Masterclass Critical Care Nutrition 2019

How to screen the critically ill on ICU admission for nutritional risk?

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Nutrition Hospital
Goede zorg proef je!
You can taste good care !

Gelderse Vallei Hospital
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What is the purpose?

- Malnutrition assessment?
- Risk of mortality?
- Risk of long mechanical ventilation duration?
- To target nutritional support better?
- For research purposes?

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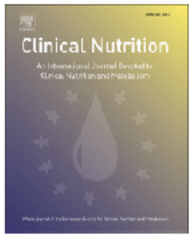

Meta-analyses

Nutrition screening tools: Does one size fit all? A systematic review of screening tools for the hospital setting☆

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83 studies (32 screening tools): None of the tools performed consistently well to establish the patients' nutritional status.

For the elderly, MNA performed fair to good, for the adults MUST performed fair to good.

SGA, NRS-2002 and MUST performed well in predicting outcome in approximately half of the studies reviewed in adults, but not in older patients.

Not one single screening or assessment tool is capable of adequate nutrition screening as well as predicting poor nutrition related outcome.

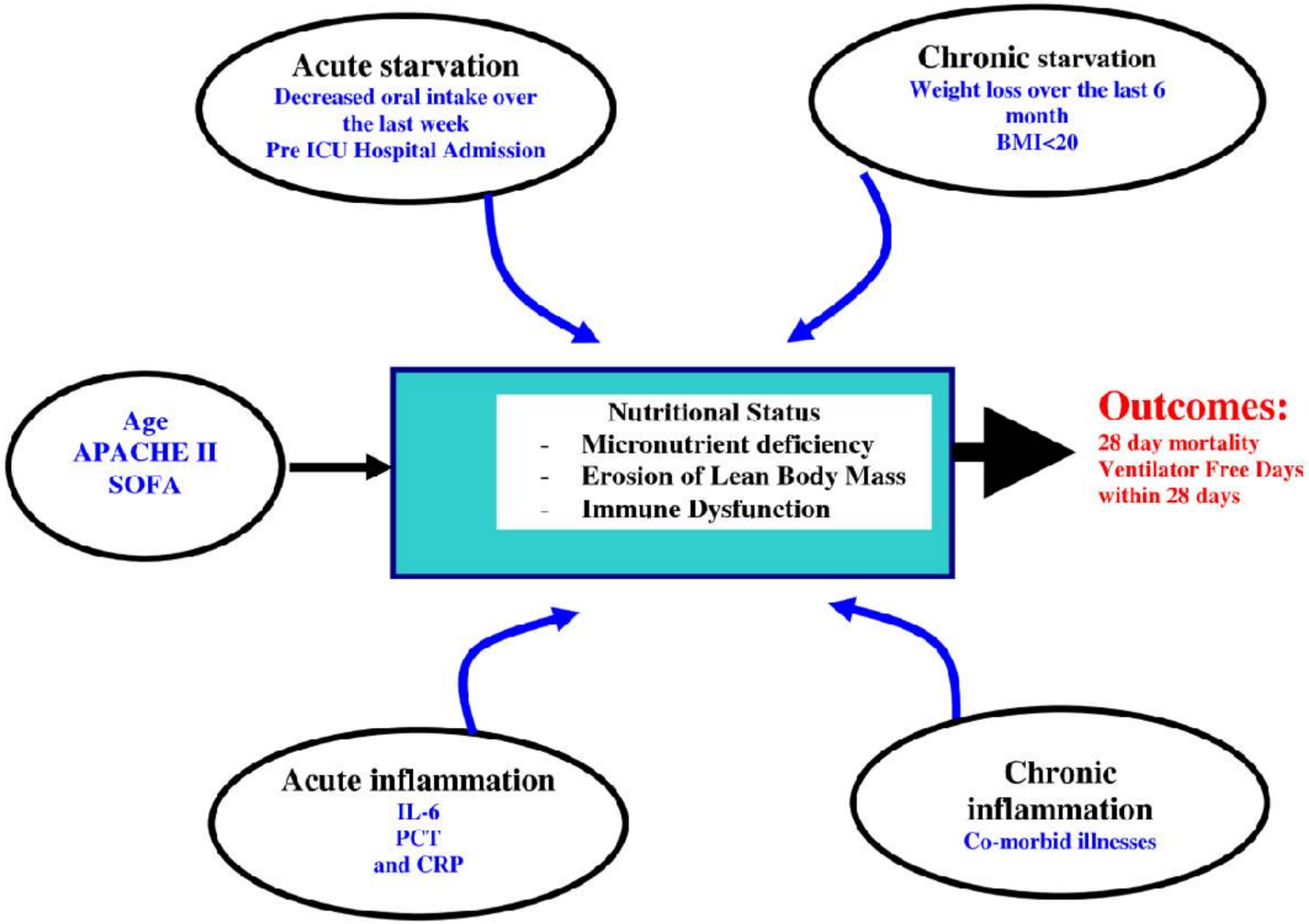
Development of new tools seems redundant and will most probably not lead to new insights. New studies comparing different tools within one patient population are required.

MUST score and mortality in the ICU

	Non Survivors	Survivors	Total	
High score	33	89	122	PPV=29%
Low score	56	164	220	NPV=74%
Total	89	253	342	
	Sen=30%	Spec=74%		

de Vries MC, Koekkoek WK, Opdam MH, van Blokland D, van Zanten AR.
Eur J Clin Nutr. 2018 Mar;72(3):428-435.

Conceptual framework for NUTRIC score



Heyland DK et al. Critical Care 2011, 15:R268

Modified NUTRIC score

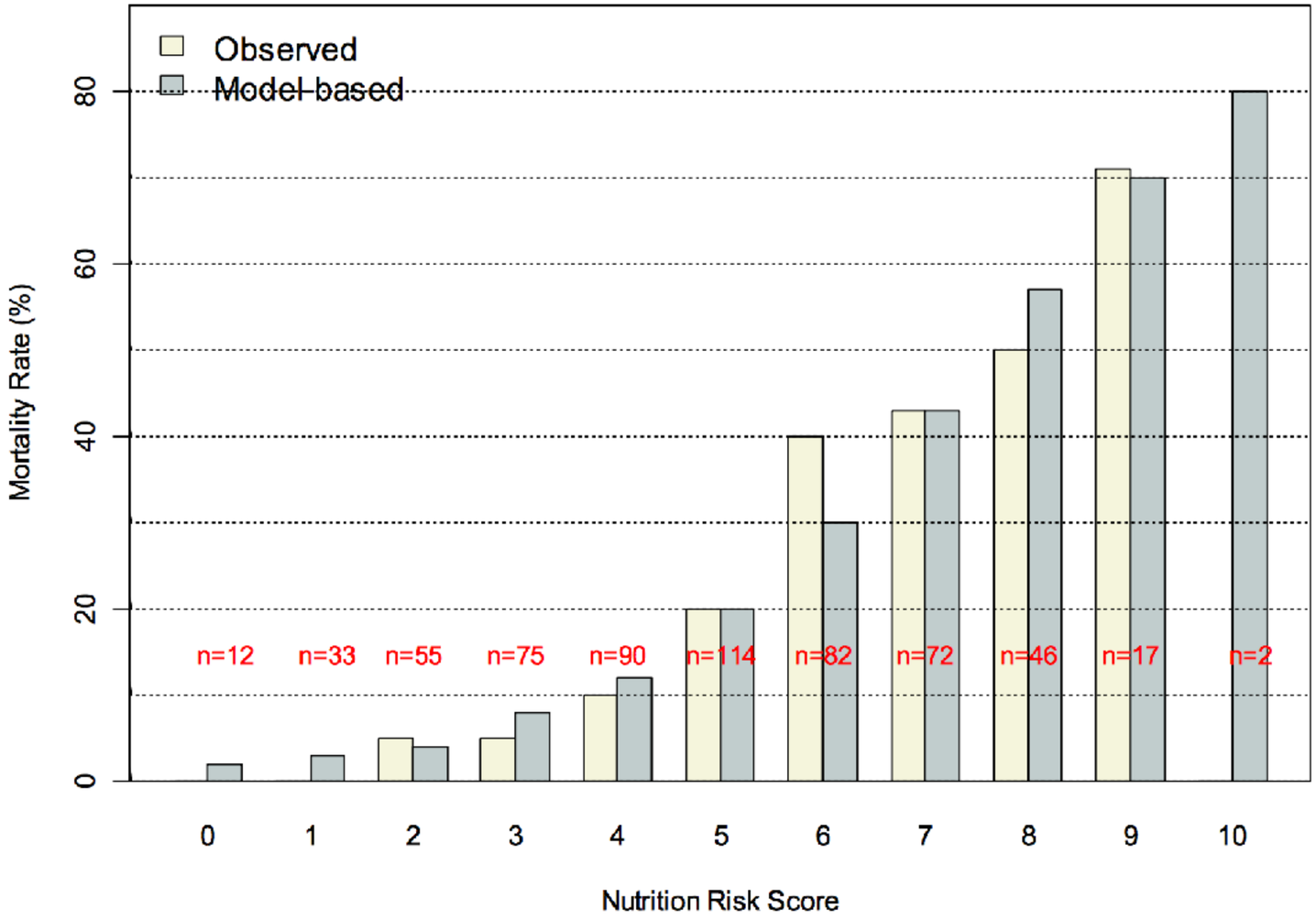
	Overall (n = 598)		Random split A (n = 299)		Random split B (n = 299)	
Variables in NUTRIC Score	**Range**	**Points**	**Range**	**Points**	**Range**	**Points**
Age	< 50	0	< 50	0	< 60	0
	50-< 75	1	50-< 75	1	60-< 75	1
	≥75	2	75+	2	75+	2
APACHE II	< 15	0	< 15	0	< 15	0
	15-< 20	1	15-< 19	1	15-< 28	2
	20-28	2	19-28	2	28+	3
	≥28	3	28+	3		
SOFA	< 6	0	< 6	0	< 6	0
	6-< 10	1	6-< 10	1	6-< 10	1
	≥10	2	≥10	2	≥10	2
# Co-morbidities	0-1	0	0, 1	0		0
	2+	1	2, 3	1	1+	1
			4+	2		
Days from hospital to ICU admit	0-< 1	0	0<-1hr	0	ALL	0
	1+	1	1hr	1		
					220+	1
IL6	0-< 400	0	0-350	0	0-< 450	0
	400+	1	350+	1	450+	1
NUTRIC score discriminative performance	In sample		Out of sample		Out of sample	
AUC	0.783		0.771		0.770	
Gen R-Squared	0.169		0.163		0.157	
Gen Max-rescaled R-Squared	0.256		0.246		0.237	

APACHE II, Acute Physiology and Chronic Health Evaluation; AUC, area under the curve; SOFA, Sequential Organ Failure Assessment.

The proposed NUTRIC score is based on the overall sample. However, we randomly split the data into two halves to cross-validate its performance out of sample. The model developed by random split A was evaluated using random split B and vice versa.

Heyland DK et al. Critical Care 2011, 15:R268

NUTRIC score and mortality rate



Heyland DK et al. Critical Care 2011, 15:R268

Calories received in high and low risk patients based on NUTRIC scores and 28-day mortality

Table 1: NUTRIC Score variables

Variable	Range	Points
Age	<50	0
	50 - <75	1
	≥75	2
APACHE II	<15	0
	15 - <20	1
	20-28	2
	≥28	3
SOFA	<6	0
	6 - <10	1
	≥10	2
Number of Co-morbidities	0-1	0
	≥2	1
Days from hospital to ICU admission	0 - <1	0
	≥1	1
IL-6	0 - <400	0
	≥ 400	1

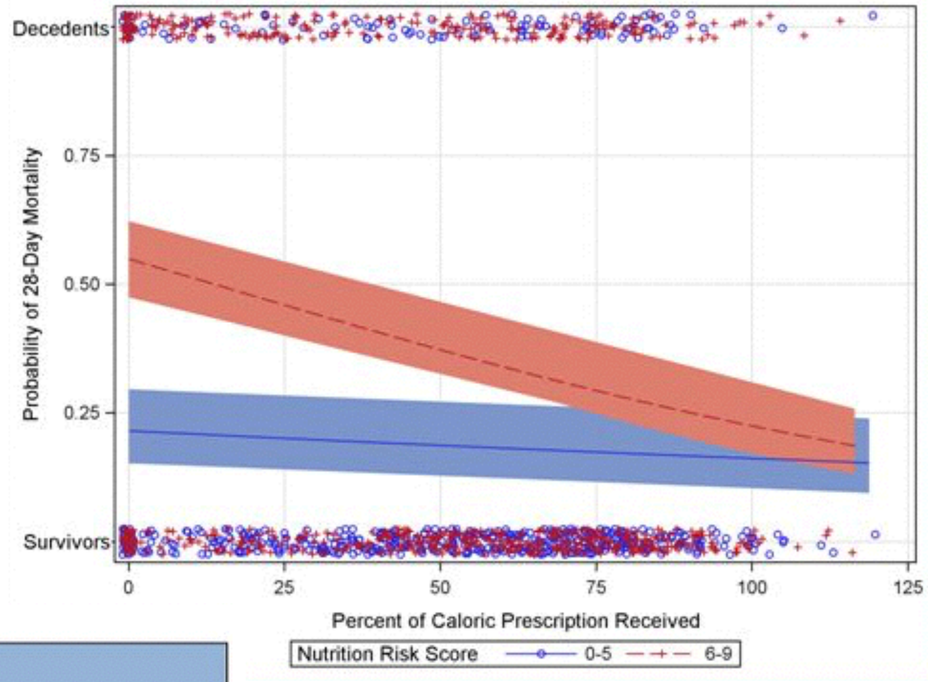


Table 2: NUTRIC Score scoring system: if IL-6 available

Sum of points	Category	Explanation
6-10	High Score	➢ Associated with worse clinical outcomes (mortality, ventilation). ➢ These patients are the most likely to benefit from aggressive nutrition therapy.
0-5	Low Score	➢ These patients have a low malnutrition risk.

Table 3. NUTRIC Score scoring system: If no IL-6 available*

Sum of points	Category	Explanation
5-9	High Score	➢ Associated with worse clinical outcomes (mortality, ventilation). ➢ These patients are the most likely to benefit from aggressive nutrition therapy.
0-4	Low Score	➢ These patients have a low malnutrition risk.

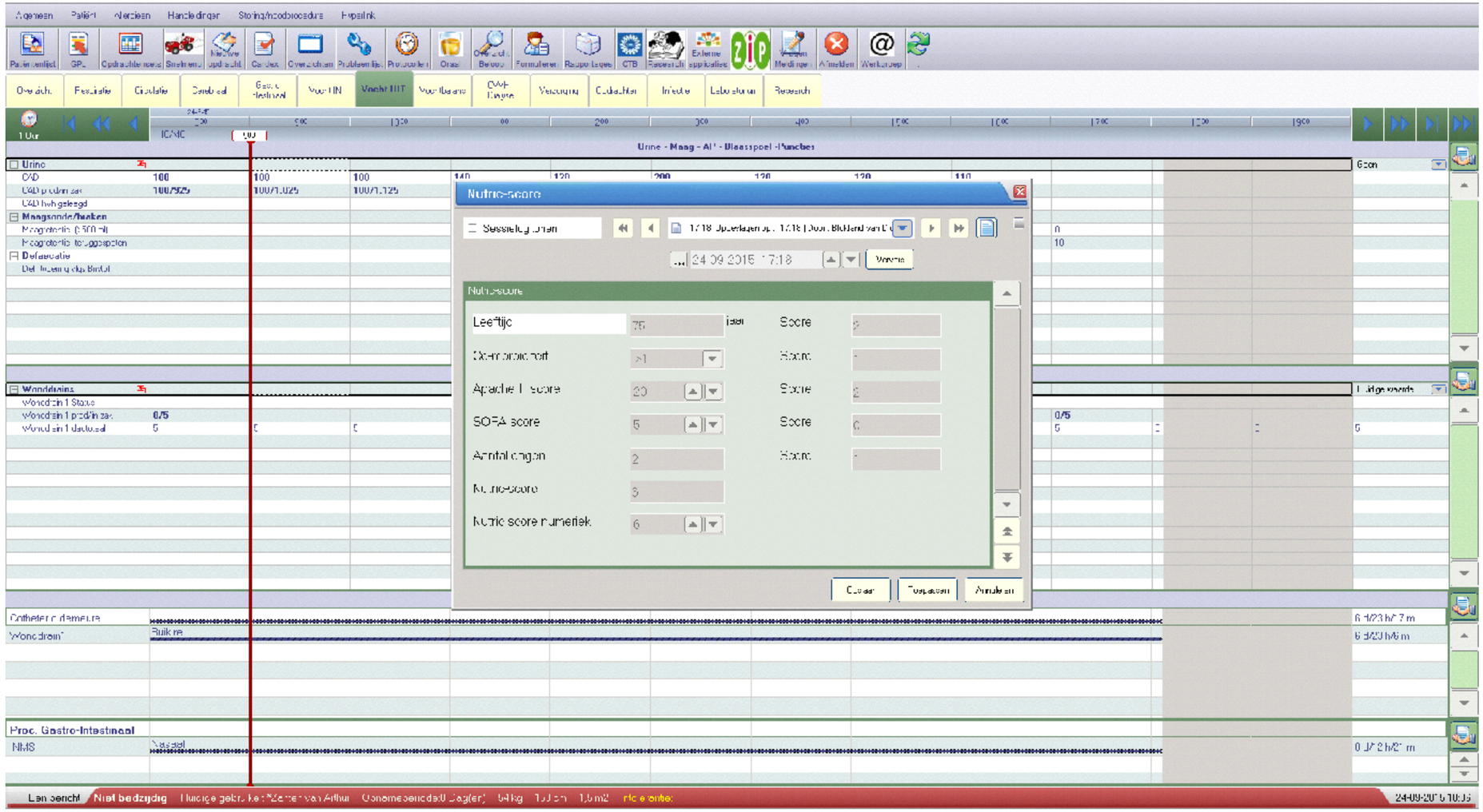
Rahman A et al. Clin Nutr. 2016 Feb;35(1):158-62.

More Protein and Energy Associated With Improved Mortality in Higher Risk Patients

Outcome	Protein Intake (per 10% of Goal)		Energy Intake (per 10% of Goal)	
	Low NUTRIC Score (n = 1,217)	High NUTRIC Score (n = 1,636)	Low NUTRIC Score (n = 1,217)	High NUTRIC Score (n = 1,636)
Sample in ICU ≥ 4 d				
Mortality[a,b]	0.952 (0.895–1.011)	0.930 (0.892–0.969)[c]	0.962 (0.904–1.023)	0.927 (0.893–0.962)[c]
Adjusted[d]	0.998 (0.936–1.064)	0.934 (0.894–0.975)[c]	1.011 (0.946–1.079)	0.929 (0.893–0.966)[c]
TDA[f,g]	0.970 (0.936–1.006)	1.004 (0.967–1.043)	0.956 (0.921–0.992)[c]	0.995 (0.959–1.032)[c]
Adjusted[d]	1.013 (0.975–1.052)	1.051 (1.012–1.091)[c]	0.998 (0.958–1.039)	1.045 (1.007–1.085)[c]
Sample in ICU ≥ 12 d				
Mortality[a,b]	1.059 (0.964–1.165)	0.913 (0.853–0.977)[e]	1.069 (0.975–1.173)	0.909 (0.854–0.967)[e]
Adjusted[d]	1.052 (0.954–1.156)	0.899 (0.84–0.963)[e]	1.067 (0.967–1.178)	0.884 (0.829–0.941)[c]
TDA [f,g]	0.963 (0.913–1.016)	1.062 (1.002–1.126)[e]	0.937 (0.888–0.989)[e]	1.048 (0.990–1.109)
Adjusted[d]	0.999 (0.946–1.056)	1.092 (1.032–1.155)[e]	0.981 (0.925–1.040)	1.091 (1.032–1.155)[e]

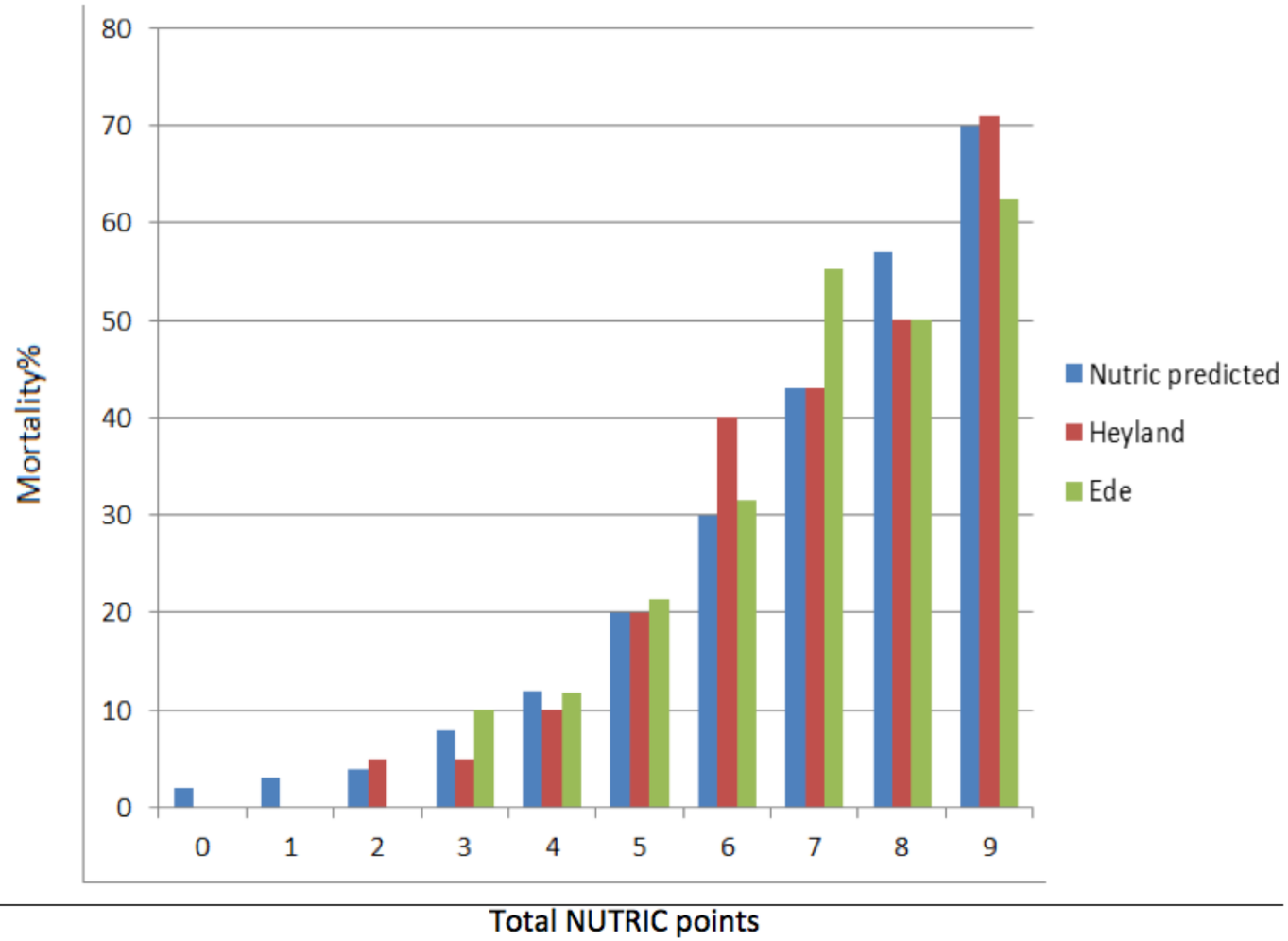
Compher C et al. Crit Care Med 2017; 45:156–163

Nutric score calculation in PDMS



de Vries MC, Koekkoek WK, Opdam MH, van Blokland D, van Zanten AR.
Eur J Clin Nutr. 2018 Mar;72(3):428-435.

NUTRIC score performs as good in Netherlands as in USA/Canada



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ESPEN ICU guidelines 2018

Recommendation 2

- A general clinical assessment should be performed to assess malnutrition in the ICU, until a specific tool has been validated.

- Remark:

- General clinical assessment could include anamnesis, report of unintentional weight loss or decrease in physical performance before ICU admission, physical examination, general assessment of body composition, and muscle mass and strength, if possible.

- Grade of recommendation: GPP – strong consensus (100 % agreement)

Conclusions

- Many instruments for nutritional assessment
- Poor predictability
- MUST score obsolete in ICU patients
- NUTRIC Score most promising, also in European ICU setting
- To identify patients at high risk
- ESPEN ICU guidelines no recommendation

ESPEN ICU guidelines 2018

- **Statement 1**
- **Every critically ill patient staying for more than 48 h in the ICU should be considered at risk for malnutrition.**
- **Strong consensus (96 % agreement)**

GLIM criteria 2019

NESPEN gaat GLIM criteria implementeren in NL

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ESPEN Endorsed Recommendation

GLIM criteria for the diagnosis of malnutrition – A consensus report from the global clinical nutrition community☆

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