], Lorenzo Pradelli [j], Mark Puder [k], Hester Vlaardingerbroek [l], Pierre Singer [g]

- The ESPEN Expert Group supports the use of olive oil in nutrition support in surgical and non-surgical ICU patient

DOI: 10.1079/BJN20061760 • Corpus ID: 27256363

Monounsaturated fatty acid-based lipid emulsions in critically ill patients are associated with fewer complications

A. García-de-Lorenzo • Published in British Journal of Nutrition 1 May 2006 • Medicine

- olive oil–based intravenous lipid emulsions (ILEs) have demonstrated the ability to preserve immune function and induce less lipid peroxidation than other ILE

- Monounsaturated fatty acid-based lipid emulsions in critically ill patients are associated with fewer complications

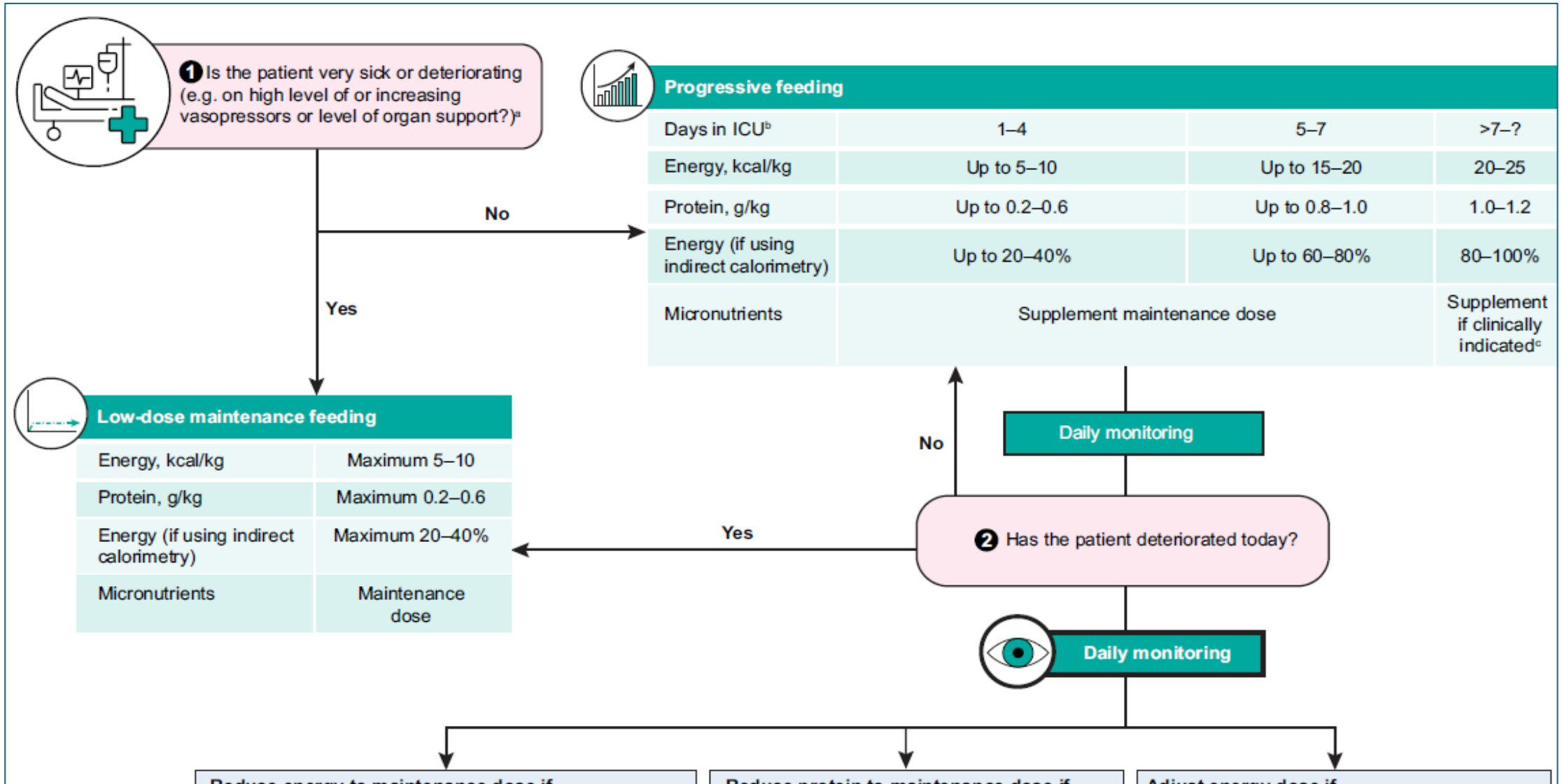
Beware Refeeding Syndrome!!!

Caused by***deficiency in micronutrients*** and ***electrolytes (vitamin B1,K+, P)***

Biochemical Hallmark: hypophosphatemia (<0,65mmol/l)

To prevent refeeding syndrome, ensure ***sufficient micronutrient intake*** in all patients: parenteral administration of micronutrients and electrolytes

Rethinking energy and protein provision for critically ill patients
Stoppe,C Intensive Care Med 2024



Mechanisms explaining the lack of benefit by early full feeding in critical illness