NUTRITION DU PATIENT AGGRESSÉ

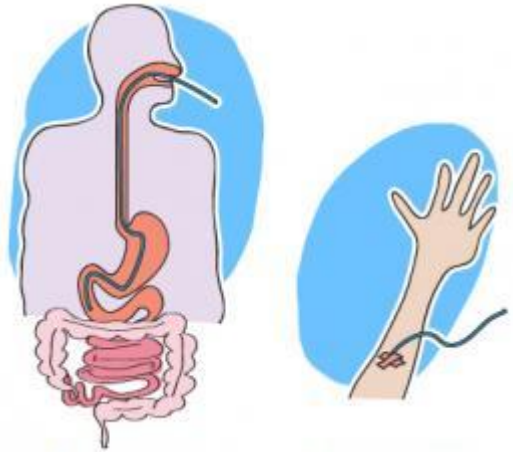
BROCÉLIANDE ATLANTIQUE
GROUPEMENT HOSPITALIER
Vannes - Auray

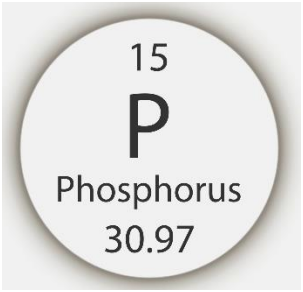
Dr Agathe DELBOVE
Réanimation polyvalente
CHBA Vannes

CONFLITS D'INTÉRÊT

- RFE Nutrition en réanimation (SRLF)

PLAN





QUAND

- Précoce <48h vs > 48h
  - Résultats mortalité hétérogènes
  - Résultats plus homogènes sur infections

Impact of EN and feeding route on outcomes of MV patients with shock: a post hoc marginal structural model study
Reignier, Intensive Care Med 2015

	HR (95 % CI)	*P* value
Time of nutrition initiation: early nutrition vs. delayed nutrition[a]		
Day-28 mortality	0.89 (0.81–0.98)	0.01
Death within 7 days after IMV initiation	0.76 (0.66–0.87)	<0.001
Death 7–28 days after IMV initiation	1.00 (0.89–1.12)	0.98
Risk of VAP by day 28	1.08 (1.00–1.17)	0.046
Risk of VAP until day 7	7.17 (6.27–8.19)	<0.001
Risk of VAP from day 7 to day 28	0.85 (0.78–0.92)	<0.001

Early enteral nutrition is associated with improved outcomes in critically ill mechanically ventilated medical and surgical patients
Haines, Clinical nutrition ESPEN 2023

	Crude outcomes after IPTW		Regression analysis	
	Early EN	Late EN	Yes (Reference = Late EN)	*P* value
			OR (95% CI)	
Hospital mortality, n (%)	2584 (15.4)	3230 (19.2)	0.77 (0.71, 0.82)	<0.0001
			HR (95% CI)	
LOS, days, median (IQR)	18.3 ± 17.8	23.7 ± 33.5	1.43 (1.33, 1.54)	<0.0001
ICU LOS, days, median (IQR)	10.7 ± 10.3	13.5 ± 16	1.36 (1.27, 1.46)	<0.0001
MV days, median (IQR)	9.6 ± 10.2	11.8 ± 24.9	1.23 (1.11, 1.37)	<0.0001
			Estimate (95% CI)	
Total cost, mean ± SD	67643.6 ± 72872.8	88215.7 ± 134984.3	−21226.5 (−23605.1, −18847.9)	<0.0001

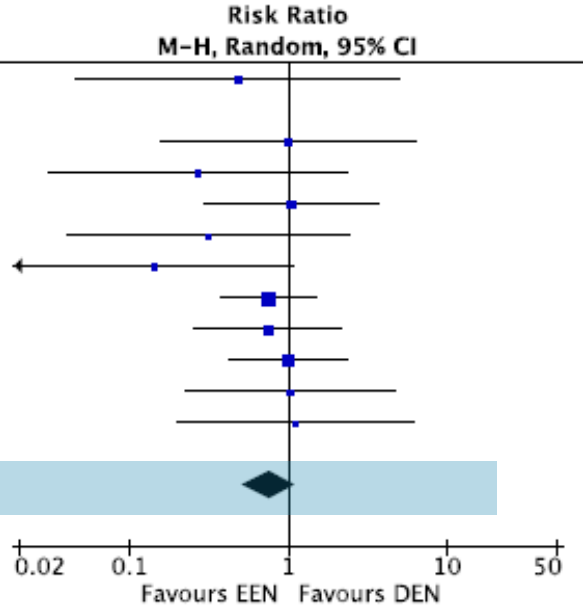
Early EN in critically ill patients: ESICM clinical practice guidelines. *Reintam Blaser, ICM 2017*

a Mortality

Study or Subgroup	EEN Events	EEN Total	DEN Events	DEN Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Moore 1986	1	32	2	31	2.6%	0.48 [0.05, 5.07]	1986
Chiarelli 1990	0	10	0	10		Not estimable	1990
Eyer 1993	2	19	2	19	4.2%	1.00 [0.16, 6.38]	1993
Chuntrasakul 1996	1	21	3	17	3.1%	0.27 [0.03, 2.37]	1996
Singh 1998	4	21	4	22	9.3%	1.05 [0.30, 3.66]	1998
Minard 2000	1	12	4	15	3.4%	0.31 [0.04, 2.44]	2000
Pupelis 2001	1	30	7	30	3.5%	0.14 [0.02, 1.09]	2001
Malhotra 2004	12	100	16	100	30.1%	0.75 [0.37, 1.50]	2004
Peck 2004	4	14	5	13	12.5%	0.74 [0.25, 2.18]	2004
Nguyen 2008	6	14	6	14	19.9%	1.00 [0.43, 2.35]	2008
Moses 2009	3	29	3	30	6.3%	1.03 [0.23, 4.71]	2009
Chourdakis 2012	3	34	2	25	5.0%	1.10 [0.20, 6.12]	2012
Total (95% CI)		**336**		**326**	**100.0%**	**0.76 [0.52, 1.11]**	
Total events	38		54				

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 5.61$, df = 10 (P = 0.85); $I^2 = 0\%$

Test for overall effect: Z = 1.44 (P = 0.15)

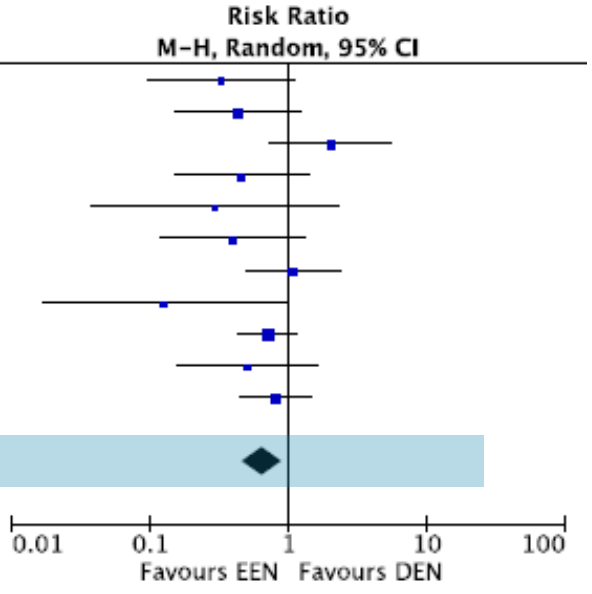


b Infections

Study or Subgroup	EEN Events	EEN Total	DEN Events	DEN Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
Moore 1986	3	32	9	31	6.4%	0.32 [0.10, 1.08]	1986
Chiarelli 1990	3	10	7	10	8.3%	0.43 [0.15, 1.20]	1990
Eyer 1993	8	19	4	19	8.4%	2.00 [0.72, 5.53]	1993
Hasse 1995	3	14	8	17	7.2%	0.46 [0.15, 1.40]	1995
Watters 1997	1	13	4	15	2.5%	0.29 [0.04, 2.27]	1997
Singh 1998	3	21	8	22	6.6%	0.39 [0.12, 1.28]	1998
Minard 2000	6	12	7	15	12.4%	1.07 [0.49, 2.34]	2000
Pupelis 2001	1	30	8	30	2.6%	0.13 [0.02, 0.94]	2001
Malhotra 2004	21	100	30	100	21.3%	0.70 [0.43, 1.14]	2004
Nguyen 2008	3	14	6	14	6.7%	0.50 [0.15, 1.61]	2008
Chourdakis 2012	13	34	12	25	17.5%	0.80 [0.44, 1.44]	2012
Total (95% CI)		**299**		**298**	**100.0%**	**0.64 [0.46, 0.90]**	
Total events	65		103				

Heterogeneity: $Tau^2 = 0.08$; $Chi^2 = 13.41$, df = 10 (P = 0.20); $I^2 = 25\%$

Test for overall effect: Z = 2.58 (P = 0.010)

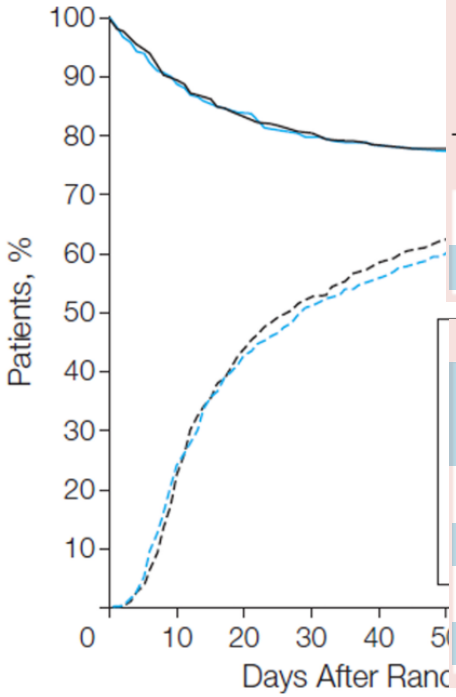


COMBIEN

- Première semaine
  - Hypocalorique/Hypoprotidique vs normocalorique/normoprotidique

Initial Trophic vs Full E... Acute Lung Injury: The... *ARDS Network, JAMA 2...*

Low versus standard calorie and protein feeding in ventilated adults with shock: a randomised, controlled, multicentre, open-label, parallel-group trial (NUTRIREA-3). *Reignier, Lancet respir 2023*



	Low group (n=1521)	Standard group (n=1515)	Absolute difference (95% CI)	Hazard ratio (95% CI)	p value
Primary outcomes					
Day 90 mortality	628 (41·3%)	648 (42·8%)	−1·5 (−5·0 to 2·0)	..	0·41
Time to readiness for ICU discharge*	8·0 (5·0 to 14·0)	9·0 (5·0 to 17·0)	..	1·12 (1·02 to 1·22)	0·015
Gastrointestinal events, cumulative incidence					
Vomiting	20·2%	25·5%	..	0·77 (0·67 to 0·89)	<0·001
Diarrhoea	28·9%	33·3%	..	0·83 (0·73 to 0·94)	0·004
Constipation	27·8%	28·7%	..	0·97 (0·86 to 1·10)	0·64
Bowel ischaemia	0·9%	1·8%	..	0·50 (0·26 to 0·95)	0·030
Acute colonic pseudo-obstruction	8 patients	2 patients	..	..	..
Liver dysfunction, cumulative incidence§	61·7%	65·8%	..	0·92 (0·86 to 0·99)	0·032

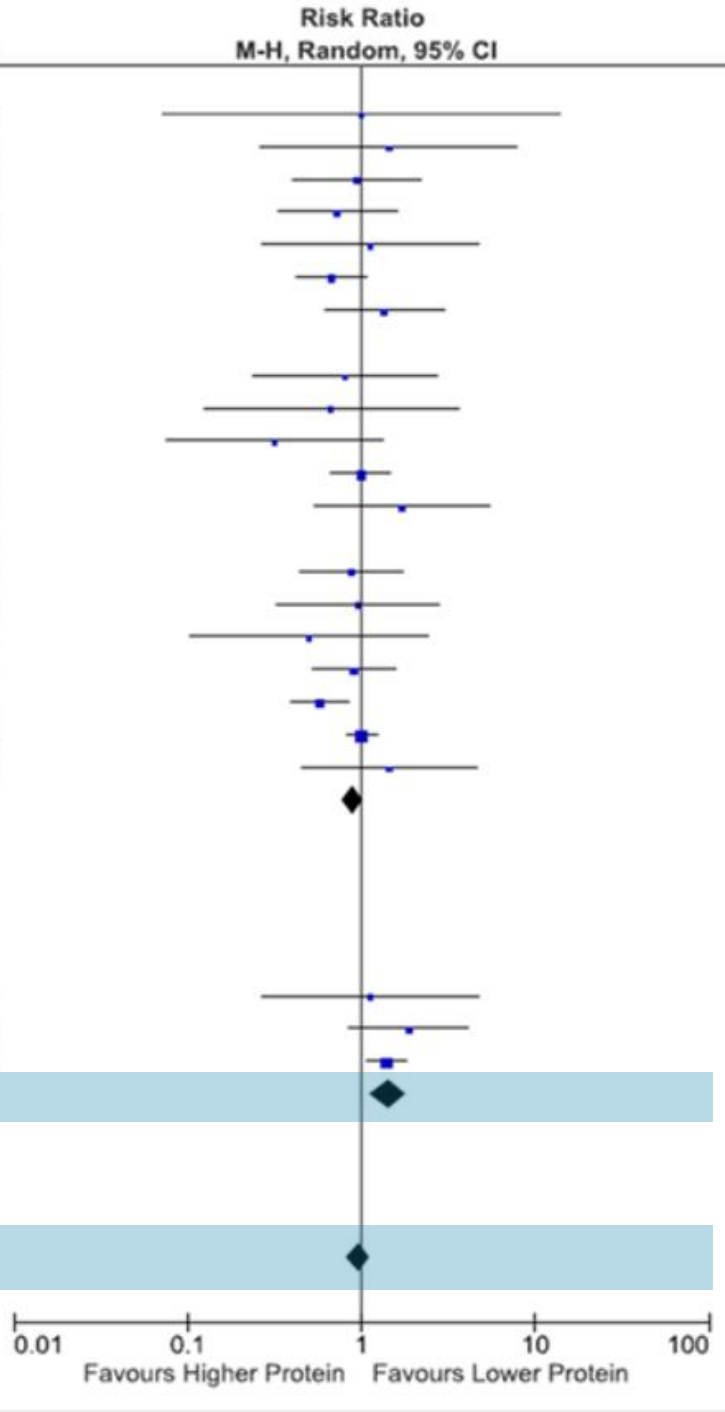
COMBIEN

- Première semaine
  - Apports protéiques

The effects of higher versus lower protein delivery in critically ill patients: an updated systematic review and meta-analysis of randomized controlled trials with trial sequential analysis. *Lee, Crit care 2024*

Mortalité

Study or Subgroup	Higher Protein Events	Higher Protein Total	Lower Protein Events	Lower Protein Total	Weight	Risk Ratio M-H, Random, 95% CI	Year
1.2.1 No or Not Known AKI							
Clifton 1985	1	10	1	10	0.3%	1.00 [0.07, 13.87]	1985
Saffle 1990	3	25	2	24	0.8%	1.44 [0.26, 7.88]	1990
Mesejo 2003	7	24	8	26	2.9%	0.95 [0.41, 2.22]	2003
Zhou 2006	7	25	10	26	3.3%	0.73 [0.33, 1.61]	2006
Singer 2007	3	8	2	6	1.1%	1.13 [0.27, 4.76]	2007
Doig 2015	25	176	40	189	8.2%	0.67 [0.43, 1.06]	2015
Ferrie 2015	12	59	9	60	3.4%	1.36 [0.62, 2.98]	2015
Vega-Alava 2018	0	20	0	20		Not estimable	2018
Fetterplace 2018	4	30	5	30	1.5%	0.80 [0.24, 2.69]	2018
						3.61]	2018
						1.34]	2019
						1.46]	2019
						5.50]	2020
						mable	2020
						1.72]	2020
Nakamura 2020	6	60	6	57	1.9%	0.95 [0.33, 2.78]	2020
Dresen 2021	2	21	4	21	0.9%	0.50 [0.10, 2.44]	2021
Carteron 2021	20	100	21	95	6.2%	0.90 [0.53, 1.56]	2021
Azevedo 2021	25	87	47	94	10.2%	0.57 [0.39, 0.85]	2021
Heyland 2023	129	482	135	507	19.3%	1.01 [0.82, 1.24]	2022
Kagan 2022	5	19	4	22	1.6%	1.45 [0.45, 4.63]	2022
Subtotal (95% CI)		**1331**		**1377**	**79.8%**	**0.89 [0.78, 1.02]**	
Total events	298		350				
Heterogeneity: Tau² = 0.00; Chi² = 14.33, df = 18 (P = 0.71); I² = 0%							
Test for overall effect: Z = 1.71 (P = 0.09)							
1.2.2 AKI							
Singer 2007	3	8	2	6	1.1%	1.13 [0.27, 4.76]	2007
Doig 2015	17	60	7	46	3.3%	1.86 [0.84, 4.11]	2015
Heyland 2023	82	162	53	146	15.8%	1.39 [1.07, 1.81]	2022
Subtotal (95% CI)		**230**		**198**	**20.2%**	**1.42 [1.11, 1.82]**	
Total events	102		62				
Heterogeneity: Tau² = 0.00; Chi² = 0.58, df = 2 (P = 0.75); I² = 0%							
Test for overall effect: Z = 2.82 (P = 0.005)							
Total (95% CI)		**1561**		**1575**	**100.0%**	**0.96 [0.83, 1.12]**	
Total events	400		412				
Heterogeneity: Tau² = 0.02; Chi² = 25.79, df = 21 (P = 0.21); I² = 19%							
Test for overall effect: Z = 0.46 (P = 0.65)							
Test for subgroup differences: Chi² = 10.84, df = 1 (P = 0.0010), I² = 90.8%							



COMBIEN

- Au-delà >7 jours
  - Calories
    - Pas de bénéfice hypocalorique
    - Normo ou hypercalorique ?

Hypocaloric compared with eucaloric nutritional support and its effect on infection rates in a surgical intensive care unit: a randomized controlled trial. *Charles, Am J Nutrition 2014*

Variable	Hypocaloric (n = 41)	Eucaloric (n = 42)	P value	OR (95% CI)
Total no. of infections	82	66	0.72	—
Infections per patient (n)	2.0 ± 0.6[2]	1.6 ± 0.2	0.50	—
Any infection [% (n)][3,4]	70.7 (29)	76.2 (32)	0.57	0.76 (0.28, 2.01)
ICU-acquired infection [% (n)][3,5]	56.1 (23)	57.1 (24)	0.92	0.96 (0.40, 2.28)
ICU[2] length of stay (d)	16.7 ± 2.7[3]	13.5 ± 1.1	0.28	—
Hospital length of stay (d)	35.2 ± 4.9	31.0 ± 2.5	0.45	—
Mortality [% (n)]	7.3 (3)	9.5 (4)	0.72	0.75 (0.16, 3.58)

Early goal-directed nutrition versus standard of care in adult intensive care patients: the single-centre, randomised, outc… EAT-ICU trial. *Allingstrup, ICM 2017*

The effects of higher versus lower protein delivery in critically ill patients: an updated systematic review and meta-analysis of randomized controlled trials with trial sequential analysis. *Lee, Crit care 2024*

Primary outcome measure	Early goal-directe… (N = 100)			
PCS score at 6 months adjusted for presence of haematologic malignancy, mean (SD)	22.9 (21.8)	23.0 (22.3)	−0.0[a] (−5.9 to 5.8)	0.99

Secondary outcome measures	Early goal-directed nutrition (N = 100)	Standard of care (N = 99)	Relative risk or mean difference (95% CI)	p value
Vital status, no. (%)				
Dead at day 28	20 (20%)	21 (21%)	0.94 (0.55–1.63)	0.83
Dead at day 90	30 (30%)	32 (32%)	0.93 (0.61–1.40)	0.72
Dead at 6 months	37 (37%)	34 (34%)	1.08 (0.74–1.57)	0.70
Length of stay among 6-month survivors, median days (IQR)				
ICU	7 (5–22)	7 (4–11)	NA	0.21
Hospital	30 (12–53)	34 (14–53)	NA	1.00

COMMENT

- Entérale vs paren

Trial of the Route of I
Critically Ill Adults (C

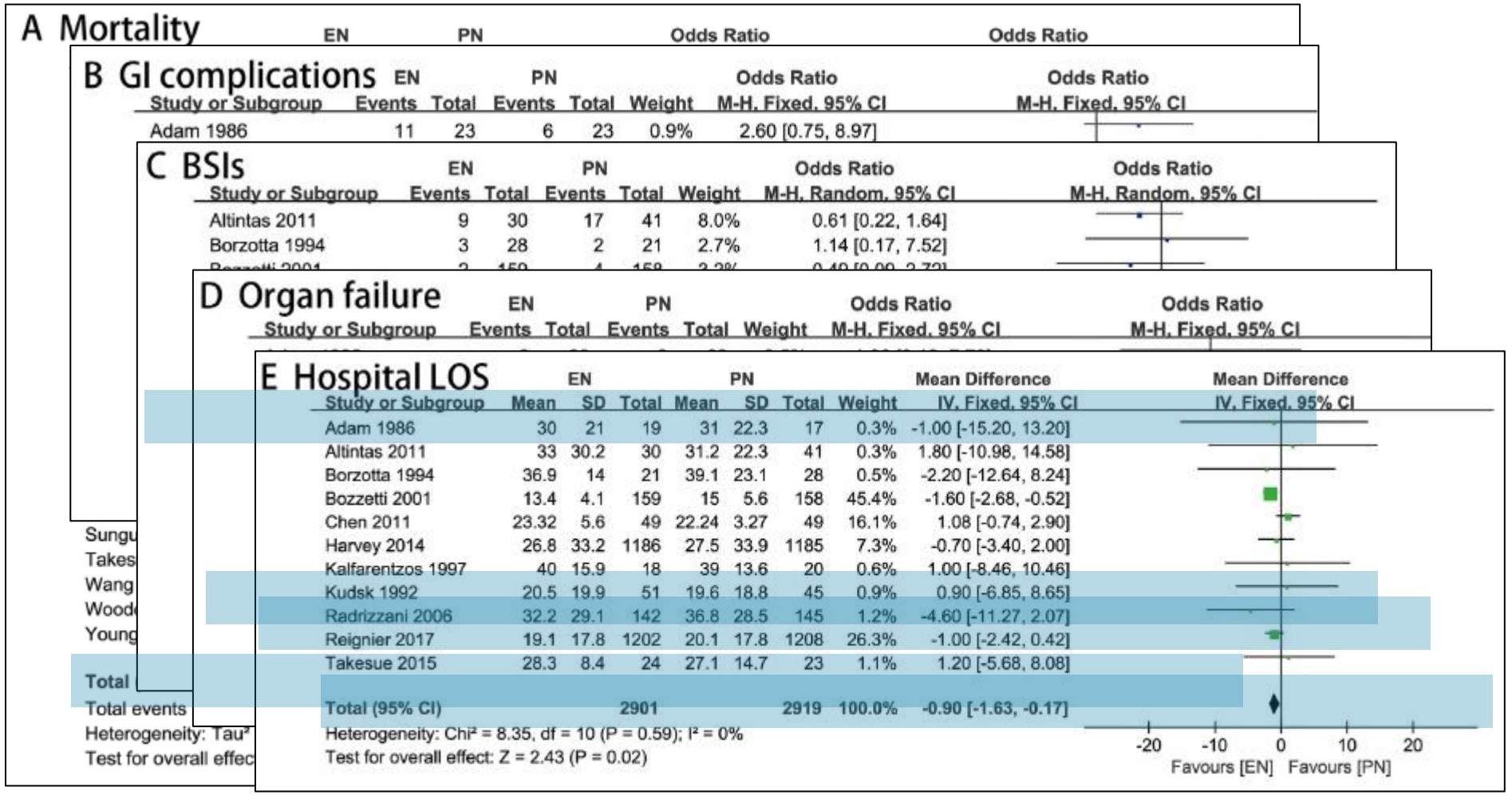
Outcome	Parenteral Group (N=1191)	Enteral Group (N=1197)	Absolute Difference between Groups (95% CI)	Relative Risk (95% CI)	P Value
Primary outcome: death within 30 days — no./total no. (%)	393/1188 (33.1)	409/1195 (34.2)	1.15 (–2.65 to 4.94)†	0.97 (0.86 to 1.08)‡	0.57§
Secondary outcomes					
No. of days alive and free of specified organ support up to 30 days¶					
Free of advanced respiratory support	14.3±12.1	14.3±12.2	0.04 (–0.94 to 1.01)		0.94
Free of advanced cardiovascular support	18.9±13.5	18.5±13.6	0.41 (–0.63 to 1.53)		0.44
Free of renal support	19.1±13.9	18.8±14.0	0.26 (–0.85 to 1.47)		0.66
Free of neurologic support	19.2±13.8	18.9±14.0	0.34 (–0.81 to 1.36)		0.57
Free of gastrointestinal support	13.0±11.7	13.2±11.8	–0.12 (–1.05 to 0.80)		0.81
No. of treated infectious complications per patient‖	0.22±0.60	0.21±0.56	0.01 (–0.04 to 0.06)		0.72
Median no. of days in the ICU (IQR)‡‡	8.1 (4.0–15.8)	7.3 (3.9–14.3)			0.15
Median no. of days in a hospital (IQR)§					32
Death — no./total no.					
In the ICU					13§
In acute care hospital	431/1185 (36.4)	450/1186 (37.9)		0.96 (0.86 to 1.06)	0.44§
By 90 days	442/1184 (37.3)	464/1188 (39.1)		0.96 (0.86 to 1.06)	0.40§
Acute colonic pseudo-obstruction*	11 (1%)	3 (<1%)	--	3·7 (1·03 to 13·2)	0·04

A multicentre, randomised controlled trial comparing the clinical effectiveness and cost-effectiveness of early nutritional support via the parenteral versus the enteral route in critically ill patients (CALORIES).
Harvey, Health Technology 2016

The effect of enteral versus parenteral nutrition for critically ill patients: A systematic review and meta-analysis. *Zhang, J Clinical Anesthseia 2018*

COMMENT

- Entérale vs parentérale



MICRONUTRIMENTS

- Nutrition parentérale
  - Pas de micronutriments > apports nécessaires
- Nutrition Entérale
  - Pas d'étude robuste
  - NE > 1500 kcal / >80% EE apporte assez
- Alcool ?
- Dosages ?
  - Réponse inflammatoire… obtention des résultats…

Micronutrient intake from enteral nutrition in critically ill adults: A systematic review of randomised controlled trials. *Breik, Austr Crit Care 2022*

Micronutrient	Parameter[a]	<80% adequacy	>80% adequacy	p-value
Vitamin B12	Intake (µg)	3 ± 1	7 ± 3	0.043*
	RDI (%)	139 ± 28	311 ± 138	0.043*
	UL (%)	–	–	–
Vitamin D	Intake (µg)	14 ± 3	12 ± 3	0.185
	AI (%)	144 ± 27	116 ± 34	0.185
	UL (%)	18 ± 2	14 ± 2	0.185
Vitamin C	Intake (mg)	135 [113–168]	240 [163–820]	0.039*
	RDI (%)	300 [252–374]	535 [362–1822]	0.039*
	UL (%)	14 [11–17]	24 [16–82]	0.039*
Vitamin A	Intake (µg)	1604 ± 1238	3156 ± 1212	0.053
	RDI (%)	201 ± 155	394 ± 152	0.053
	UL (%)	53 ± 41	105 ± 40	0.053
	RDI (%)	246 ± 25	239 ± 62	0.854

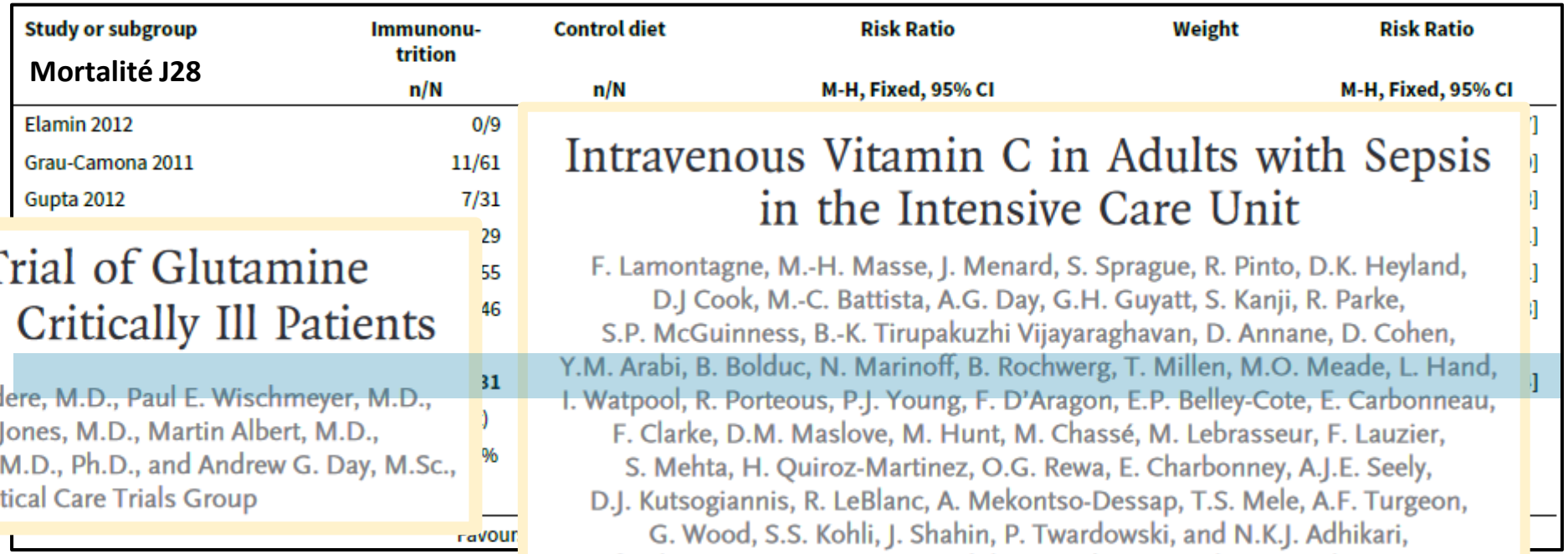
Quantitative data on the magnitude of the systemic inflammatory response and its effect on micronutrient status based on plasma measurements. *Duncan, Am J Clin Nutr 2012*

		Plasma vitamin B-6 (µmol/L)					
CRP	Subject	2.5th Percentile	25th Percentile	Median	75th Percentile	97.5th Percentile	*P*
	n (%)						
≤5 mg/L	401 (50)	10	29	48	78	225	—
>5–10 mg/L	102 (13)	10	15	27	68	276	<0.001
>10–20 mg/L	83 (10)	10	20	32	58	190	0.001
>20–40 mg/L	67 (8)	10	11	24	51	349	<0.001
>40–80 mg/L	61 (8)	10	10	18	34	183	<0.001
>80 mg/L	82 (10)	10	10	15	24	226	<0.001

IMMUNONUTRITION

Immunonutrition for acute respiratory distress syndrome (ARDS) in adults. *Dushianthan, Cochrane 2019*

- Omega-3 dans ARDS ?
- Autres ?



Study or subgroup	Immunonu-trition	Control diet	Risk Ratio	Weight	Risk Ratio
Mortalité J28	n/N	n/N	M-H, Fixed, 95% CI		M-H, Fixed, 95% CI
Elamin 2012	0/9				
Grau-Camona 2011	11/61				
Gupta 2012	7/31				

A Randomized Trial of Glutamine and Antioxidants in Critically Ill Patients

Daren Heyland, M.D., John Muscedere, M.D., Paul E. Wischmeyer, M.D., Deborah Cook, M.D., Gwynne Jones, M.D., Martin Albert, M.D., Gunnar Elke, M.D., Mette M. Berger, M.D., Ph.D., and Andrew G. Day, M.Sc., for the Canadian Critical Care Trials Group

Intravenous Vitamin C in Adults with Sepsis in the Intensive Care Unit

F. Lamontagne, M.-H. Masse, J. Menard, S. Sprague, R. Pinto, D.K. Heyland, D.J Cook, M.-C. Battista, A.G. Day, G.H. Guyatt, S. Kanji, R. Parke, S.P. McGuinness, B.-K. Tirupakuzhi Vijayaraghavan, D. Annane, D. Cohen, Y.M. Arabi, B. Bolduc, N. Marinoff, B. Rochwerg, T. Millen, M.O. Meade, L. Hand, I. Watpool, R. Porteous, P.J. Young, F. D'Aragon, E.P. Belley-Cote, E. Carbonneau, F. Clarke, D.M. Maslove, M. Hunt, M. Chassé, M. Lebrasseur, F. Lauzier, S. Mehta, H. Quiroz-Martinez, O.G. Rewa, E. Charbonney, A.J.E. Seely, D.J. Kutsogiannis, R. LeBlanc, A. Mekontso-Dessap, T.S. Mele, A.F. Turgeon, G. Wood, S.S. Kohli, J. Shahin, P. Twardowski, and N.K.J. Adhikari, for the LOVIT Investigators and the Canadian Critical Care Trials Group*

Edinburgh Research Explorer

Randomised trial of glutamine, selenium, or both, to supplement parenteral nutrition for critically ill patients

Citation for published version:
Andrews, PJD, Avenell, A, Noble, DW, Campbell, MK, Croal, BL, Simpson, WG, Vale, LD, Battison, CG, Jenkinson, DJ & Cook, JA 2011, 'Randomised trial of glutamine, selenium, or both, to supplement parenteral nutrition for critically ill patients' BMJ, vol 342, d1542, pp. 1-8., 10.1136/bmj.d1542

SITUATIONS PARTICULIERES

- Decubitus ventral
  - Arrêt nutrition ?

Before–after study of a standardized ICU protocol for early enteral feeding in patients turned in the prone position. *Reignier, Clin Nutrition 2010*

	Control group (n=64)	Intervention group (n=69)	p-value
Median volume EN (ml)	774 (513-925)	1170 (736-1417)	p<0.001
Gastro-intestinal intolerance	24 (71%)	24 (63%)	p=0,5
Ventilator-Associated pneumonia	10 (29%)	9 (24%)	p=0,58

Administration of EN and gastro-intestinal complications in Covid-19 critical patients in prone position. *Alvez de Paula, Clin Nutrition Open Science 2022*

Factors contributing to GII	*P*-value	OR (CI 95%)
Noradrenaline		
Epinephrine		
Vasopressin	0,812	1,00 (0,97–1,02)
Prone		
Constipation		
Prokinetic		
BMI		
Infusion speed ≥45ml/h		
Enteral formulation (2,0 kcal/ml		
Use of protein module (gravitat		
Prone time >24 hours		
Diabetes mellitus		
Age	0,751	1,00 (0,98–1,03)

Meta-Analysis of Efficacy and Safety of Prone Enteral Nutrition in Critically Ill Ventilated Patients. *Zhu, Alternative Therapy 2023*

Ventilator-associated-pneumonia

	P-value
	0,012
	0,002
	0,046
	0,500
	0,062
	0,319
	0,174
	0,222
	0,625
	0,190
Age	0,476

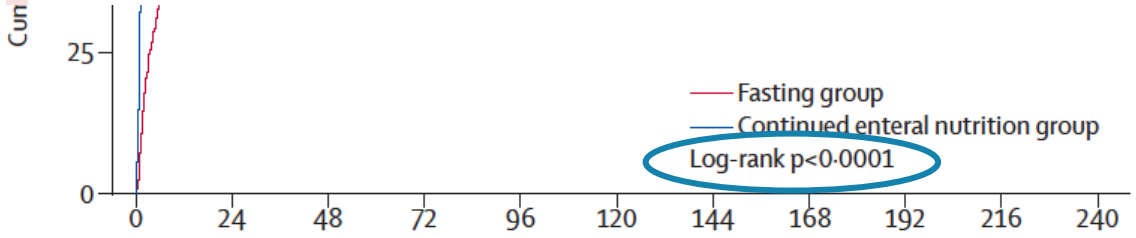
SITUATIONS PARTICULIERES

Continued EN until extubation compared with fasting before extubation in patients in ICU : an open-label, cluster-randomised, parallel-group, non-inferiority trial. *Landais, Lancet Respir 2023*

- Extubation

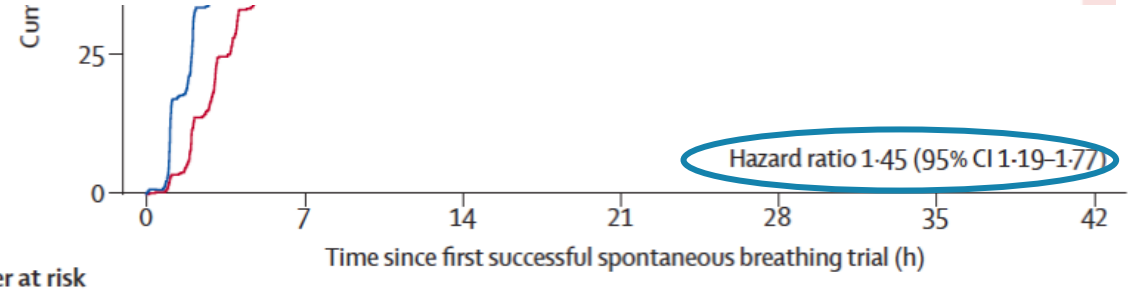
	Continued enteral nutrition group (n=617)	Fasting group (n=513)	Between-group difference* (95% CI)	Relative risk or rate ratio (95% CI)
Primary outcome				
Extubation failure within 7 days after extubation†	106 (17·2%)	90 (17·5%)	−0·4% (−5·2 to 4·5)	0·98 (0·74 to 1·29)
Secondary outcomes				
Nosocomial pneumonia‡	10 (1·6%)	13 (2·5%)	NA	0·77 (0·22 to 2·69)
Duration from the first successful spontaneous breathing trial to extubation, h§	2·0 (1·0 to 4·4)	17·6 (3·4 to 26·8)	NA	NA
Duration from the first successful spontaneous breathing trial to intensive care unit discharge, days¶	4·0 (2·0 to 8·0)	6·6 (3·0 to 11·1)	NA	NA

Extubation



Number at risk (number censored)											
Continued enteral nutrition group	602 (0)	67 (0)	32 (0)	18 (0)	14 (0)	11 (0)	11 (0)	10 (0)	7 (0)	7 (0)	5 (0)
Fasting group	485 (0)	161 (0)	76 (0)	37 (0)	26 (0)	20 (0)	14 (0)	9 (0)	8 (0)	6 (0)	4 (0)

ICU discharge



Number at risk (number censored)							
Continued enteral nutrition group	602 (0)	182 (0)	75 (0)	42 (0)	29 (0)	18 (0)	13 (0)
Fasting group	485 (0)	234 (0)	111 (0)	62 (0)	35 (0)	24 (0)	15 (0)

QUEL SOLUTÉ

- Hypercalorique ?

Energy-Dense versus Routine Enteral Nutrition in the Critically Ill. *Target invetigators, NEJM 2018*

Measure	1.5-kcal Group (N=1971)	1.0-kcal Group (N=1985)†	Difference or Relative Risk (95% CI)‡
Median time from ICU admission to commencing trial nutrition (IQR) — hr	15.8 (7.7 to 26.3)	15.9 (7.9 to 28.3)	−0.4 (−1.1 to 0.4)
Median duration of trial nutrition (IQR) — days§	6.0 (3.0 to 11.0)	6.0 (3.0 to 11.0)	0
Volume of trial nutrition delivered — ml/day¶	1242±318	1262±313	−20 (−40 to 0)
Percentage of trial target rate delivered	81±17	82±16	−1 (−2 to 0)
Calories delivered — kcal/day¶			
Trial nutrition	1863±478	1262±313	601 (576 to 626)
Trial nutrition plus other sources‖	1930±547	1407±397	523 (493 to 553)

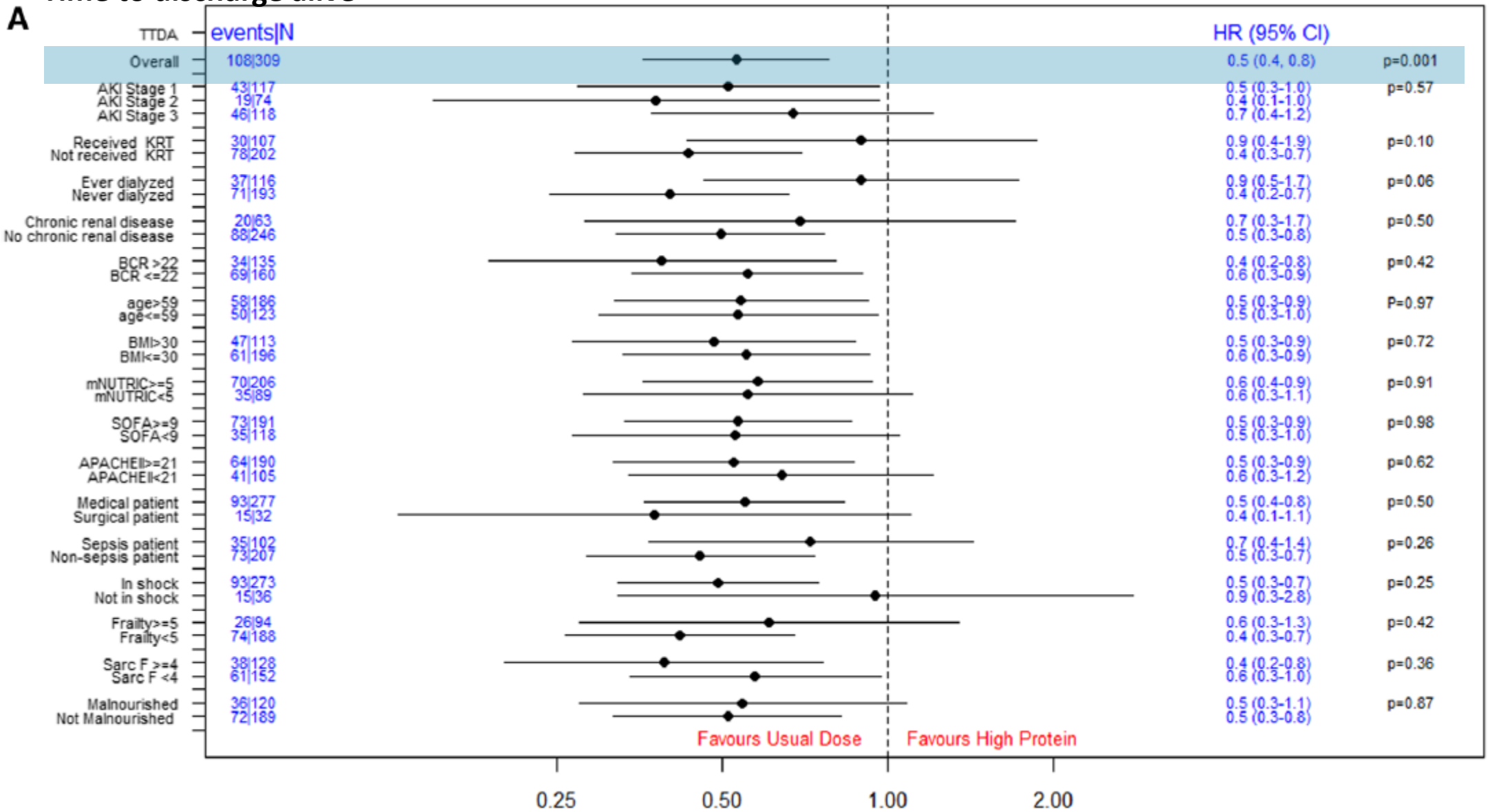
Outcome	1.5-kcal Group	1.0-kcal Group	Difference or Relative Risk (95% CI)*
Primary outcome: death by day 90 — no./total no. (%)	523/1948 (26.8)	505/1966 (25.7)	1.05 (0.94 to 1.16)†
Secondary outcomes			
Death by the time of hospital discharge — no./total no. (%)	468/1967 (23.8)	470/1981 (23.7)	1.00 (0.97 to 1.04)
Death by day 28 — no./total no. (%)	450/1961 (22.9)	455/1976 (23.0)	1.00 (0.89 to 1.12)
Median days alive and not in ICU (IQR)‡	17.0 (0 to 23.0)	17.4 (0 to 23.1)	0
Median days alive and not in hospital (IQR)‡	2.9 (0 to 15.7)	2.9 (0 to 15.3)	0
Use and duration of organ support§			
Received invasive mechanical ventilation — no./total no. (%)	1971/1971 (100)	1982/1984 (99.9)	
Median days alive and free of invasive ventilation (IQR)	20.0 (0 to 25.0)	20.0 (0 to 25.0)	0
Received vasopressor support — no./total no. (%)	1599/1971 (81.1)	1615/1984 (81.4)	1.00 (0.97 to 1.03)
Median days alive and free of vasopressor support (IQR)	23.0 (2.0 to 26.0)	23.0 (4.0 to 26.0)	0
Received renal replacement therapy — no./total no. (%)	367/1946 (18.9)	361/1955 (18.5)	1.02 (0.90 to 1.16)
Median days alive and free of renal replacement therapy (IQR)	28.0 (8.0 to 28.0)	28.0 (10.0 to 28.0)	0

QUEL SOLUTÉ

The effect of highe
nutritional risk (EF
pragmatic, registry

The impact of higher protein dosing on outcomes in critically ill patients with acute kidney injury: a post hoc analysis of the EFFORT protein trial.
Stoppe, Crit care 2023

Time to discharge alive



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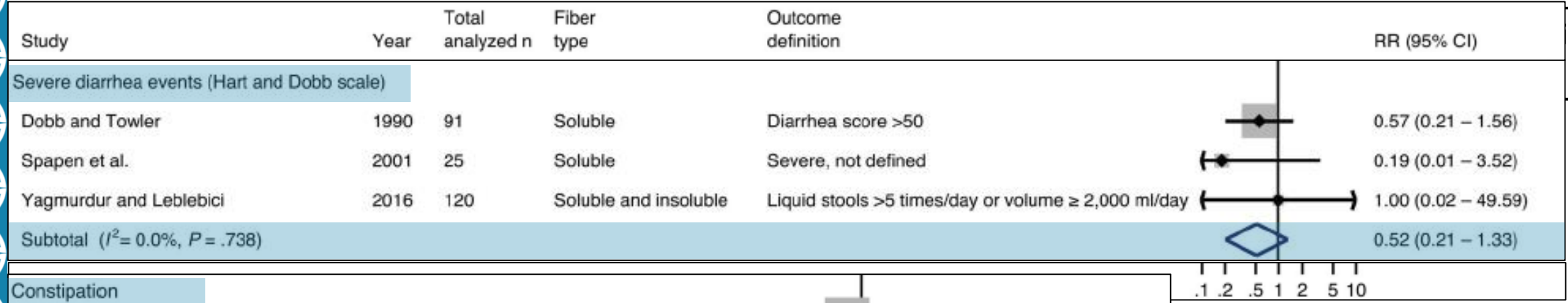
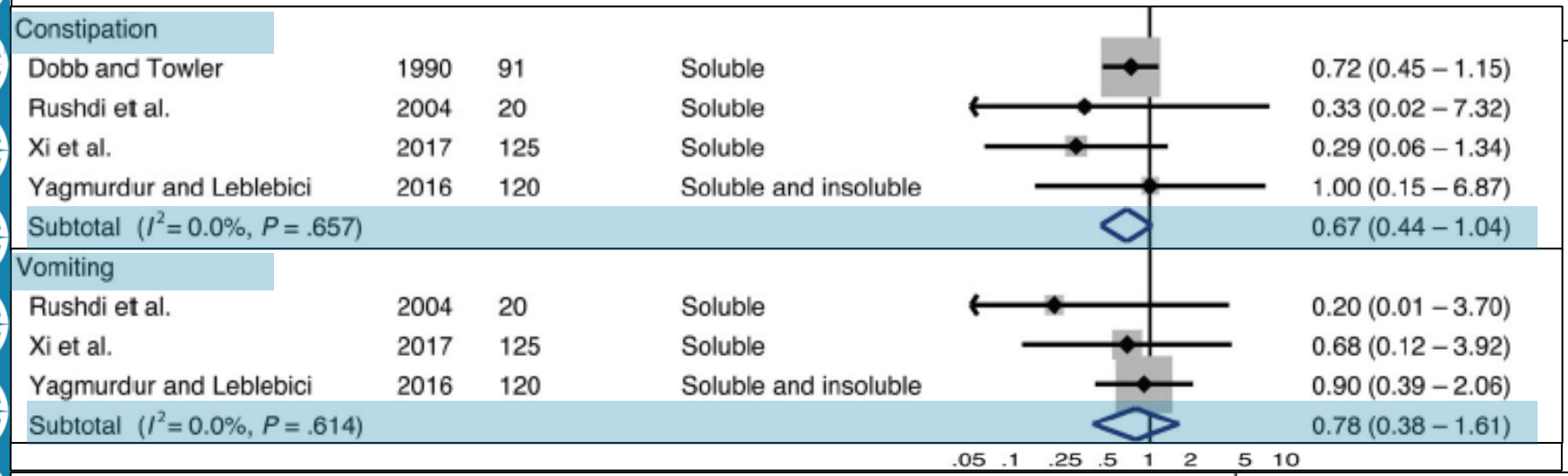
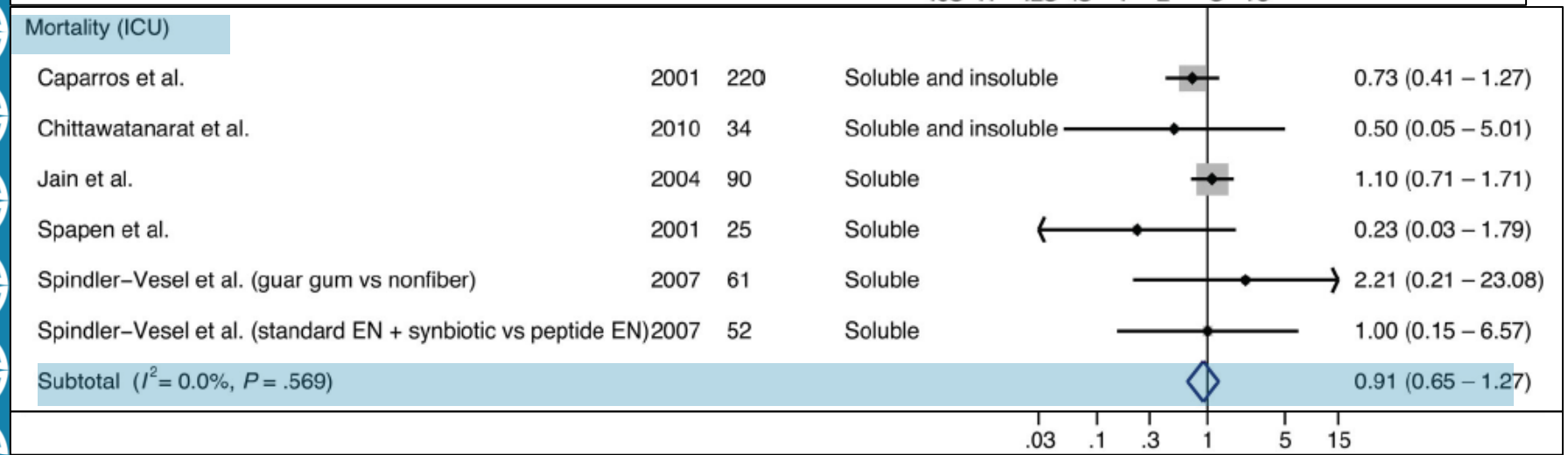

Study
Year
Total analyzed n
Fiber type
Outcome definition
RR (95% CI)
Severe diarrhea events (Hart and Dobb scale)
Dobb and Towler 1990 91 Soluble Diarrhea score >50 0.57 (0.21 – 1.56)
Spapen et al. 2001 25 Soluble Severe, not defined 0.19 (0.01 – 3.52)
Yagmurdur and Leblebici 2016 120 Soluble and insoluble Liquid stools >5 times/day or volume ≥ 2,000 ml/day 1.00 (0.02 – 49.59)
Subtotal (I^2 = 0.0%, P = .738) 0.52 (0.21 – 1.33)
.1 .2 .5 1 2 5 10

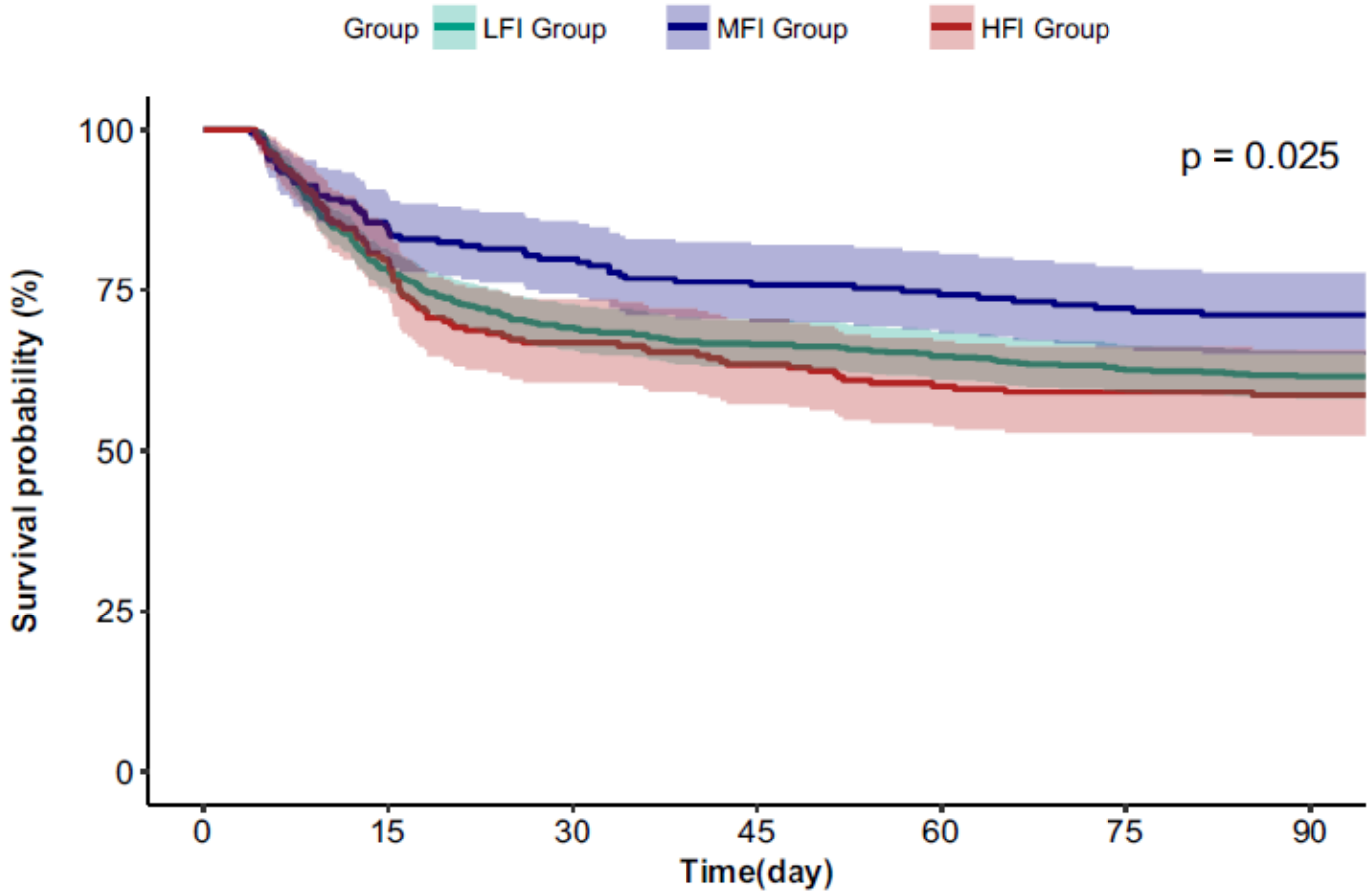

Constipation
Dobb and Towler 1990 91 Soluble 0.72 (0.45 – 1.15)
Rushdi et al. 2004 20 Soluble 0.33 (0.02 – 7.32)
Xi et al. 2017 125 Soluble 0.29 (0.06 – 1.34)
Yagmurdur and Leblebici 2016 120 Soluble and insoluble 1.00 (0.15 – 6.87)
Subtotal (I^2 = 0.0%, P = .657) 0.67 (0.44 – 1.04)
Vomiting
Rushdi et al. 2004 20 Soluble 0.20 (0.01 – 3.70)
Xi et al. 2017 125 Soluble 0.68 (0.12 – 3.92)
Yagmurdur and Leblebici 2016 120 Soluble and insoluble 0.90 (0.39 – 2.06)
Subtotal (I^2 = 0.0%, P = .614) 0.78 (0.38 – 1.61)
.05 .1 .25 .5 1 2 5 10


Mortality (ICU)
Caparros et al. 2001 220 Soluble and insoluble 0.73 (0.41 – 1.27)
Chittawatanarat et al. 2010 34 Soluble and insoluble 0.50 (0.05 – 5.01)
Jain et al. 2004 90 Soluble 1.10 (0.71 – 1.71)
Spapen et al. 2001 25 Soluble 0.23 (0.03 – 1.79)
Spindler–Vesel et al. (guar gum vs nonfiber) 2007 61 Soluble 2.21 (0.21 – 23.08)
Spindler–Vesel et al. (standard EN + synbiotic vs peptide EN) 2007 52 Soluble 1.00 (0.15 – 6.57)
Subtotal (I^2 = 0.0%, P = .569) 0.91 (0.65 – 1.27)
.03 .1 .3 1 5 15

QUEL SOLUTÉ

- Fibres

Association of early dietary fiber intake and mortality in septic patients with mechanical ventilation based on MIMIC IV 2.1 database: a cohort study. *Wang, nutrition journal 2024*



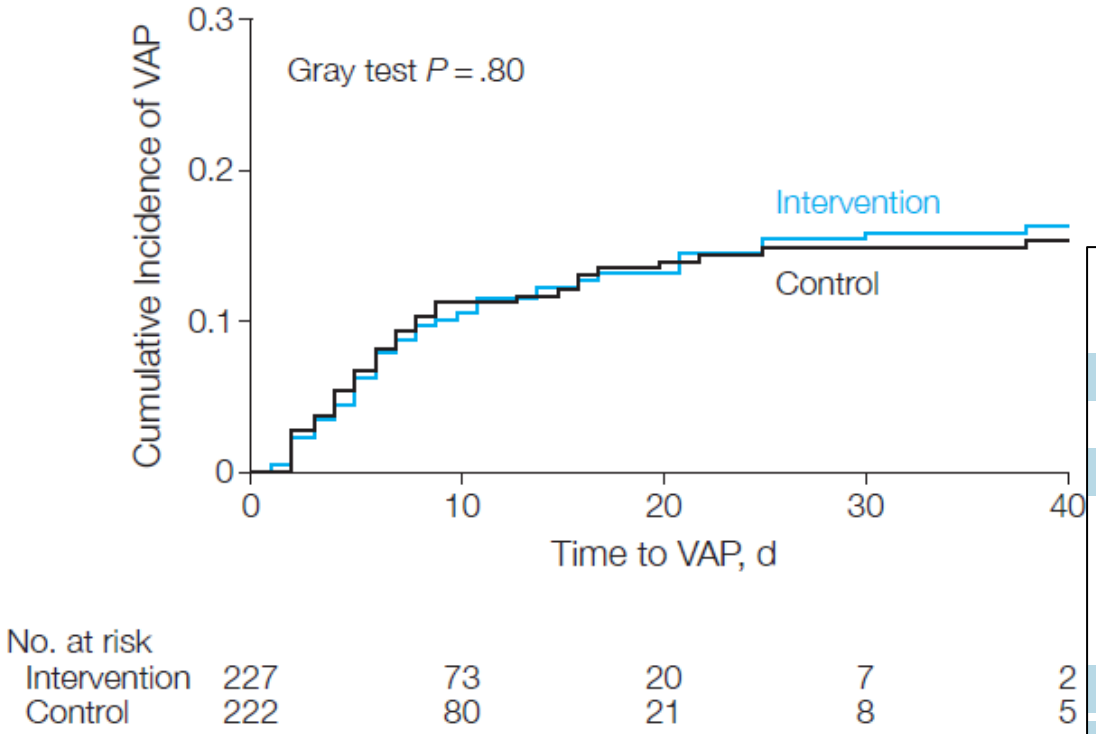
Number at risk

LFI Group	655	513	453	436	424	410	404
MFI Group	194	165	155	147	144	140	138
HFI Group	208	166	139	132	125	123	122

INTOLÉRANCE À LA NUTRITION ENTÉRALE

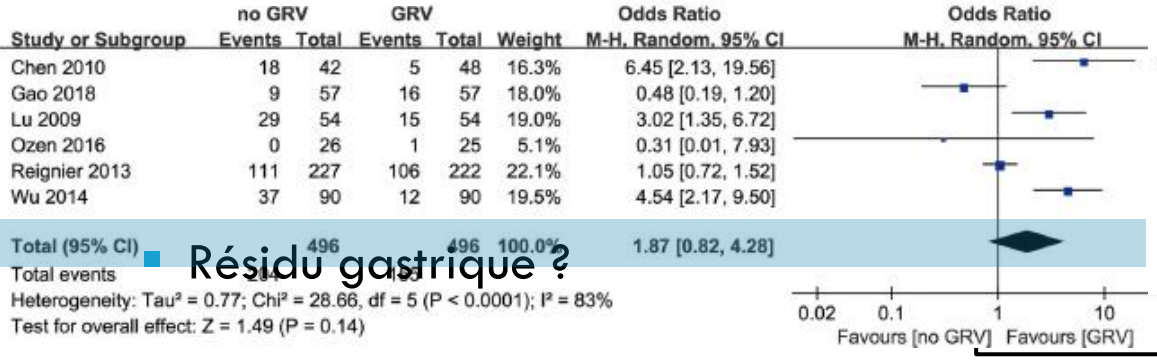
- Résidu gastrique ?

Effect of Not Monitoring Residual Gastric Volume on Risk of VAP in Adults Receiving MV and Early Enteral Feeding. *Reignier, JAMA 2013*



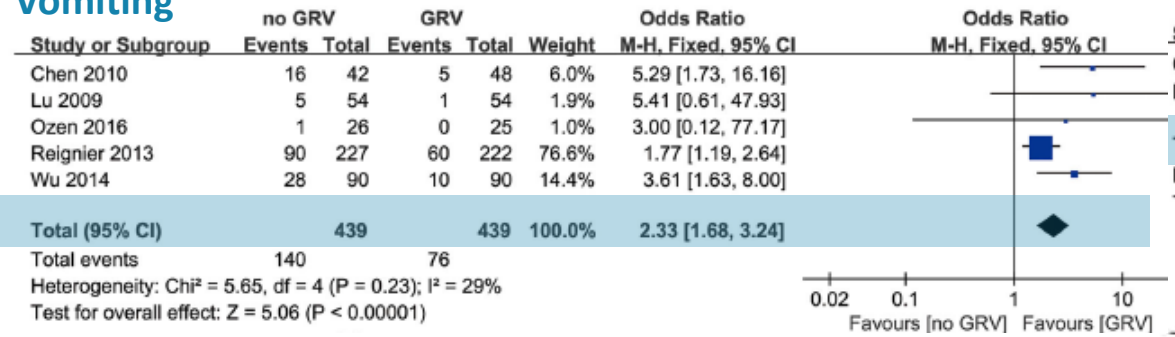
	Intervention (n = 227)	Control (n = 222)	% or Median Difference (90% CI)
Vomiting, No. (%)	90 (39.6)	60 (27.0)	12.6 (5.4-19.9)[a]
Intolerance to enteral nutrition, No. (%)[b]	90 (39.6)	141 (63.5)	
Erythromycin as prokinetic treatment, No. (%)	89 (39.2)	139 (62.6)	−23.4 (−31.0 to −15.9)[a]
Other prokinetic treatment, No. (%)	5 (2.2)	6 (2.7)	−0.5 (−2.9 to 1.9)[a]
Cumulative calorie deficit from day 0 to day 7, median (IQR), kcal[c]	319 (93-1012)	509 (185-1252)	−111 (−198 to −36)[d]
Diarrhea, No. (%)	51 (22.5)	51 (23.0)	−0.5 (−7.0 to 6.0)[a]
ICU-acquired infection, No. (%)[e]	60 (26.4)	60 (27.0)	−0.6 (−7.5 to 6.3)[a]
Duration of mechanical ventilation, median (IQR), d	7 (4-13)	7 (5-13)	0 (−1 to 0)[d]
ICU length of stay, median (IQR), d	10 (6-17)	10 (7-17)	−1 (−2 to 0)[d]
Hospital length of stay, median (IQR), d	17 (9-31)	19 (10-32)	−1 (−3 to 1)[d]
Mortality			
Day 28, No. (%)	63 (27.8)	61 (27.5)	0.3 (−6.7 to 7.2)[a]
Day 90, No. (%)	82 (36.3)	76 (34.2)	2.1 (−5.4 to 9.5)[a]

Abdominal distension

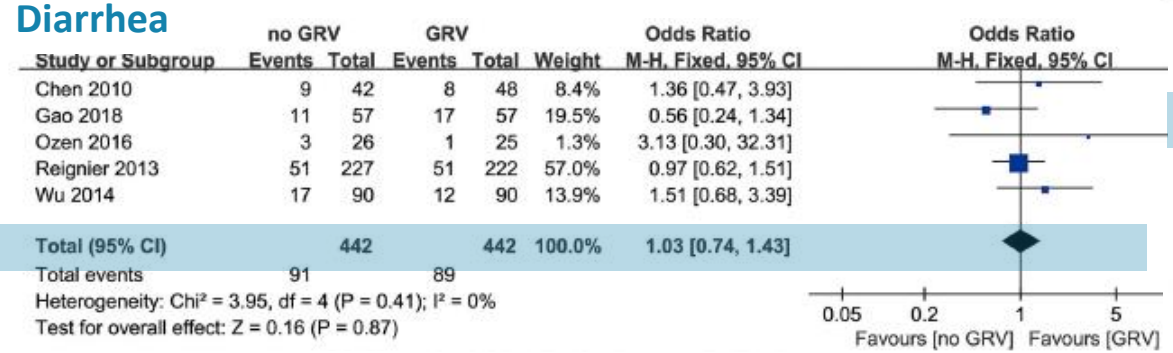


Résidu gastrique ?

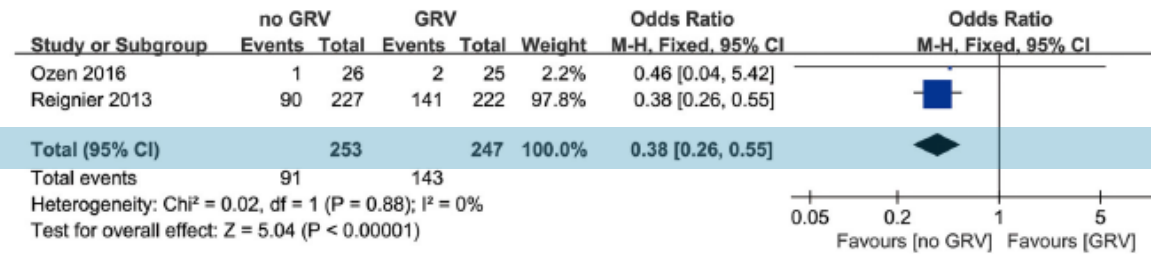
Vomiting



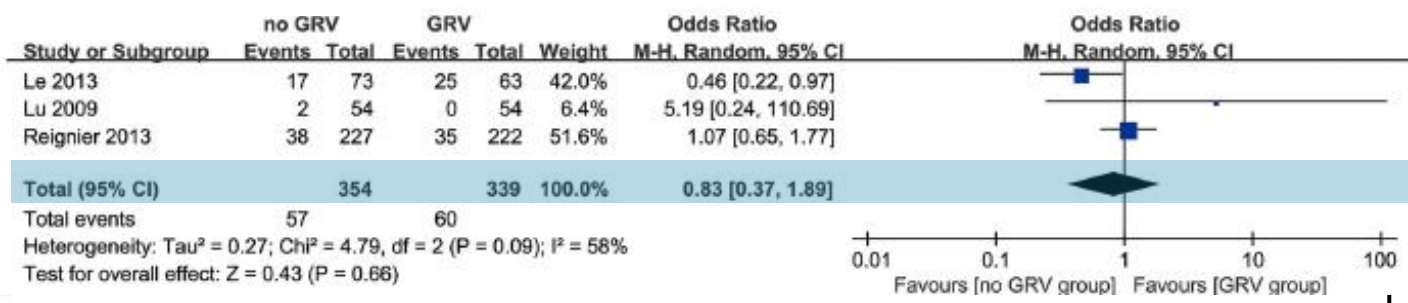
Diarrhea



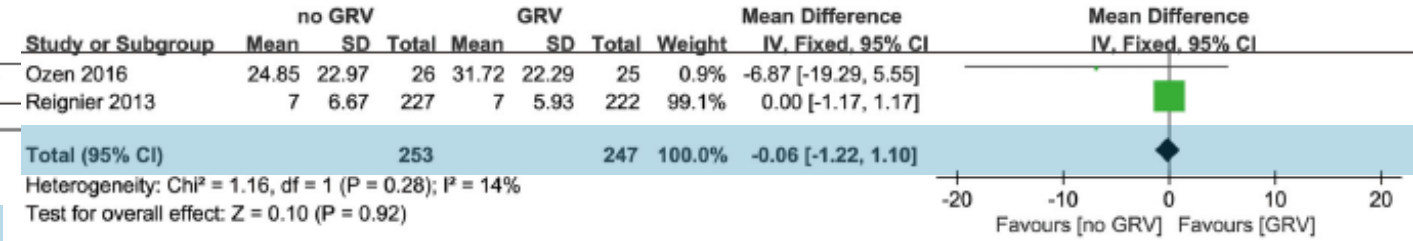
Feeding intolerance



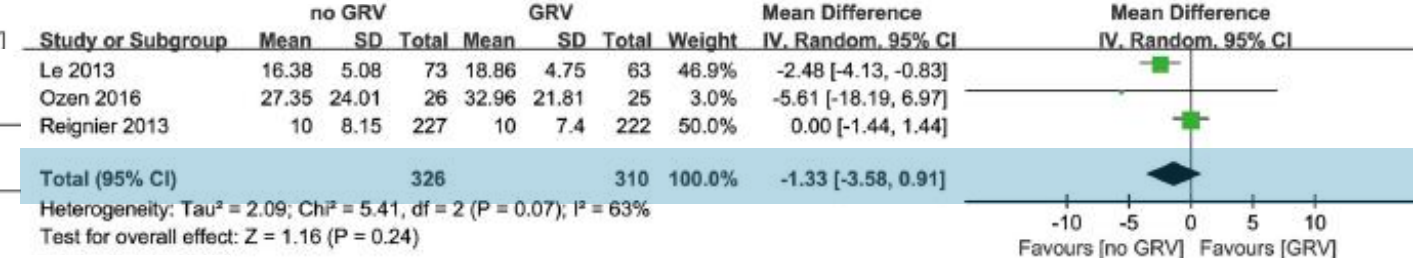
Incidence of VAP



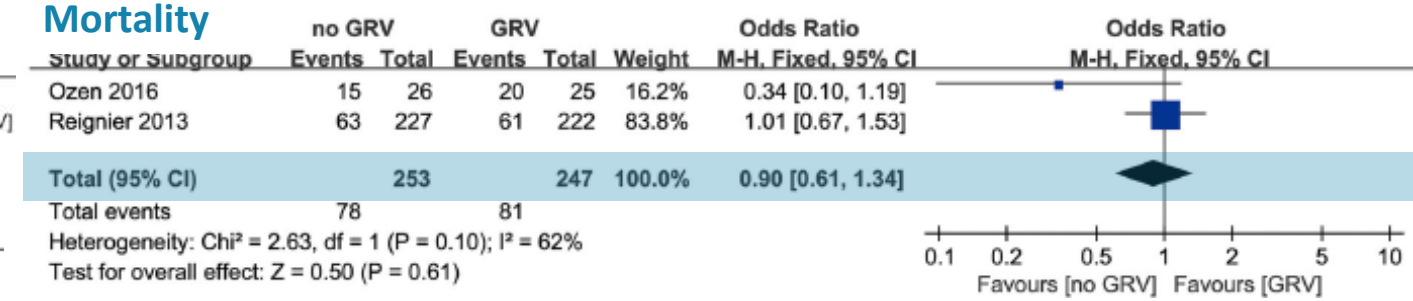
Duration of mechanical ventilation



ICU length of stay



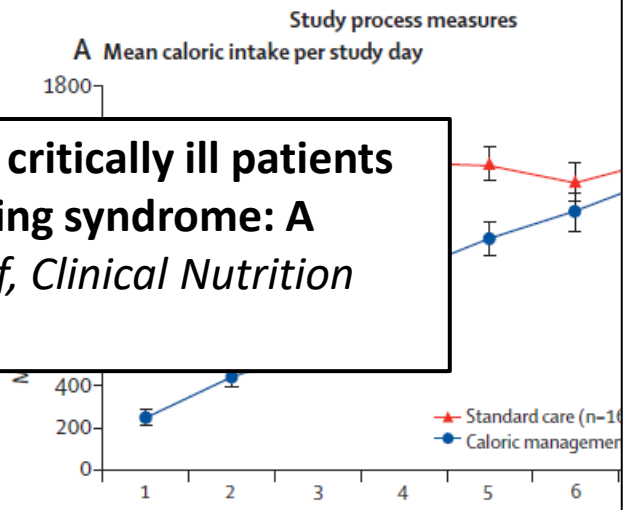
Mortality

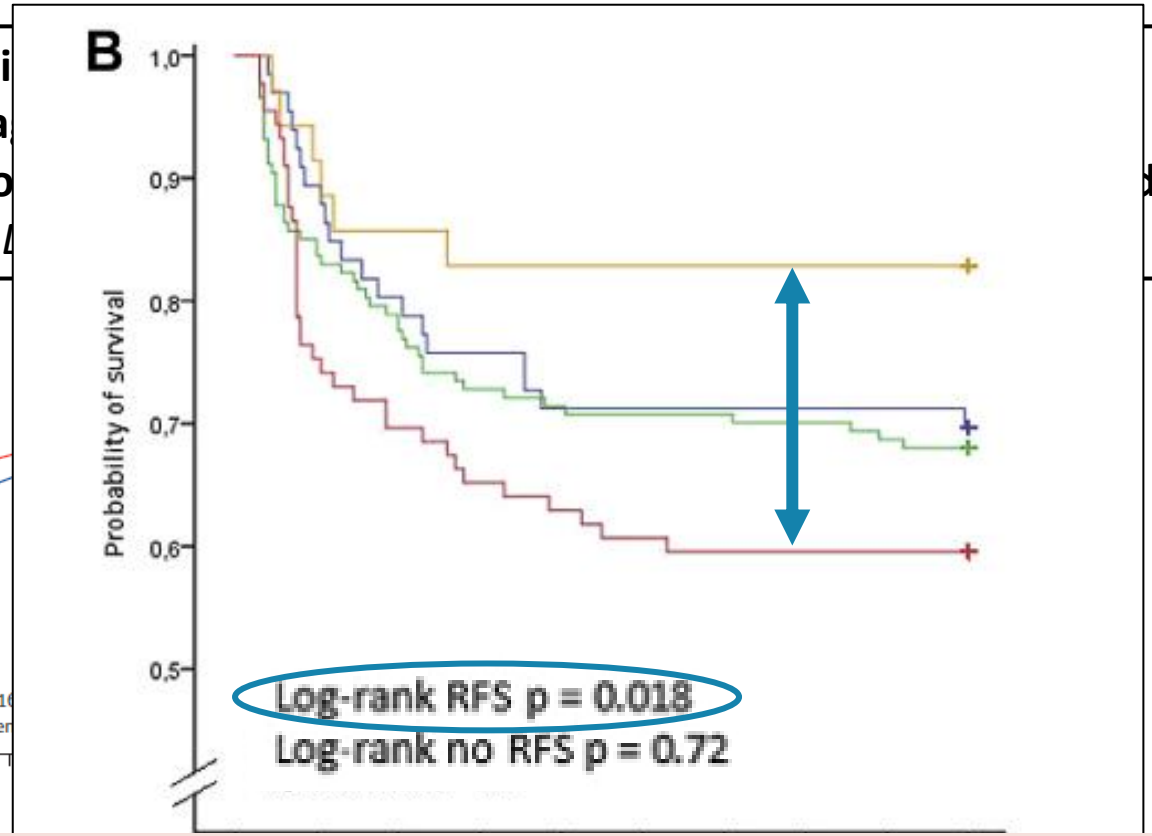


SYNDROME DE RENUTRITION

- Hypophosphorémie

Impact of caloric intake in critically ill patients with, and without, refeeding syndrome: A retrospective study. *Olthof, Clinical Nutrition 2018*





	Standard care (n=165 patients)	Caloric management (n=166 patients)	Risk difference (95% CI)	p value
Number of days alive after discharge from the ICU at day 60	39,9 (36,4-43,7)	44,8 (40,9–49,1)	4,9 (–2,3 to 13,6)	0,19
Vital status (% alive)				
ICU discharge status	150/165 (9			20
Hospital discharge status	135/165 (8			017
Day 60 status	128/163 (7			002
Day 90 status	128/163 (7			041
Length of stay (days)				
ICU	10·0 (9·2 t			14
Hospital	21·7 (20·0			003

NUTRITION DU PATIENT EXTUBÉ

- Patients sous VNI

An observational study on the practice of noninvasive ventilation at a tertiary level Australian intensive care unit. *Korula, Australian Crit Care 2020*

Initial nutritional management during noninvasive ventilation and outcomes: a retrospective cohort study. *Terzi, Crit care 2017*

NIV failure		
han pulmonary edema)	6.00 (1.3–28.7)	0.03
	1.07 (0.99–1.15)	0.11
CPAP	5.00 (1.04–24.1)	0.04
NG tube in situ	6.20 (1.9–19.8)	<0.01
Median duration breaks first 24 h	1.00 (0.99–1.01)	0.28
Median duration breaks second 24 h	0.96 (0.91–0.99)	0.04

Effect of standardized enteral nutrition on AECOPD patients with respiratory failure. *Zhang, Am J Transl Res 2021*

28-Day outcomes	sHR (95% CI)	*P* value
Parenteral nutrition	**1.7 (1.0–2.7)**	**0.04**
Enteral nutrition	**2.1 (1.1–4.2)**	**0.03**
Oral nutrition	0.5 (0.3–0.7)	**0.0005**
	HR (95% CI)	*P* value
Mortality		**0.02**
VA		
Enteral nutrition	**6.9 (2.1– 22.3)**	**0.001**
Oral nutrition	0.9 (0.4–2.1)	0.76

Group	HB		ALB		TP	
	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Control group (n=46)	86.72±6.49	103.22±7.12*	26.18±2.54	32.37±2.77*	40.45±2.36	49.97±2.48*
Observation group (n=46)	87.14±6.34	114.67±6.91*	26.47±2.73	38.43±2.82*	40.17±2.65	59.52±3.13*
t	0.3140	7.8270	0.5275	1.3977	0.5352	16.2195
P	0.7543	<0.0001	0.5992	<0.0001	0.5939	<0.0001

NUTRITION DU PATIENT EXTUBÉ

- Patients sous OHD
  - Altération déglutition avec débit > 40 L/min *(Azirono, Effects of different high-flow nasal cannula flow rates on*

Effects of high-flow nasal cannula oxygen therapy on oral intake of do-not-intubate patients with respiratory diseases. *Shibata, J Med Science 2021*

E …**asal-cannula oxyge**…**nation: An observational study.** *Zerbib, Nutrition 2021*

	HFNC (n=20)	Reservoir mask (n=23)	*P* value
In-hospital mortality	100%	100%	1.000
Overall hospital stay, day	30%	50%	0.560
	(1.9–45.2)	(3.3–55.0)	
Sedation	17 (85.0%)	16 (69.6%)	0.294
Opioid use	17 (85.0%)	12 (54.2%)	0.049*
Midazolam use	0	6 (25.0%)	0.023*
Duration from admission until application of HFNC or reservoir mask, days	7.2 [2.9–19.0]	16.1 [5.1–26.9]	0.201
Survival from starting oxygen therapy with HFNC or reservoir mask until death, days	8.9 [3.8–17.0]	3.1 [2.2–4.7]	0.005*
Able to eat solids, days	7.8 [2.6–14.3]	0.3 [0.1–1.6]	0.002*
Unable to eat solids, days	1.4 [0.6–2.5]	2.2 [1.4–3.1]	0.468
Able to drink, days	7.8 [2.6–14.3]	0.3 [0.1–3.0]	0.002*
Unable to drink, days	0.9 [0.6–2.0]	2.0 [1.2–3.0]	0.370

NUTRITION DU PATIENT EXTUBÉ

Increased Hospital-Based Physical Rehabilitation and Information Provision After Intensive Care Unit Discharge The RECOVER Randomized Clinical Trial. *Walsh, JAMA intern 2015*

- Programme de réhabilitation ?

Outcome (No. of Patients With Evaluable Data in Usual Care/Intervention Groups)	Treatment Group		Difference Scores, Mean (95% CI)	*P* Value
	Usual Care	Intervention		
RMI at 3 mo (110/118)[a]	13 (10 to 14)	13 (10 to 14)	−0.2 (−1.3 to 0.9)[b]	.71
Hospital Discharge Outcome				
Post-ICU hospital length of stay, d (119/119)[c]	10 (6 to 23)	11 (6 to 22)	0 (−2 to 2)[b]	.90
RMI (84/83)[d]	8 (5 to 10)	8 (6 to 11)	−0.7 (−1.7 to 0.4)[b]	.20
Handgrip strength, kg (82/82)[e]	15.0 (9.7 to 22.6)	14.7 (10.0 to 22.0)	1.1 (−1.3 to 3.6)[b]	.36
VAS symptom score, median (IQR) (83/80) [f]				
Breathlessness	2.8 (1.1 to 5.3)	2.5 (1.0 to 5.0)	0.2 (−0.5 to 1.0)	.49
Fatigue	5.0 (3.2 to 6.7)	5.1 (2.7 to 7.2)	0.0 (−0.9 to 0.9)	.96
Appetite	4.1 (1.7 to 6.7)	5.0 (1.9 to 7.6)	−0.4 (−1.6 to 0.4)	.33
Pain	2.6 (0.7 to 5.2)	2.3 (0.8 to 4.7)	0.0 (−0.6 to 0.8)	.89
Joint stiffness	3.6 (1.1 to 6.2)	3.3 (1.1 to 4.9)	0.5 (−0.3 to 1.5)	.21
Destination, % (116/118)[g]				
Own residence	72	76	NA	NA
Rehabilitation hospital/facility	13	13	NA	NA
Other acute care nonstudy hospital	7	6	NA	NA
Other	6	3	NA	NA
Died	2	2	NA	NA

- Etudes à venir… NUTRIREA-4

CONCLUSION

- Débuter tôt, peu, EN ou PN, avec vitamines et oligo-éléments
- Continuer « fort »
- Prescrire simple (solutés)
- S'obstiner… sauf intolérance pathologique…
- S'intéresser à l'après

MERCI