Perioperative nutrition:

Key component of modern oncological surgery

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Malnutrition

Epidemiology

50% of admitted patients, 40% in surgery

Clinical problems

↓ function, immune defence, wound healing, organ function

Consequences

↑ Mortality, complications, readmissions, hospital stay, costs

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Protein metabolism: some thoughts …

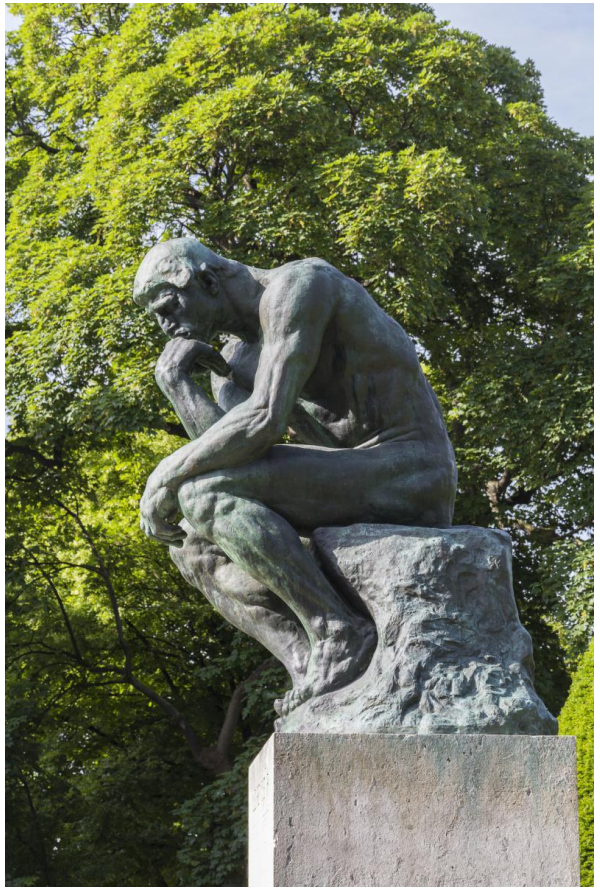
9 essential amino acids

3 conditionally essential: glutamine, arginine, cysteine

2.6g muscle protein → 1g of acute phase protein

Anabolic resistance in older and tumor patients

Requirement 1.2-1.6g/kg/d *vs.* Reality: <1g/kg/d in 50%



Surgical patient 1.2-2.0g/kg/d

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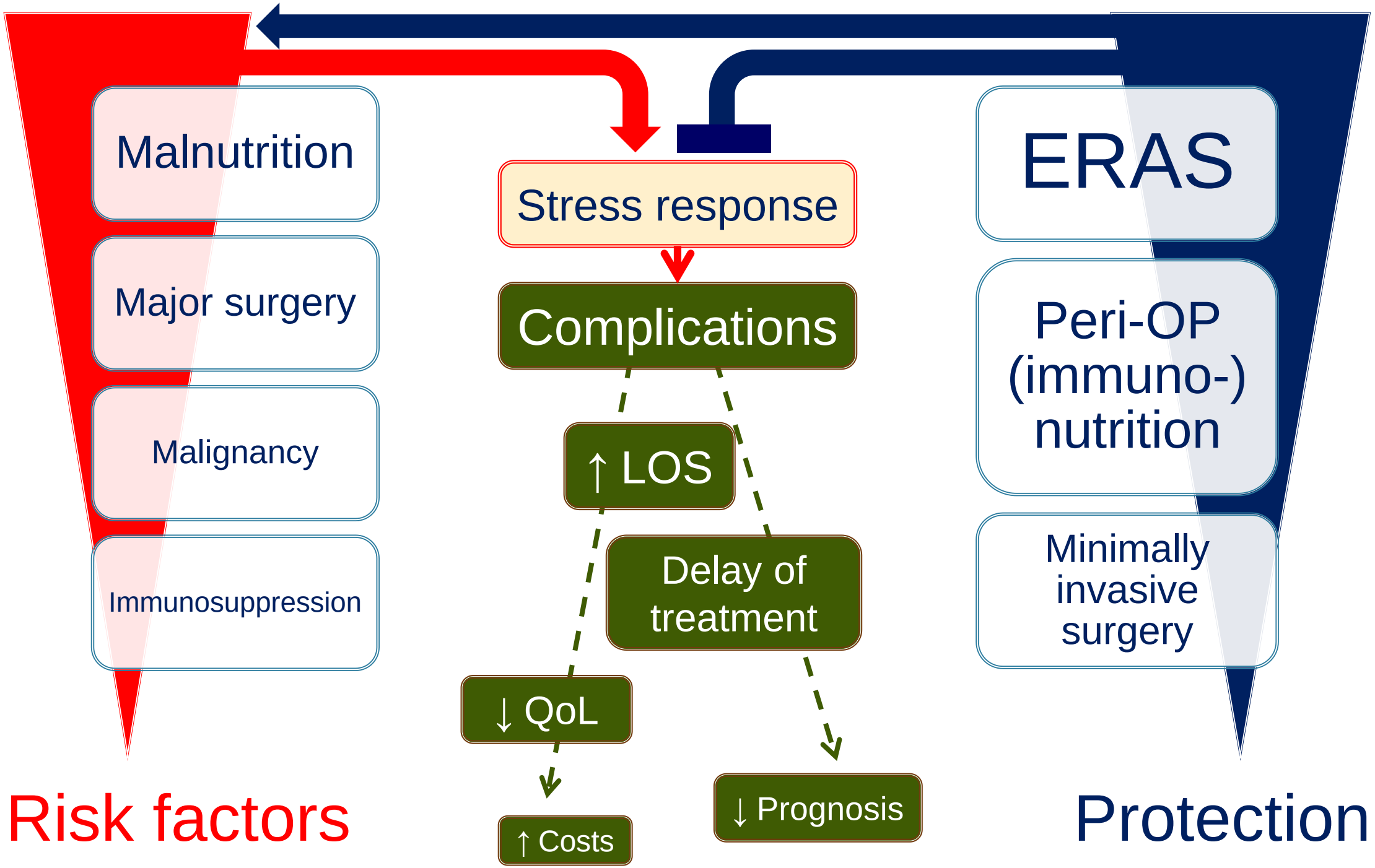
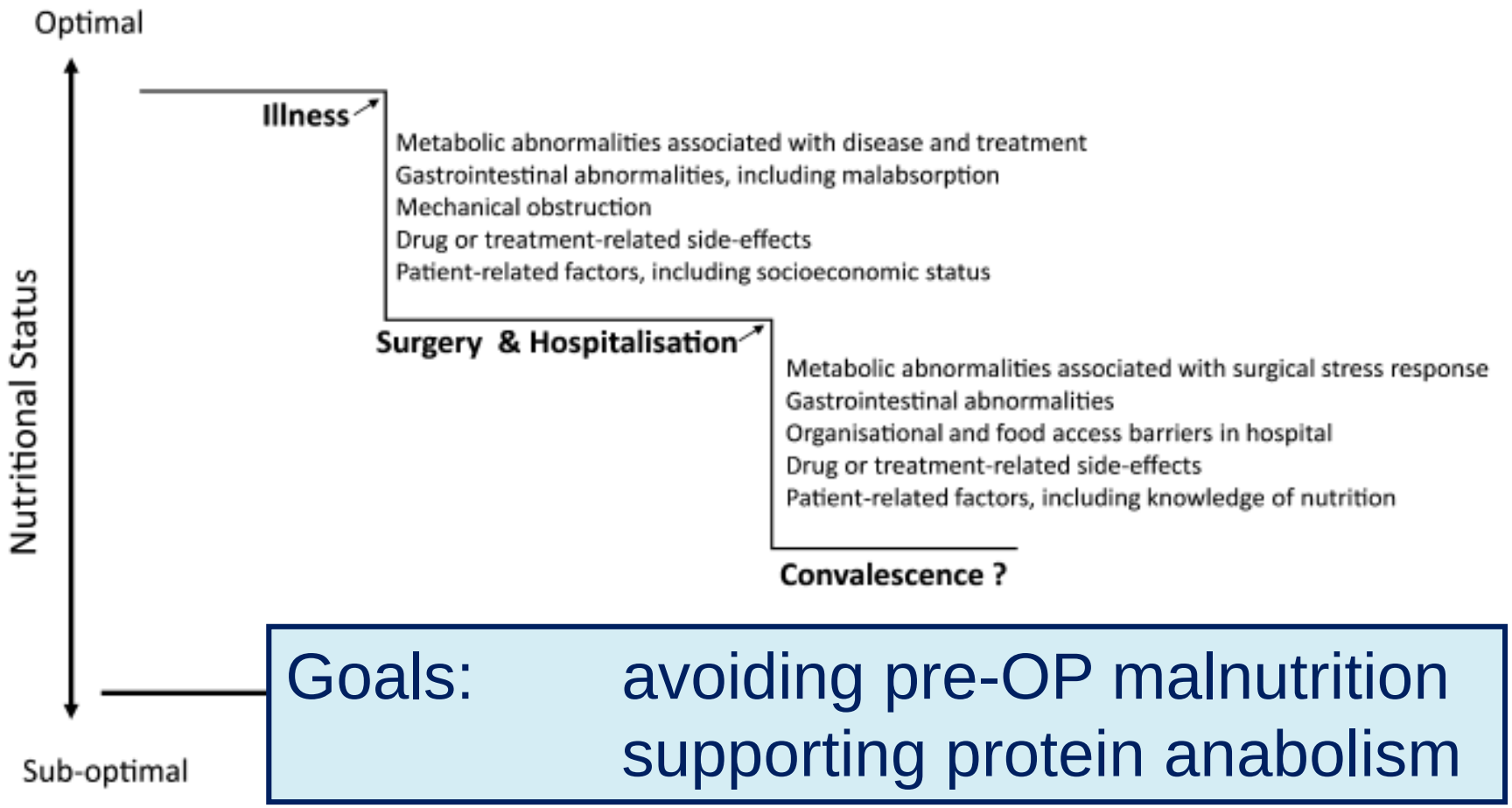

Malnutrition
Major surgery
Malignancy
Immunosuppression
Risk factors
Stress response
Complications
↑ LOS
Delay of treatment
↓ QoL
↑ Costs
↓ Prognosis
ERAS
Peri-OP (immuno-) nutrition
Minimally invasive surgery
Protection

Nutritonal status, disease and surgery



Goals: avoiding pre-OP malnutrition
supporting protein anabolism

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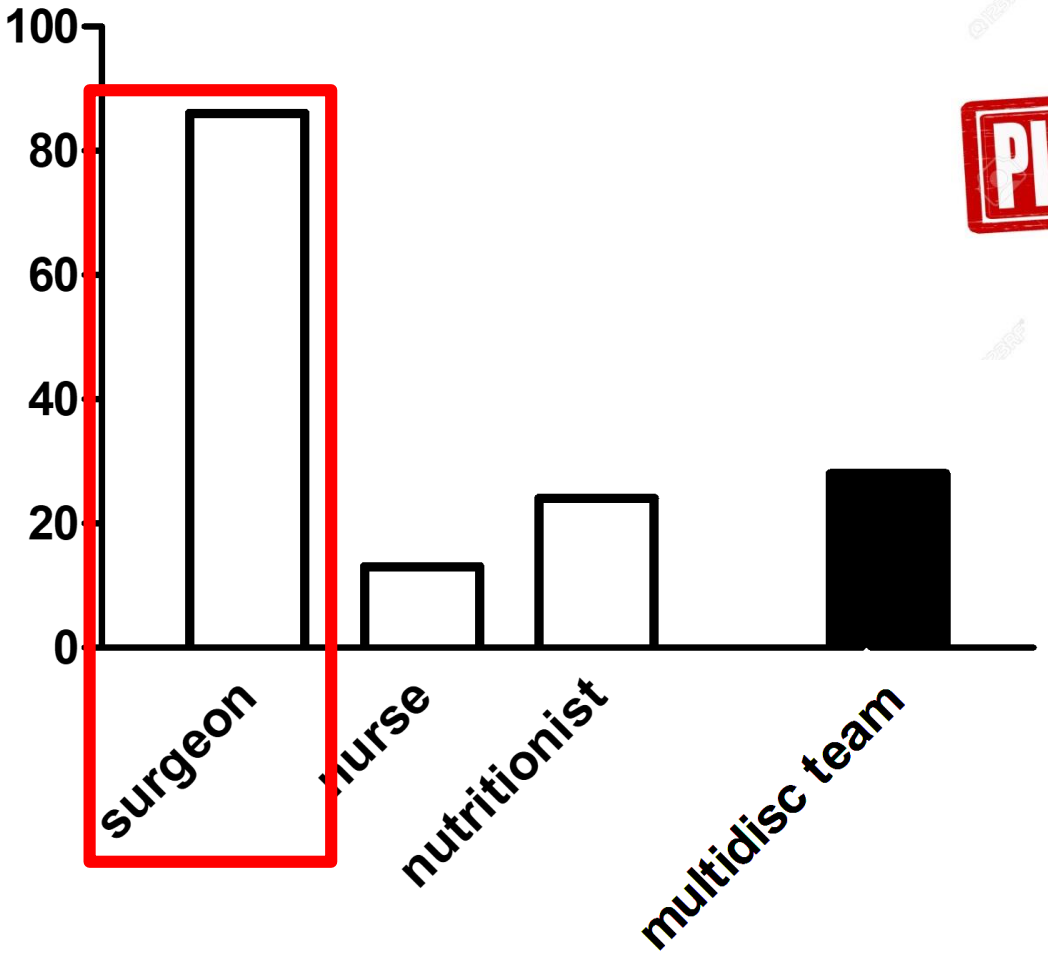
Nutrional assessment: Swiss reality



Grass, Hübner Eur J Clin Nutr 2011

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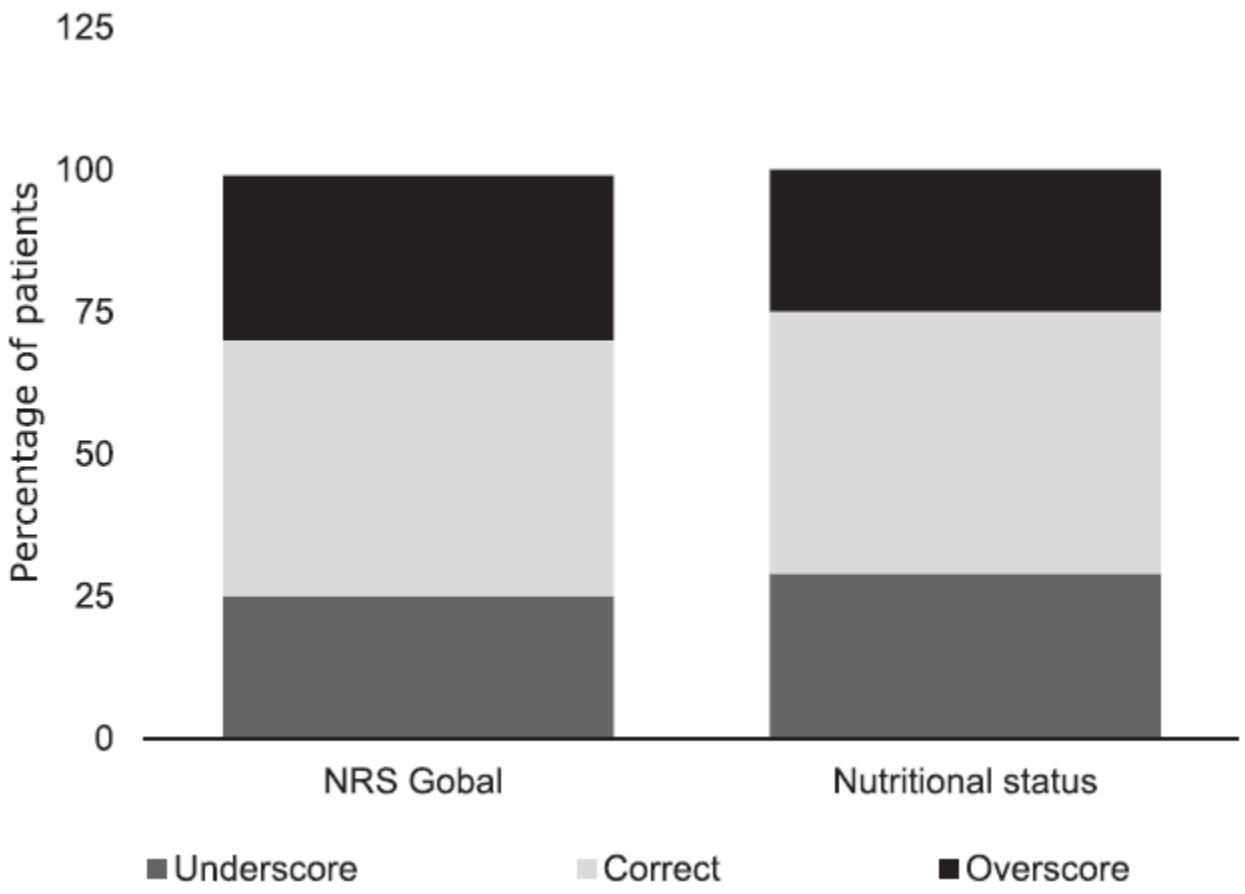
Correctness of surgeon's assessment of NRS



Benoit Clin Nutr 2016

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Nutrition for everybody!?

RESEARCH Open Access

Preoperative nutritional screening by the specialist instead of the nutritional risk score might prevent excess nutrition: a multivariate analysis of nutritional risk factors

Fabian Grass[1], Martin Hübner[1*], Markus Schäfer[1], Pierluigi Ballabeni[2], Yannick Cerantola[3], Nicolas Demartines[1], François P Pralong[4] and Pauline Coti Bertrand[4]

Nutritional support based on NRS-2002 only (our RCT)

Overnutrition with potentially deleterious clinical consequences!

Grass Nutr J 2015

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Keep it simple for the surgeon

NRS ≥ 3 ?

⇩

Detailed assessement by dedicated specialist before supplementation!

Grass Nutr J 2015

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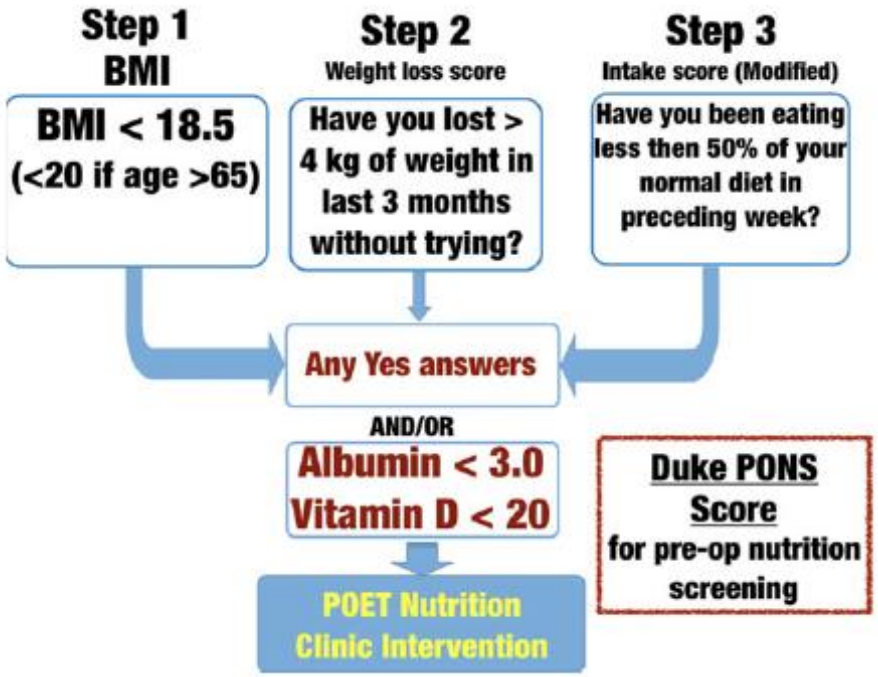
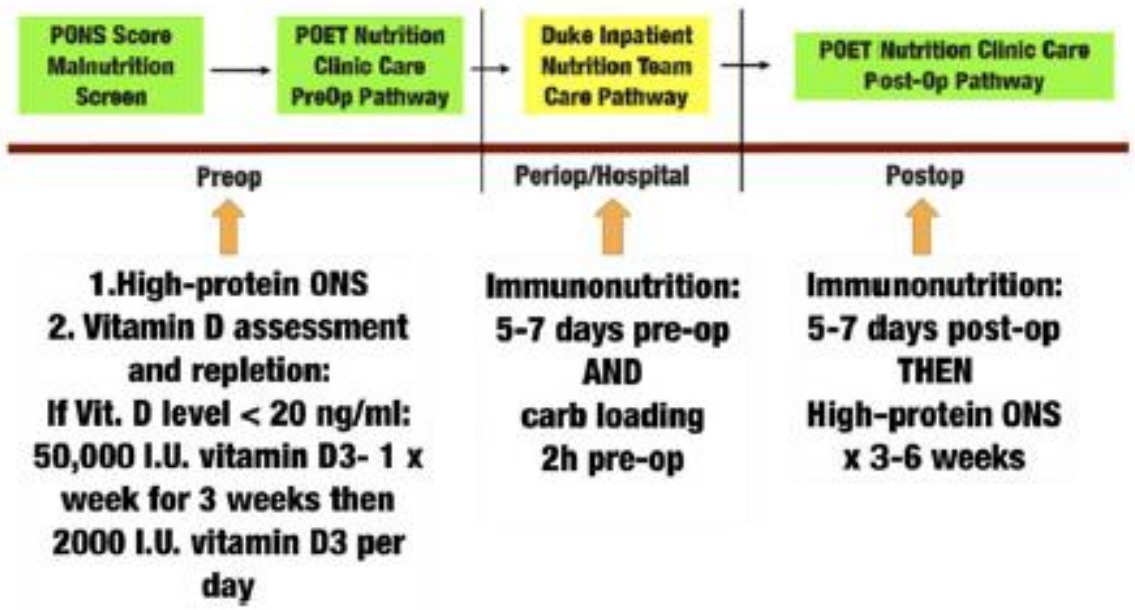
Nutritonal status, disease and surgery





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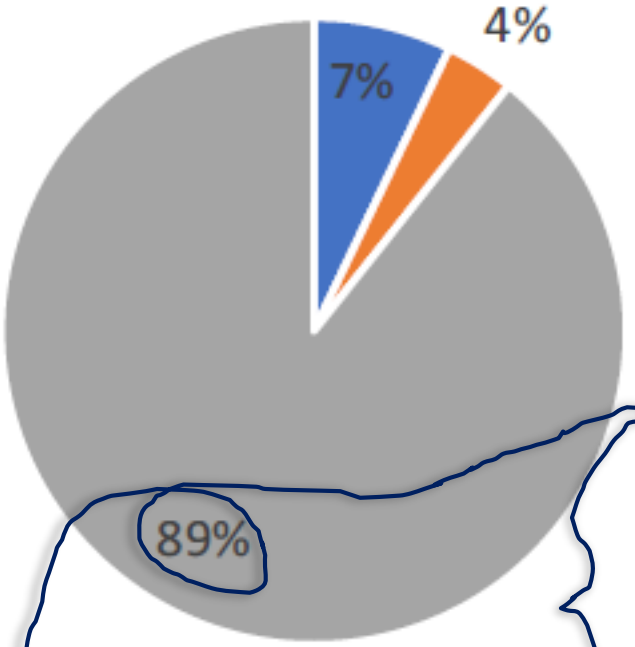
Peri-OP nutritional suppl and complications

∑ 56 RCTs, 6370 patients

Average Sample Size:

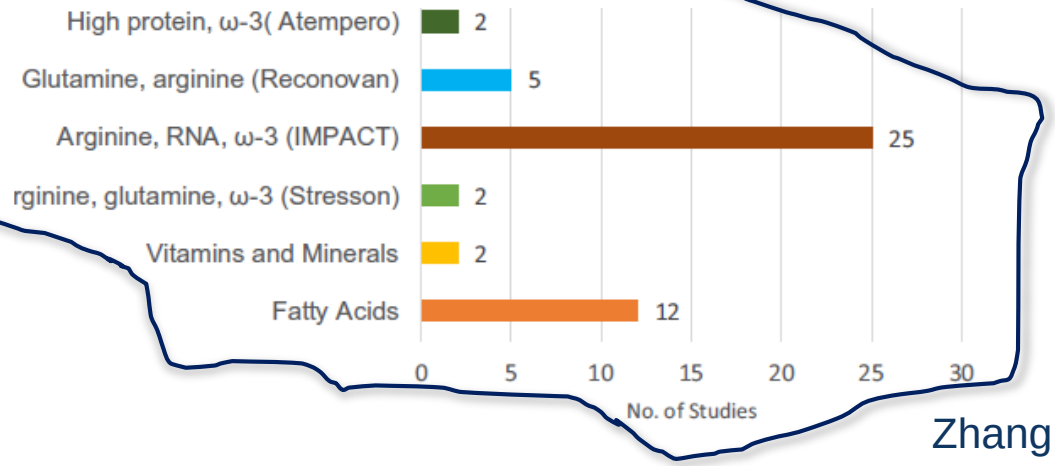
44	+	40	=	**84**
Range: 8-157 Median No. of Participants in Intervention		Range: 8-157 Median No. of Participants in Intervention		Range: 8-157 Median No. of Participants in Intervention



- Protein Supplementation
- Carbohydrate-rich Drink
- Immunonutrition

Types of Control:

Conventional Diet (27.1%)	Placebo (10.2%)
Standard Formula (55.9%)	Other (6.8%)



Zhang J Gastrointestinal Surg 2019

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Immunonutrition and « normal » supplements

Component	*IN*		*ICN*
Weight (g)	74	=	79.7
Energy (kcal)	303	=	303
Proteins (g)	16.8	=	15.5
Arginine (g)	3.8		0.51
Lipids (g)	8.3		2
Omega-3-FA (g)	1		0.02
RNA (g)	0.45		0
Carbohydrates (g)	40.2		57.7

Abbreviations: ICN, isocaloric-isonitrogenous nutrition; IN, immuno-nutrition; FA, fatty acids.

Recommended dose: 3/d

Hubner EJCN 2012

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Peri-OP nutrition decreases post-OP complications

∑ 56 >RCTs, 6370 patients

Complications	RR 0.74
Infections	RR 0.71
Hospital stay	−1.58 days

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Meta-analysis

Immunonutrition in gastrointestinal surgery

Y. Cerantola, M. Hübner, F. Grass, N. Demartines and M. Schäfer

Department of Visceral Surgery, University Hospital Vaudois (CHUV), Bugnon 46, 1011 Lausanne, Switzerland
Correspondence to: Professor N. Demartines (e-mail: Demartines@chuv.ch)

		Complications	Infections	Hospital stay	Mortality
		OR (95% CI)	OR (95% CI)	**WMD**	OR (95% CI)
Overall		**0.46**	**0.46**	**-2.1**	0.90
		(0.38-0.56)	(0.38-0.56)	(3.0-1.3)	(0.46-1.76)
Timing	Pre-OP	**0.48**	**0.36**	**-2.4**	0.66
		(0.34-0.69)	(0.24-0.56)	(3.2-1.6)	(0.11-4.03)
	Peri-OP	**0.39**	**0.41**	**-1.6**	0.82
		(0.28-0.54)	(0.28-0.58)	(2.3-0.9)	(0.23-2.88)
	Post-OP	**0.54**	**0.53**	**-2.8**	1.01
		(0.39-0.75)	(0.40-0.71)	(3.3-2.3)	(0.46-2.23)
High	Jadad	**0.47**	**0.47**	**-2.3**	1.01
quality	≥3	(0.38-0.57)	(0.38-0.59)	(2.7-1.9)	(0.46-2.23)

Cerantola&Hübner BJS 2011

Hübner Diet and Nutrition in Crit Care 2013

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Only proteins??

∑ 7 studies

= mortality, hospital stay, plasma protein levels

↓ weight loss, grip strength deterioration, (complications)

↑ nutritional status

"There is evidence to suggest that protein supplementation should be routinely provided post-operatively to this population."

"The optimal level of protein supplementation required to maximise recovery in gastrointestinal surgery patients is effectively unknown."

Crickmer WJGS 2016

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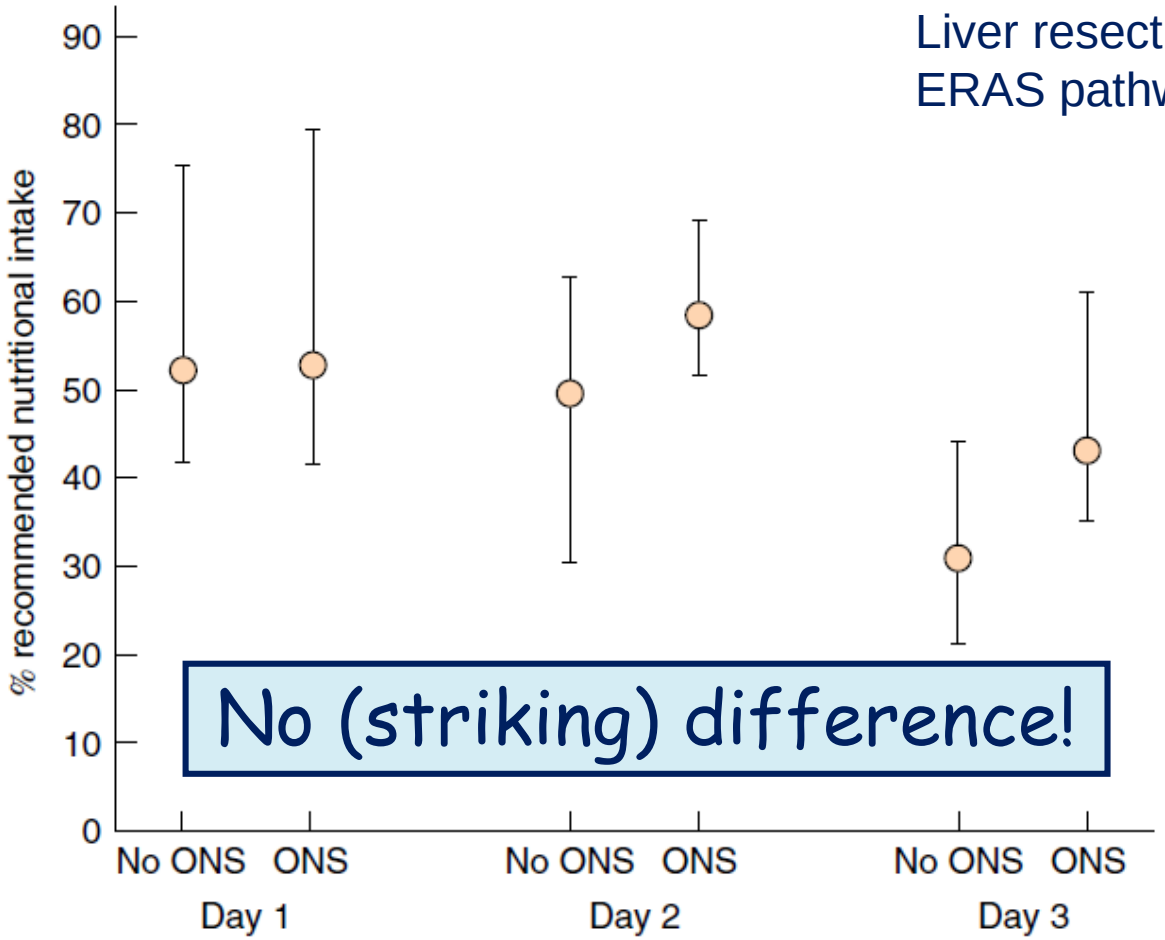
Effects of early oral supplements

RCT ±ONS
Liver resection
ERAS pathway



No (striking) difference!

Hendry BJS 2010

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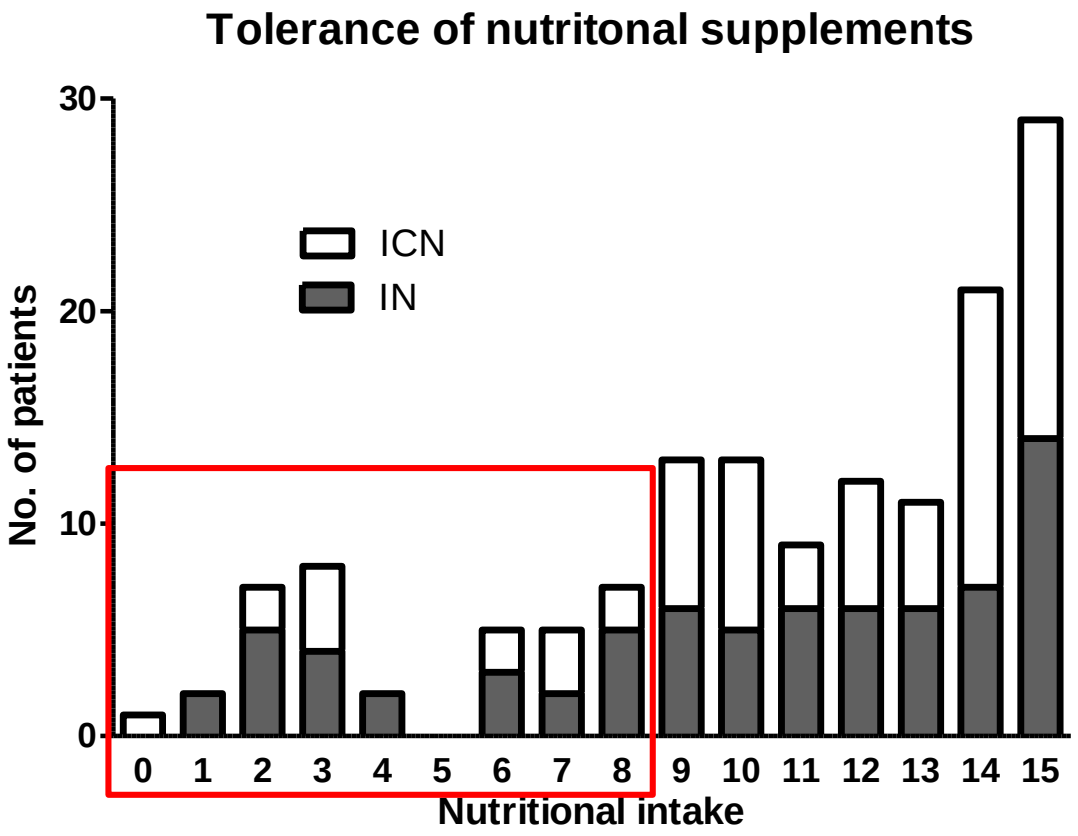
… make sure that patients take it!



Hübner EJCN 2012, Grass EJCN 2015

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Food Is Medicine: A Qualitative Analysis of Patient and Institutional Barriers to Successful Surgical Nutrition Practices in an Enhanced Recovery After Surgery Setting

Gillis Nutr Clin Practice 2018

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1. Mistaken nutrition facts & beliefs

Maybe a healthier option than ENSURE? I brought my own protein powder.

Since you are allowed to pretty much eat what you want more or less . . . and load up on carbohydrates . . .
. . . there is nothing wrong with this carbohydrate diet.

The doctors don't seem to think that there is any [food] restrictions but maybe if they put their mind to it.

Gillis Nutr Clin Practice 2018

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2. Medical diets ≠ patients' priorities

You want to eat, but the food is really bad.

My oldest daughter is a chef and made some turkey soup, chicken soup, and some other things that I really enjoy.

If they can introduce food from the patient's family but give them instruction so they don't bring in something that isn't appropriate and would enhance their stay in hospital.

Gillis Nutr Clin Practice 2018

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3. Food is medicine, no satisfaction

I ate because it was medicine and it would help me get better faster.

ted more detail than that . . . [diet handout]. You get that until you are leaving, until they are kicking ıt. The take home sheet that I had, it did say eat small meals and make sure you drink a lot of water. s like that. Helpful hints.

I felt more comfortable talking to her [dietitian] than the surgeon.

Gillis Nutr Clin Practice 2018

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Patient-centered model of care

Education: patients and providers

Personalizing nutrition elements

Gillis Nutr Clin Practice 2018

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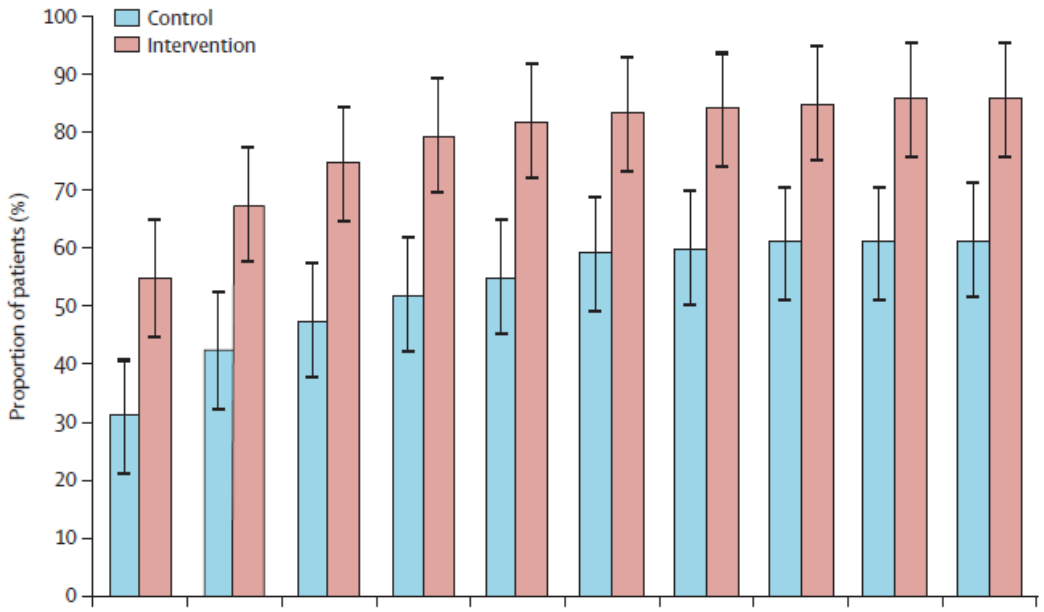
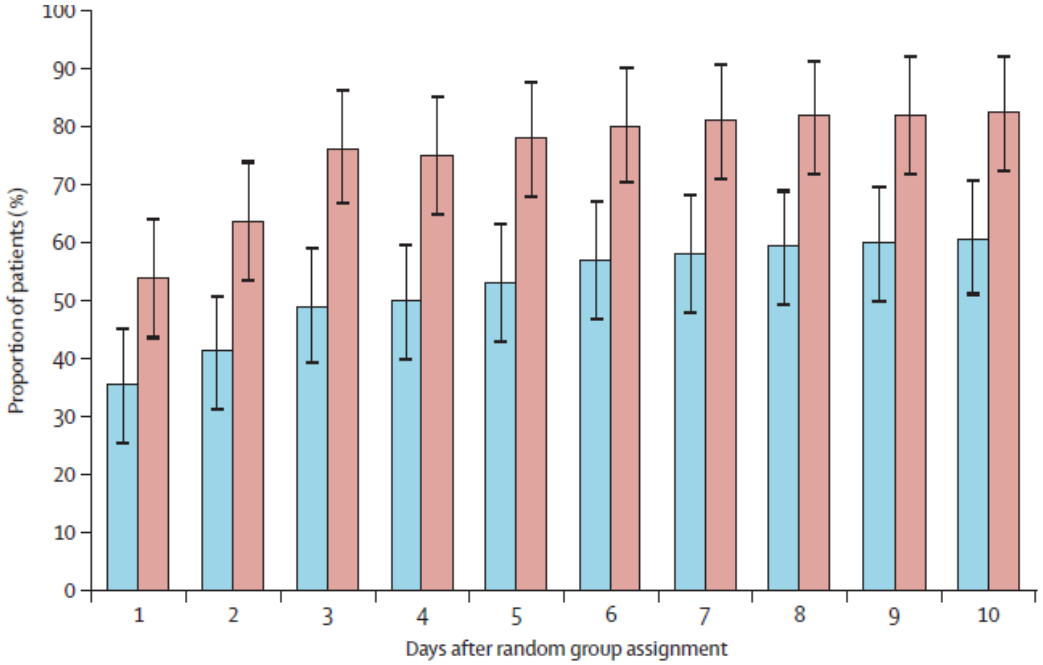
Towards « individualised nutritional support »

medical inpatients

√ calories



√ proteins



Not 100% but much better

Schuetz Lancet 2019

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« Individualised nutritional support »

↓ Adverse outcomes OR 0.79

↓ Mortality OR 0.65

EFFORT(s) needed also for surgical patients

Schuetz Lancet 2019

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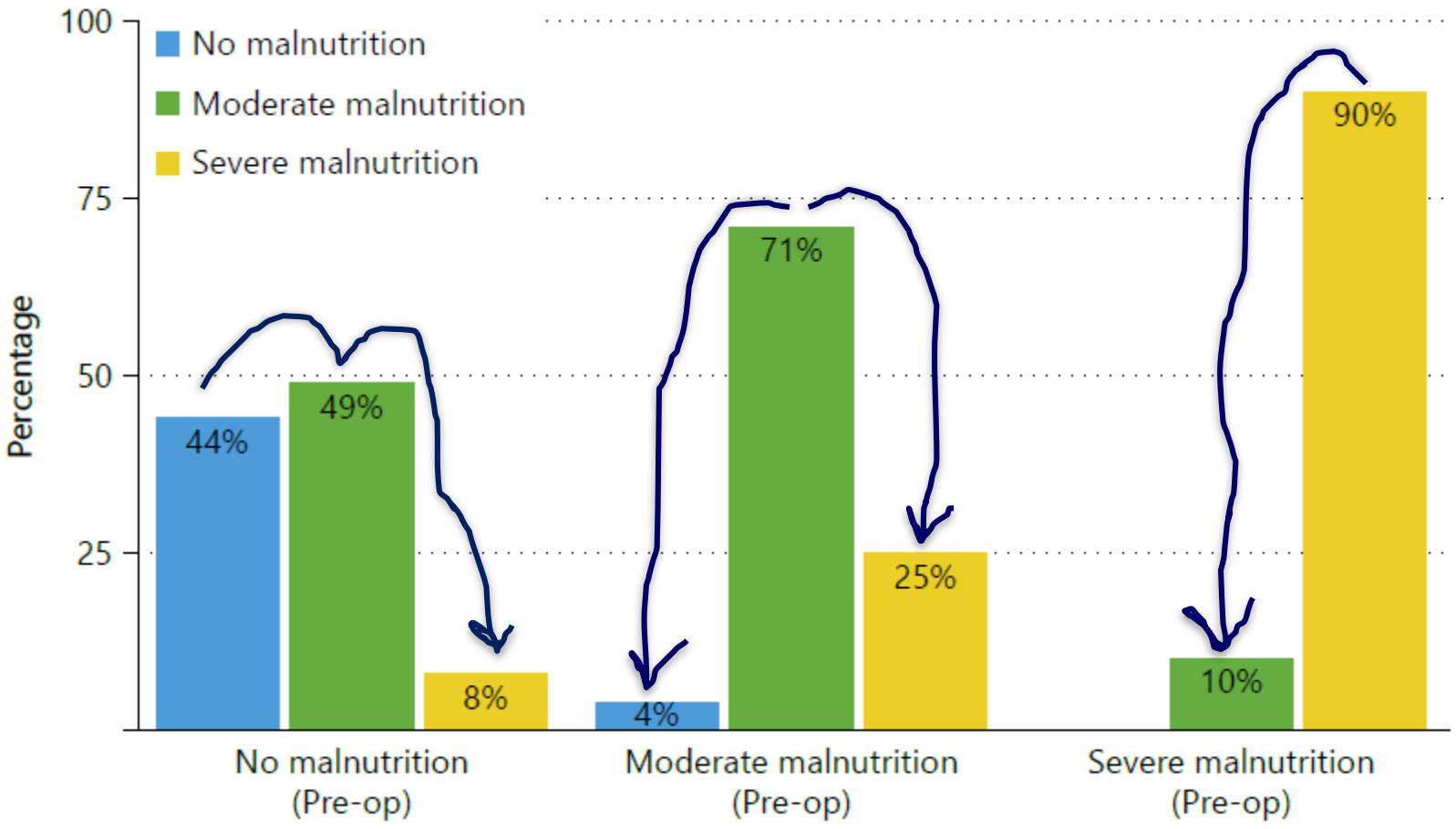
… and after discharge?



Grass, Hübner Ann Nutr Metab 2016

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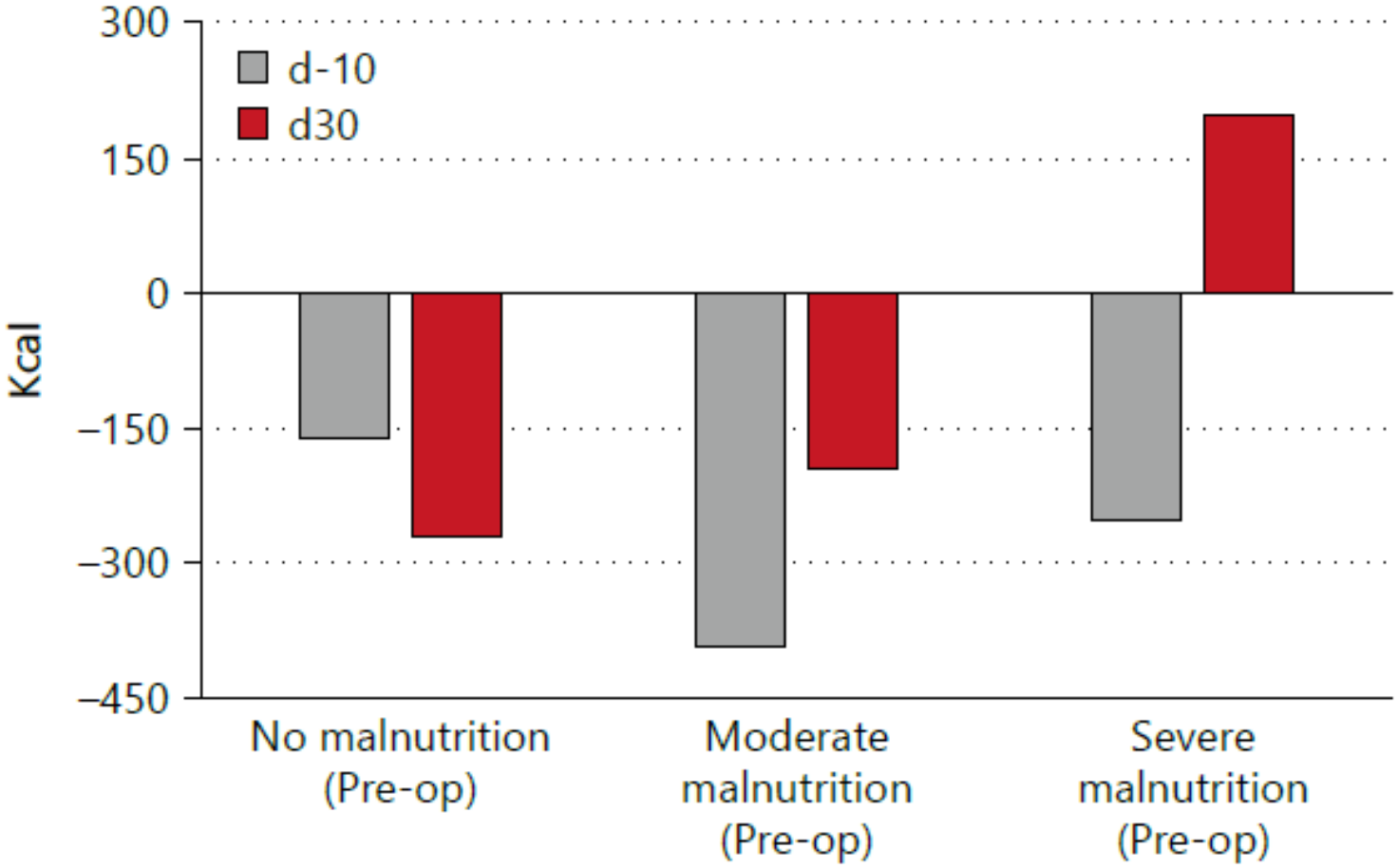
Energy coverage pre- and post-OP



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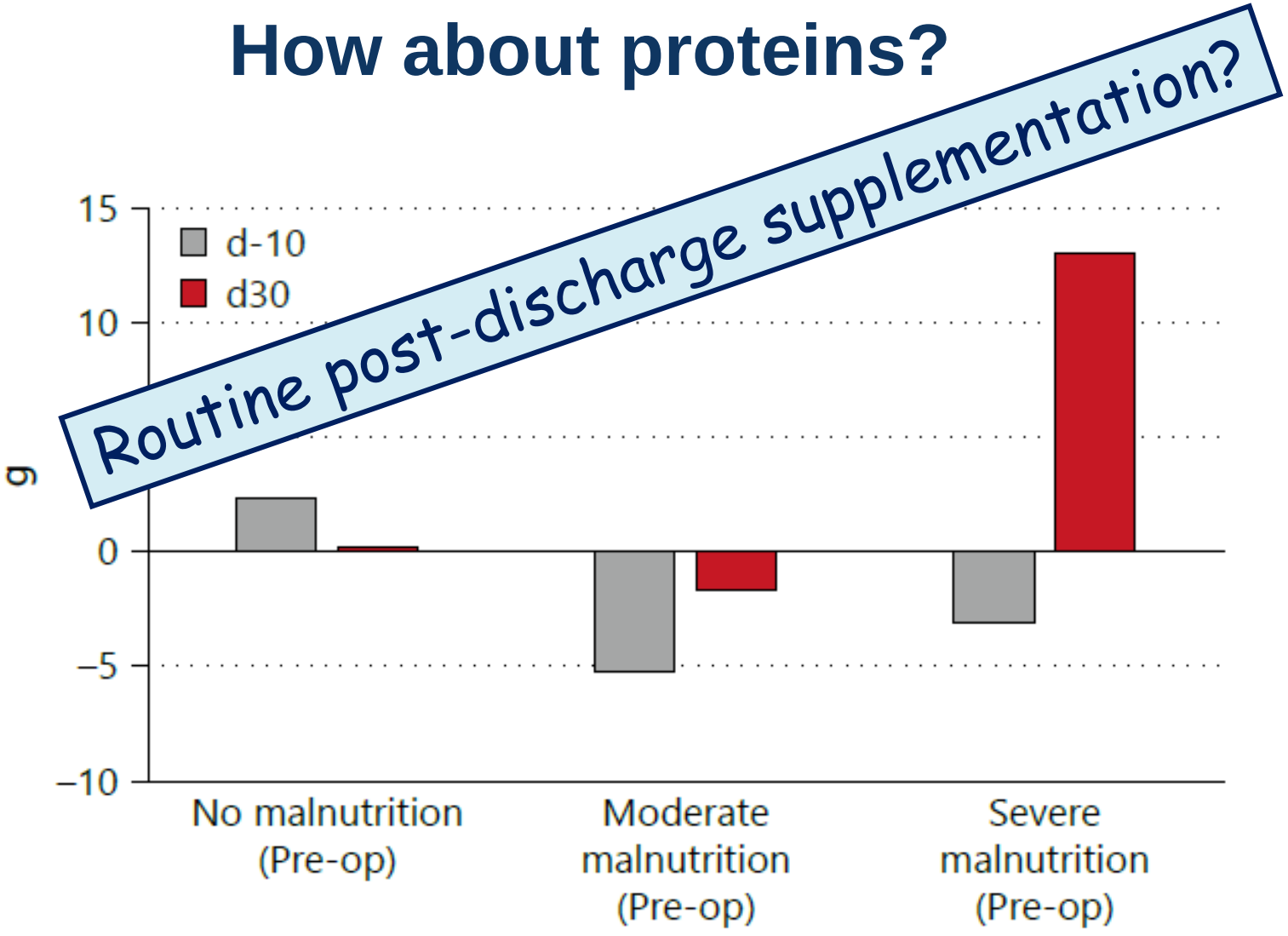
How about proteins?



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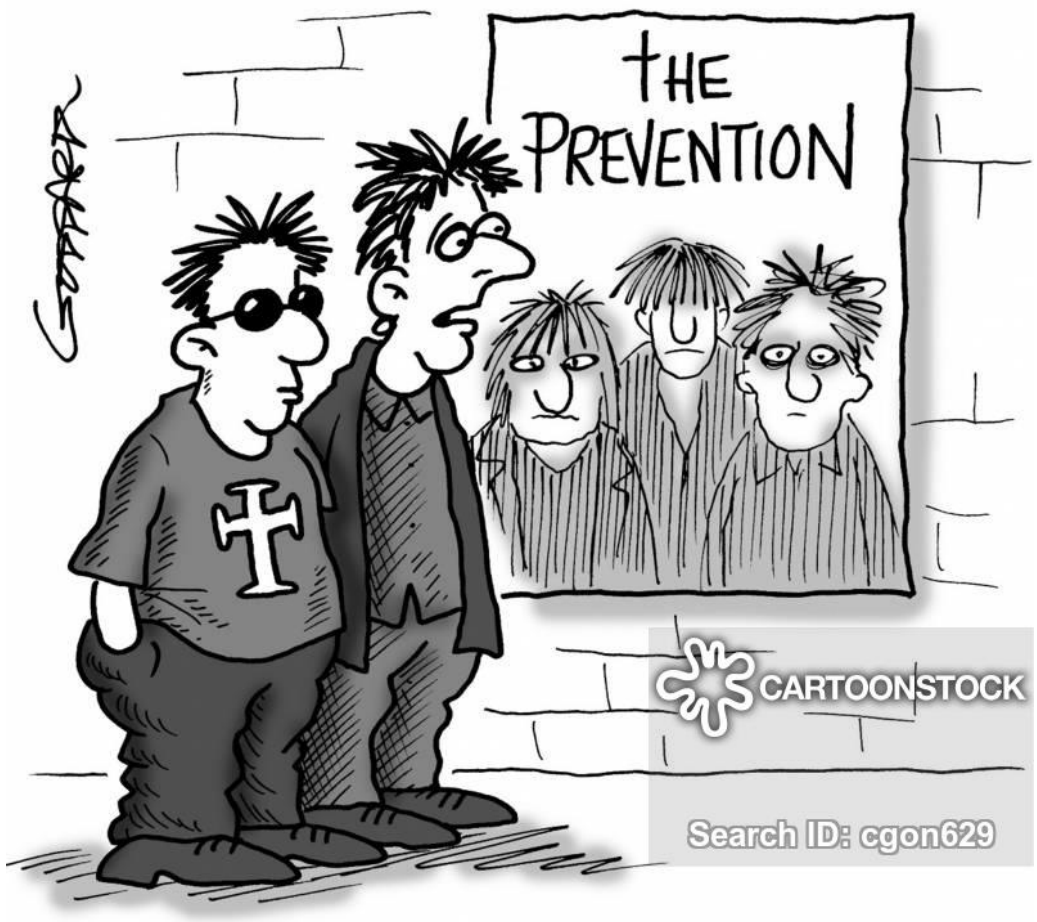

"Apparently they're better than The Cure."

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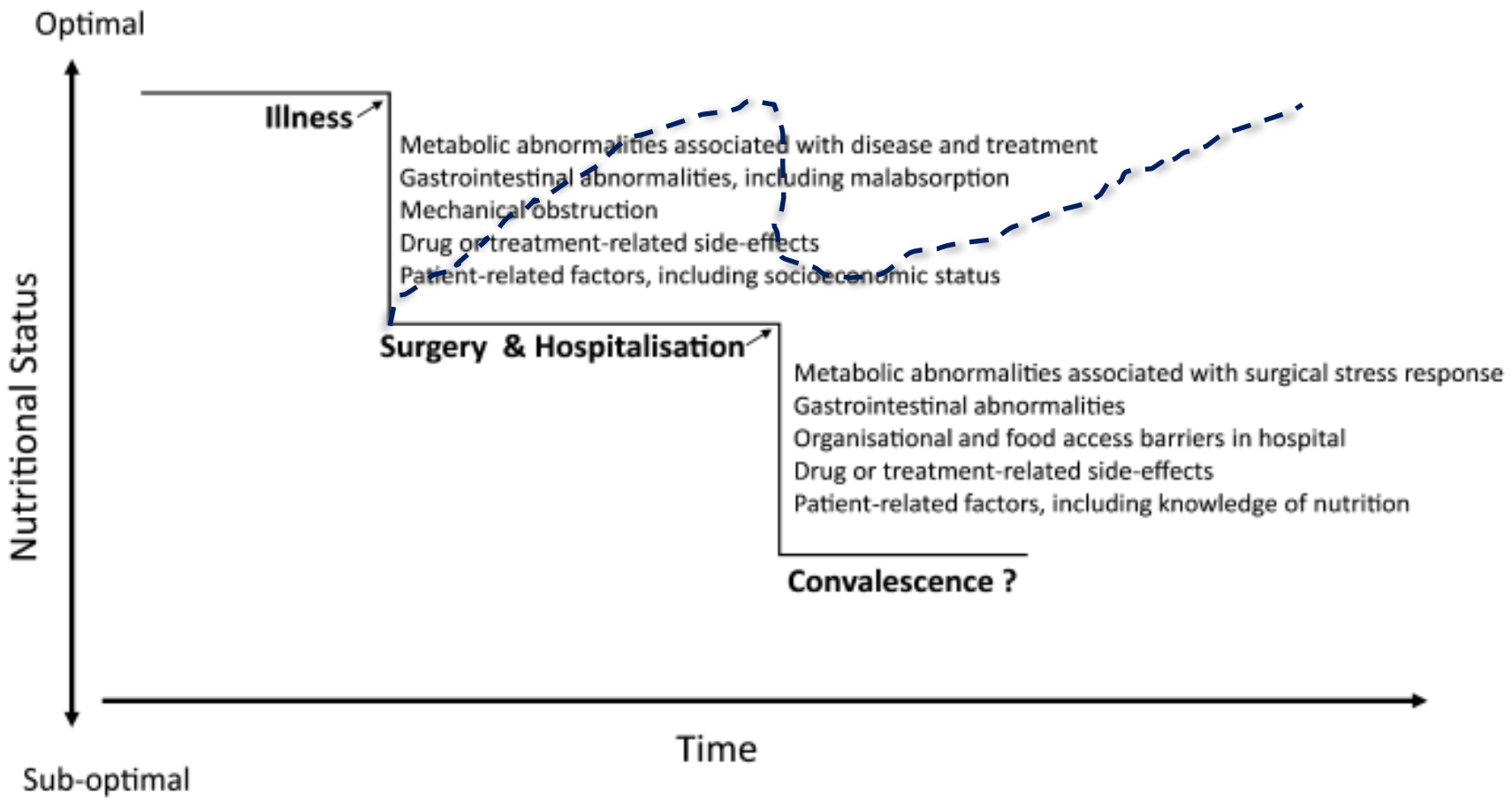
Nutritonal status, disease and surgery



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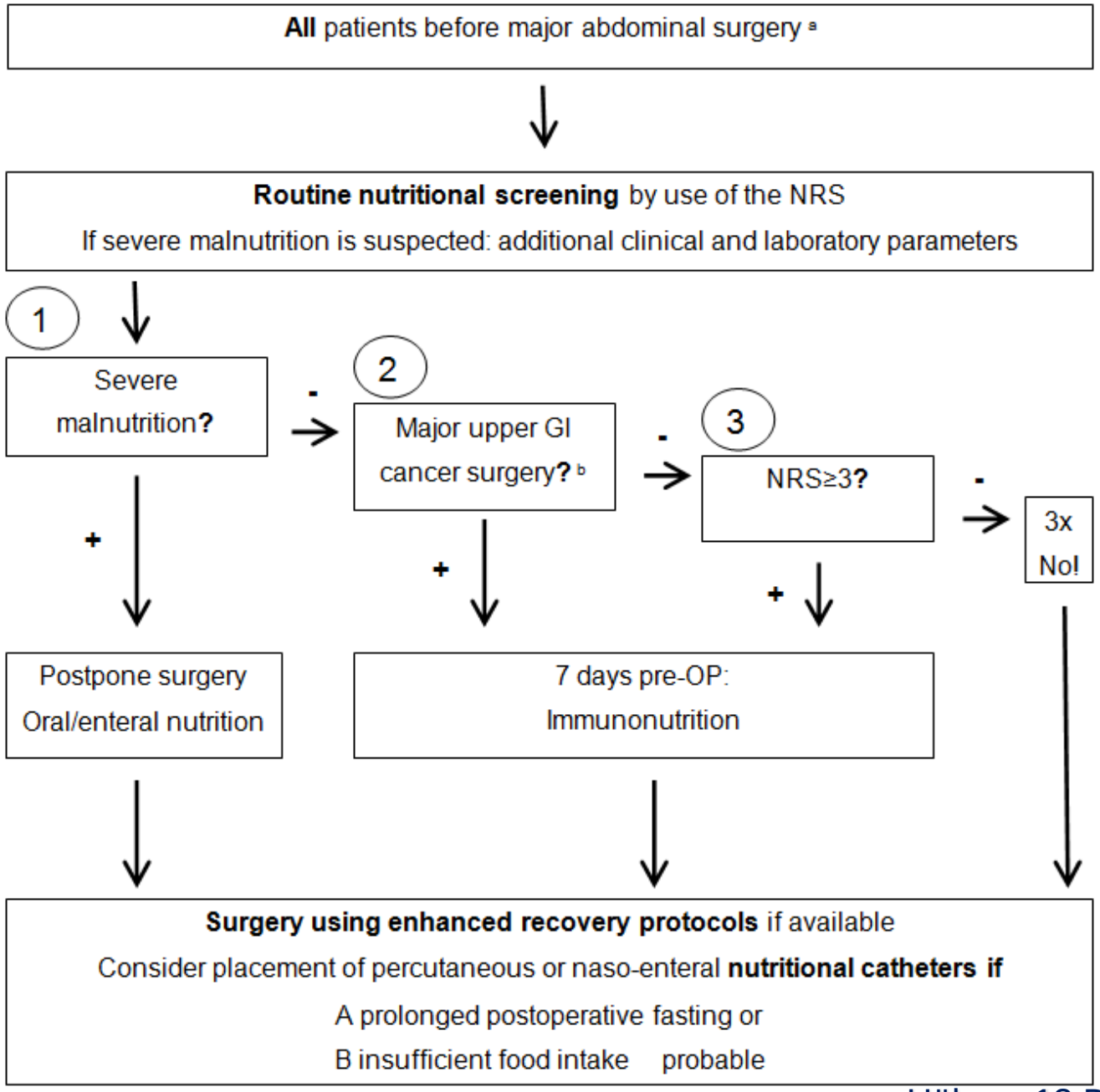

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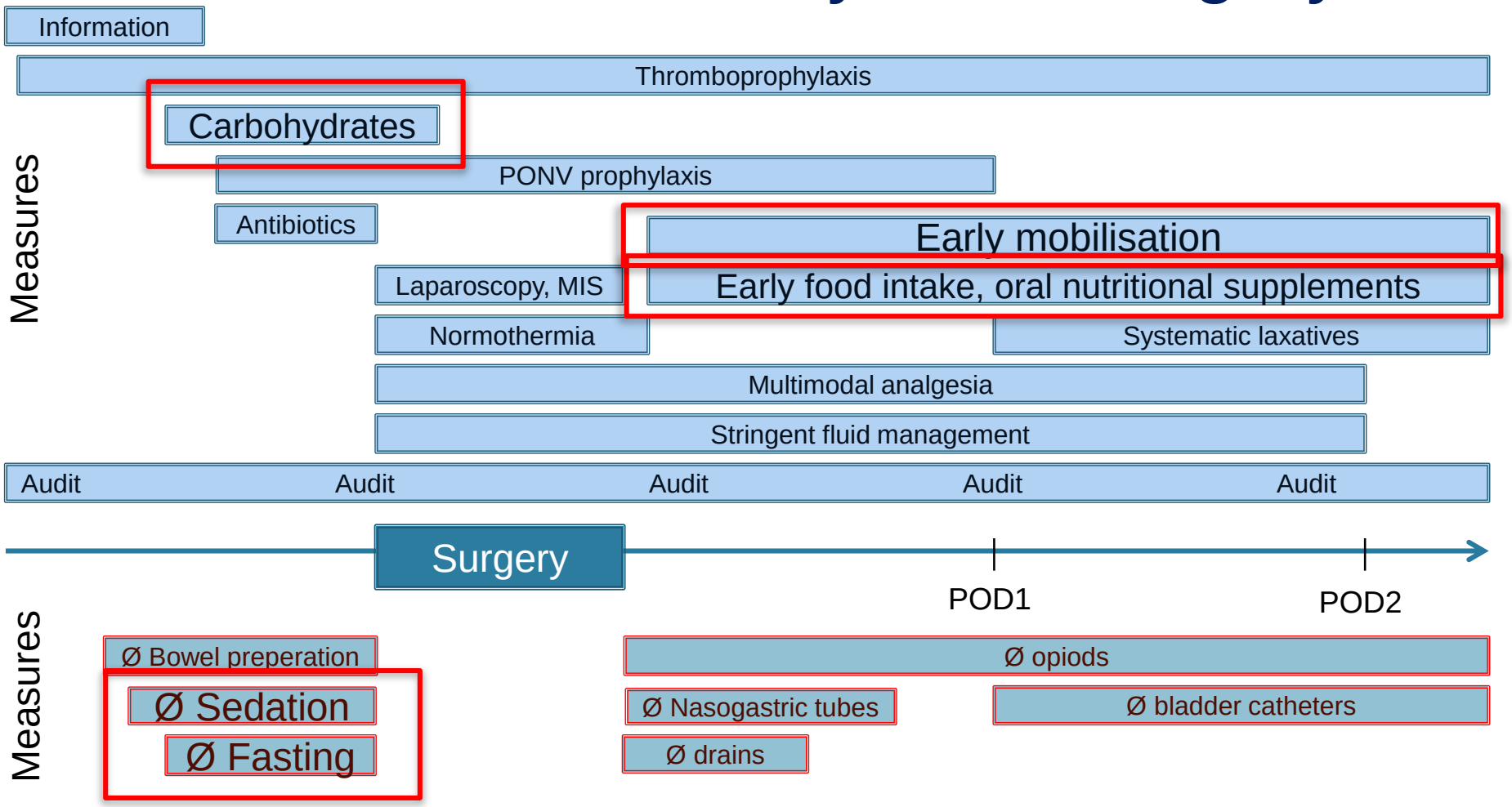
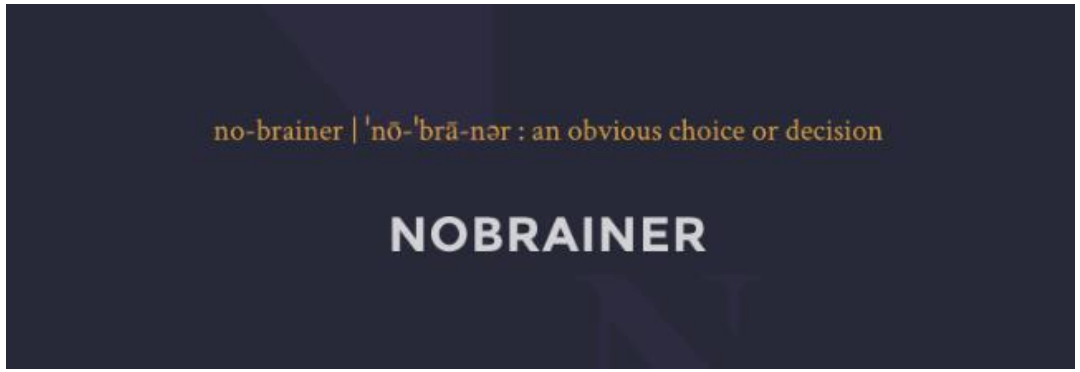
“Hot”

Enhanced Recovery After Surgery



“Not”

ERAS is a « no-brainer »



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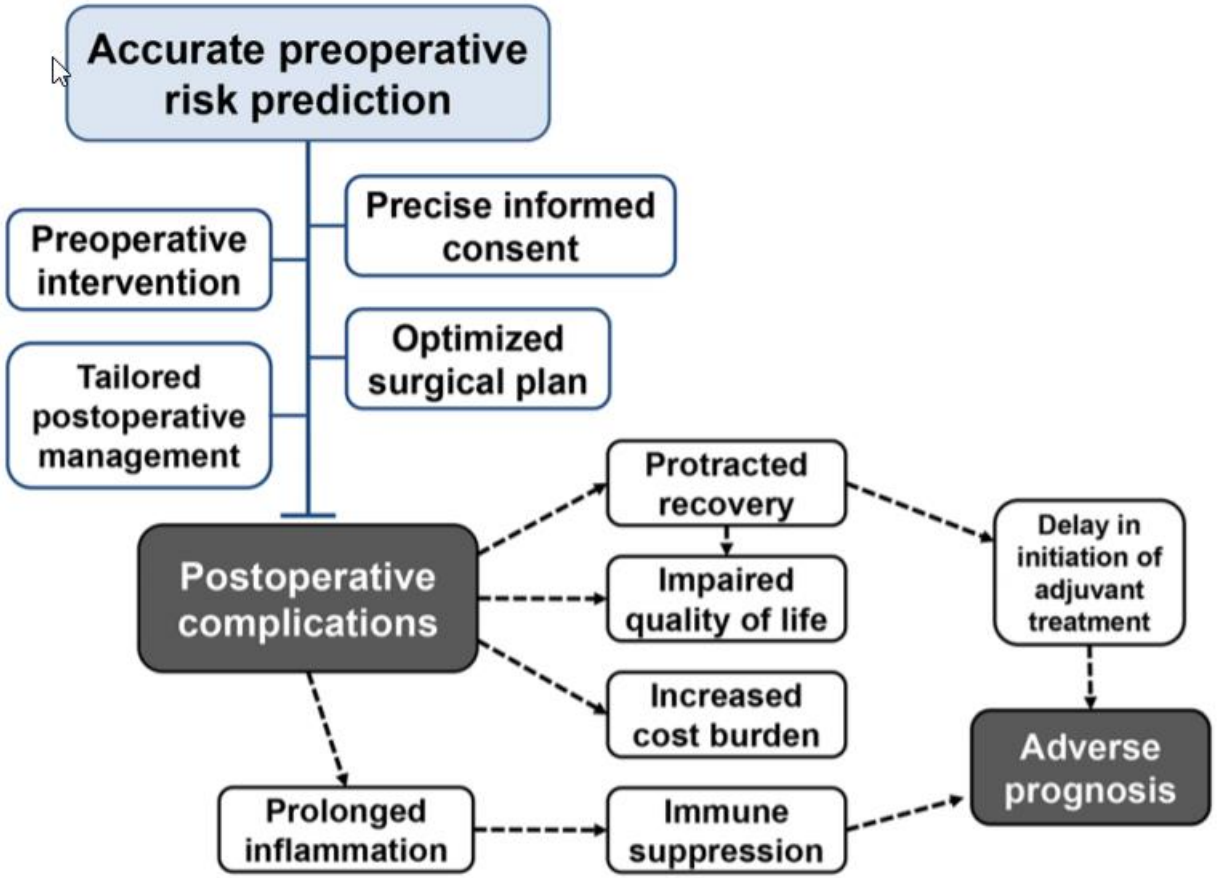
ERAS: results

	Patients (N)	Compl. (%)	LOS	Costs	Work
Colorectal	1670	-45			
Pancreas	355	-24			
Liver	350	-12	-12	-4294	?
Upper GI	360	?	?	?	?
Uro	375	?	?	?	?
GYN	400	=	-2	-4390↓	?
Chir thor	240	-24	-3	-4187	?

Return of investment: 3.8
"Every $1 invested in ERAS would bring $3.8 (range $2.4-$5.1) in return."

updated 03/04/2019 adapted from Grass Swiss Knife 2015

Postoperative complications



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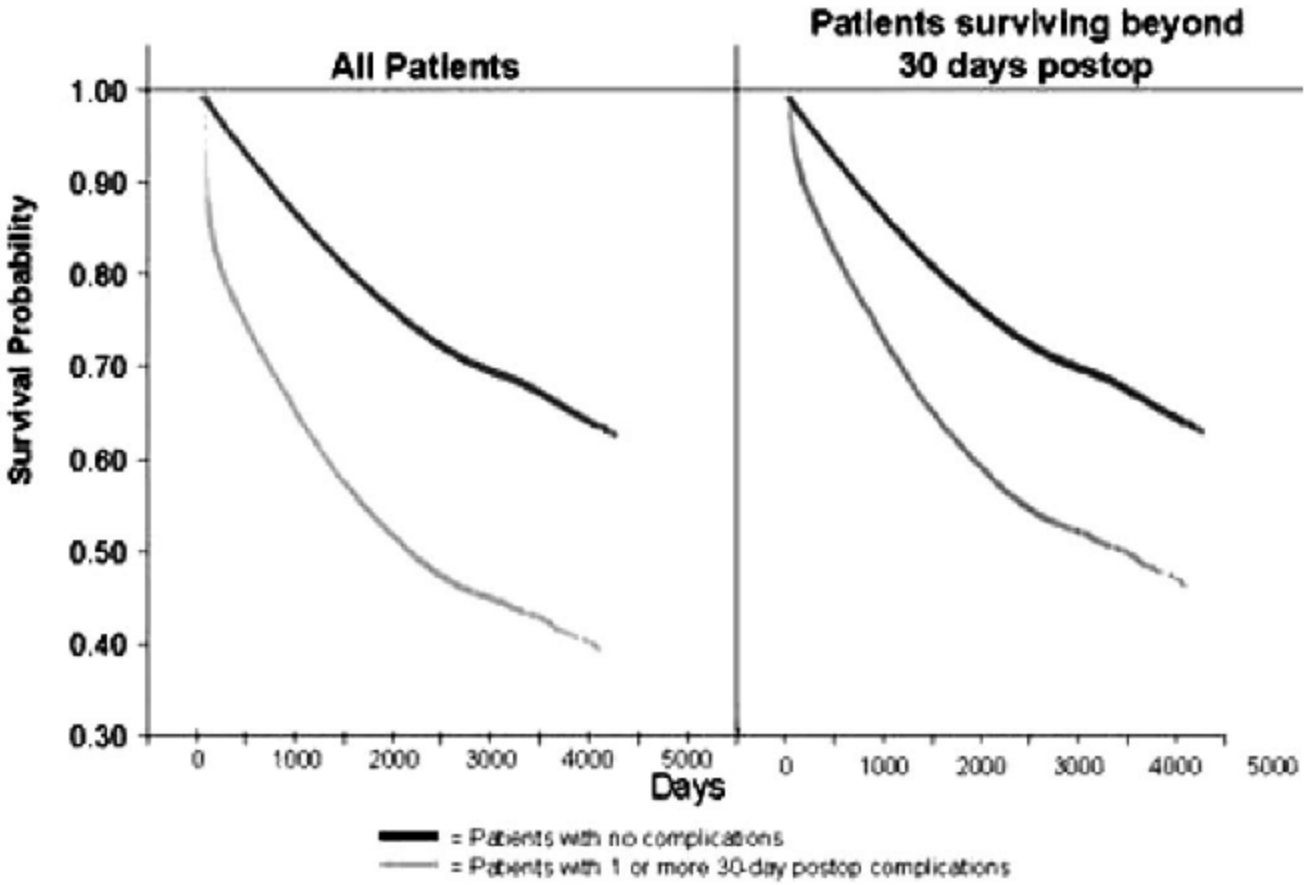
Complications and survival



Khuri Ann Surg 2005

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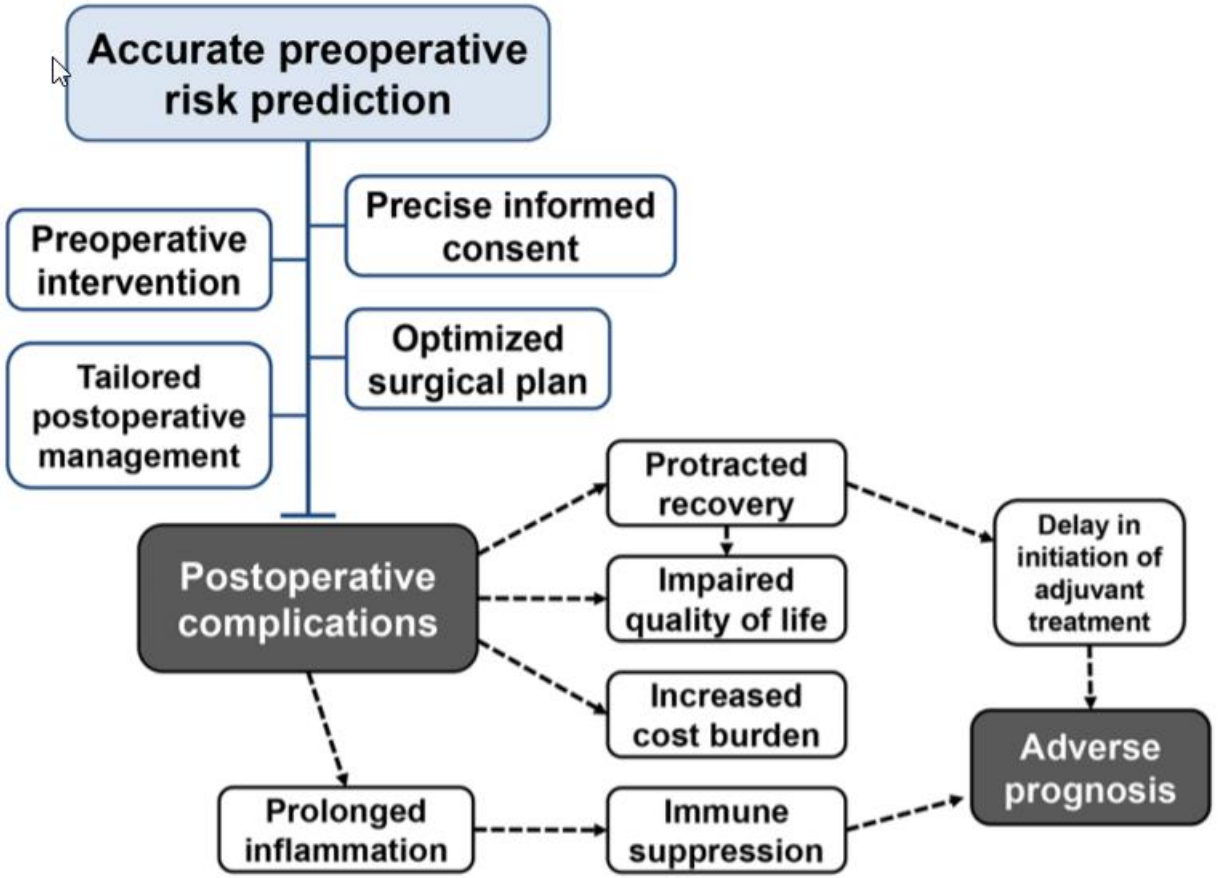
Postoperative complications



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Impact of Preoperative Risk Factors on Morbidity after Esophagectomy: Is There Room for Improvement?

Styliani Mantziari · Martin Hübner ·
Nicolas Demartines · Markus Schäfer

Yes!!!

Main targets:

Stop smoking
Stop drinking
Optimize nutritional status

World J Surg 2014

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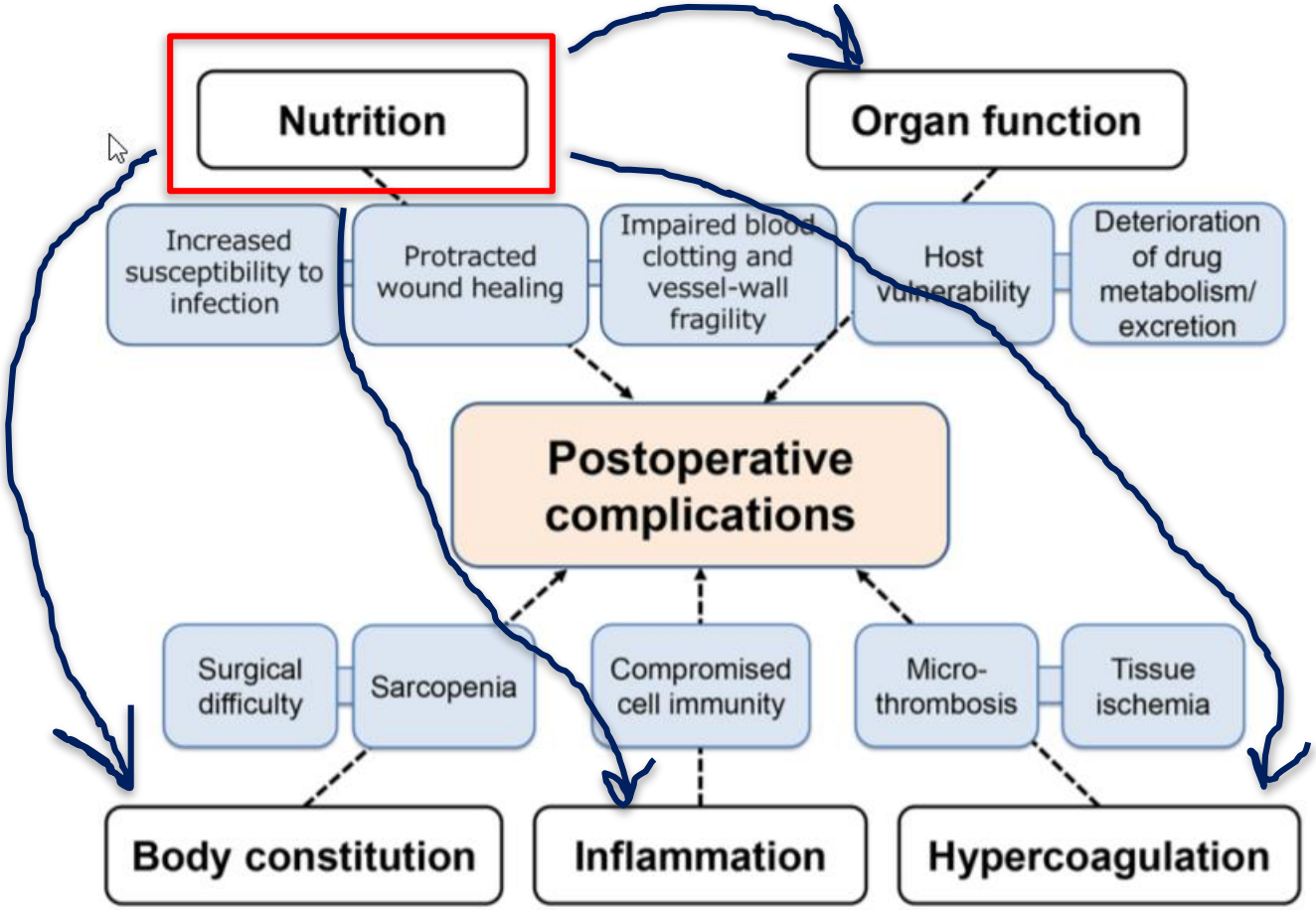
Risk factors for complications



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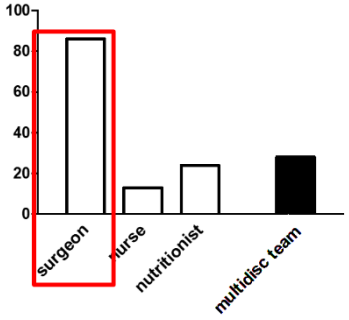
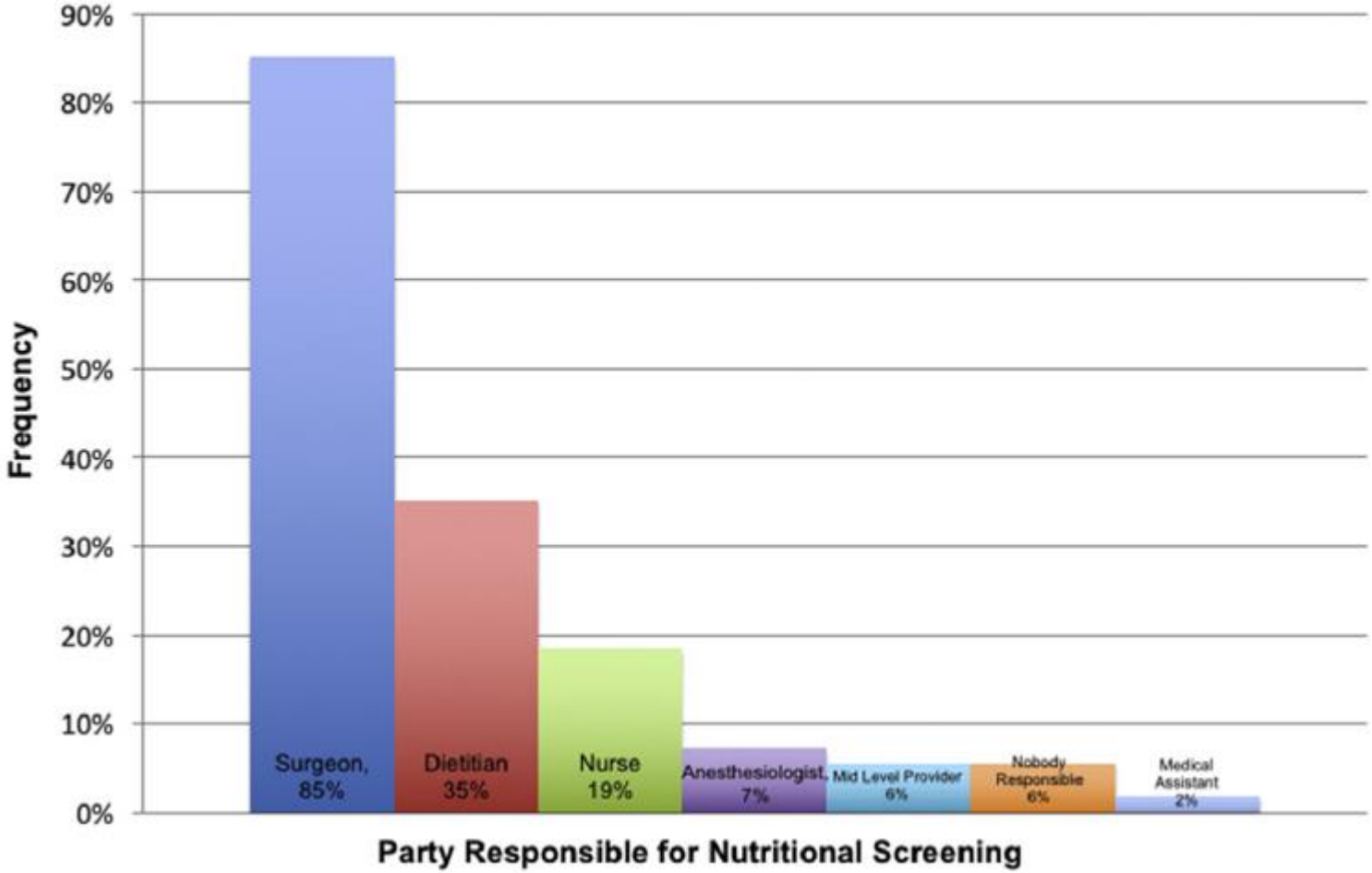


Peri-OP nutrition in GI surgery



Williams Am J Surg 2017

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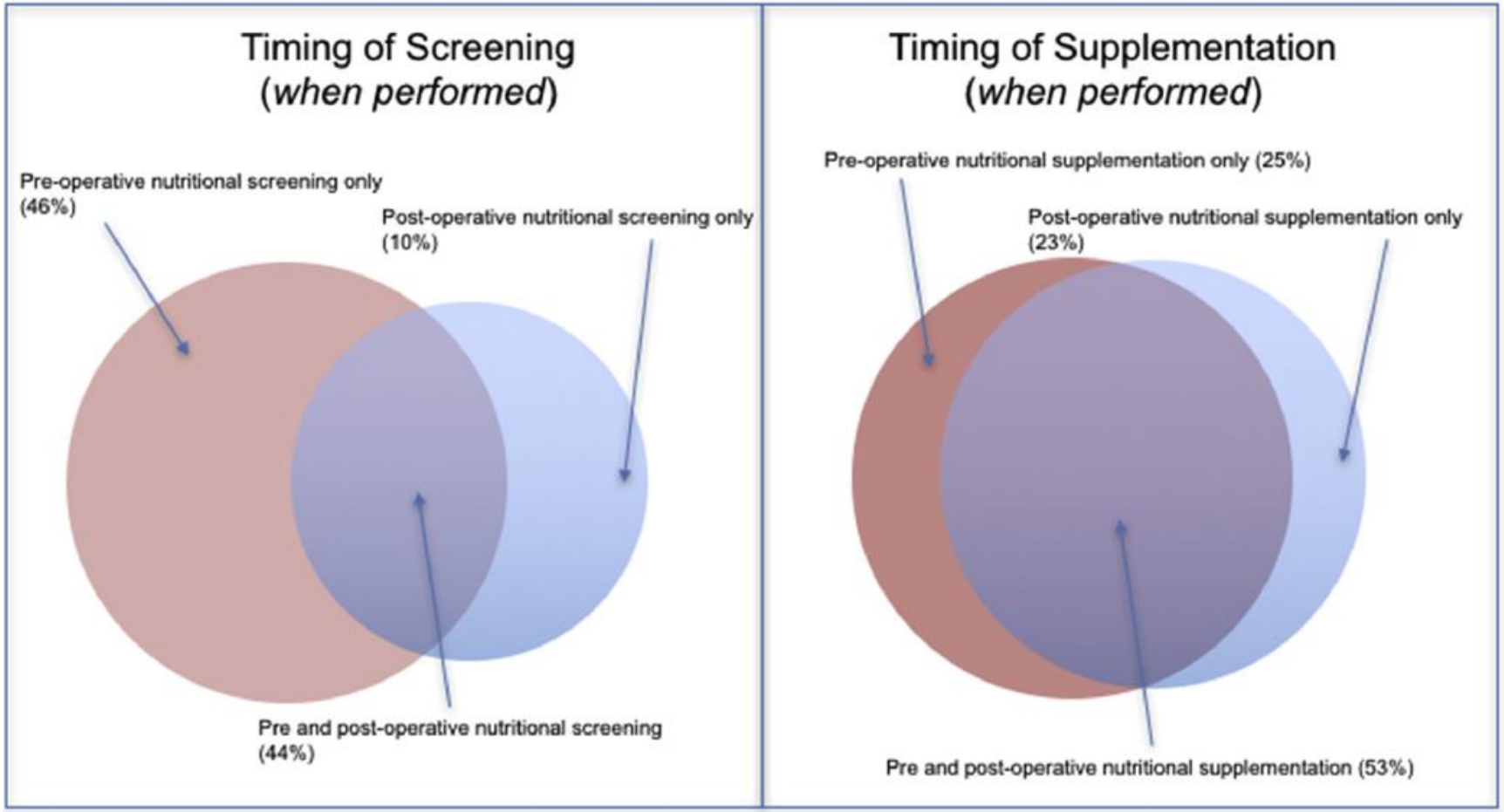
Timing is everything



Williams Am J Surg 2017

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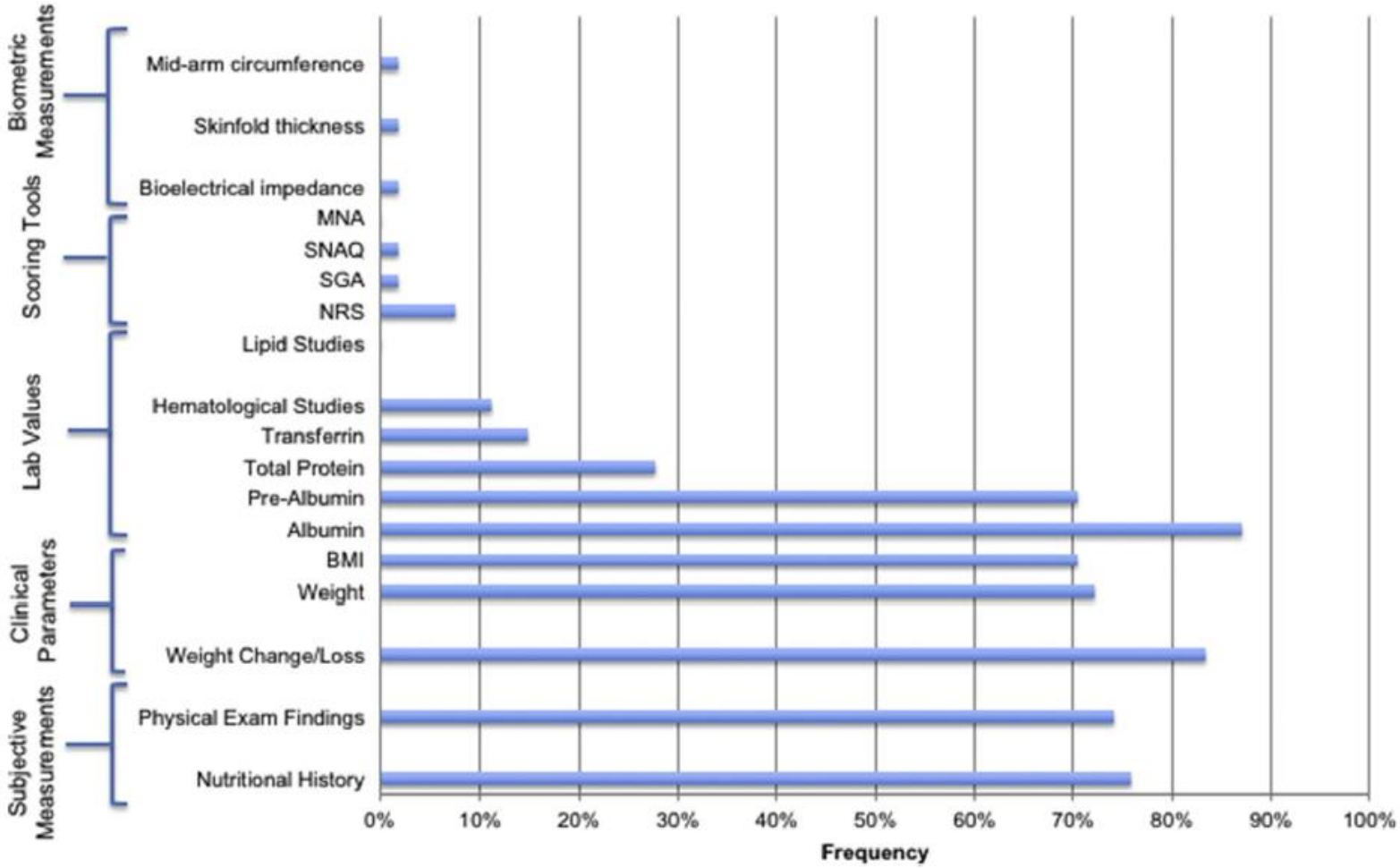
Screening methods



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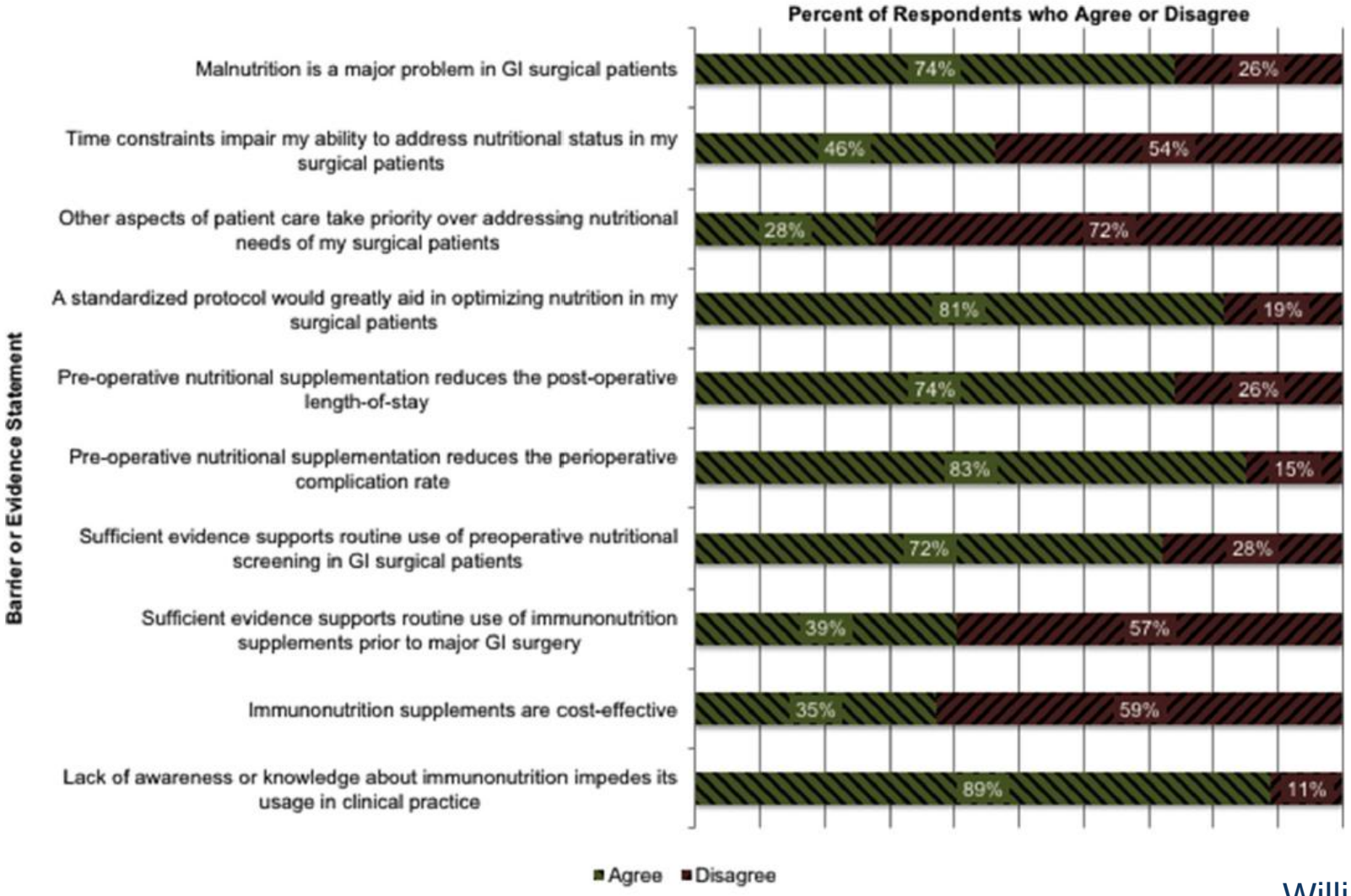
Barriers



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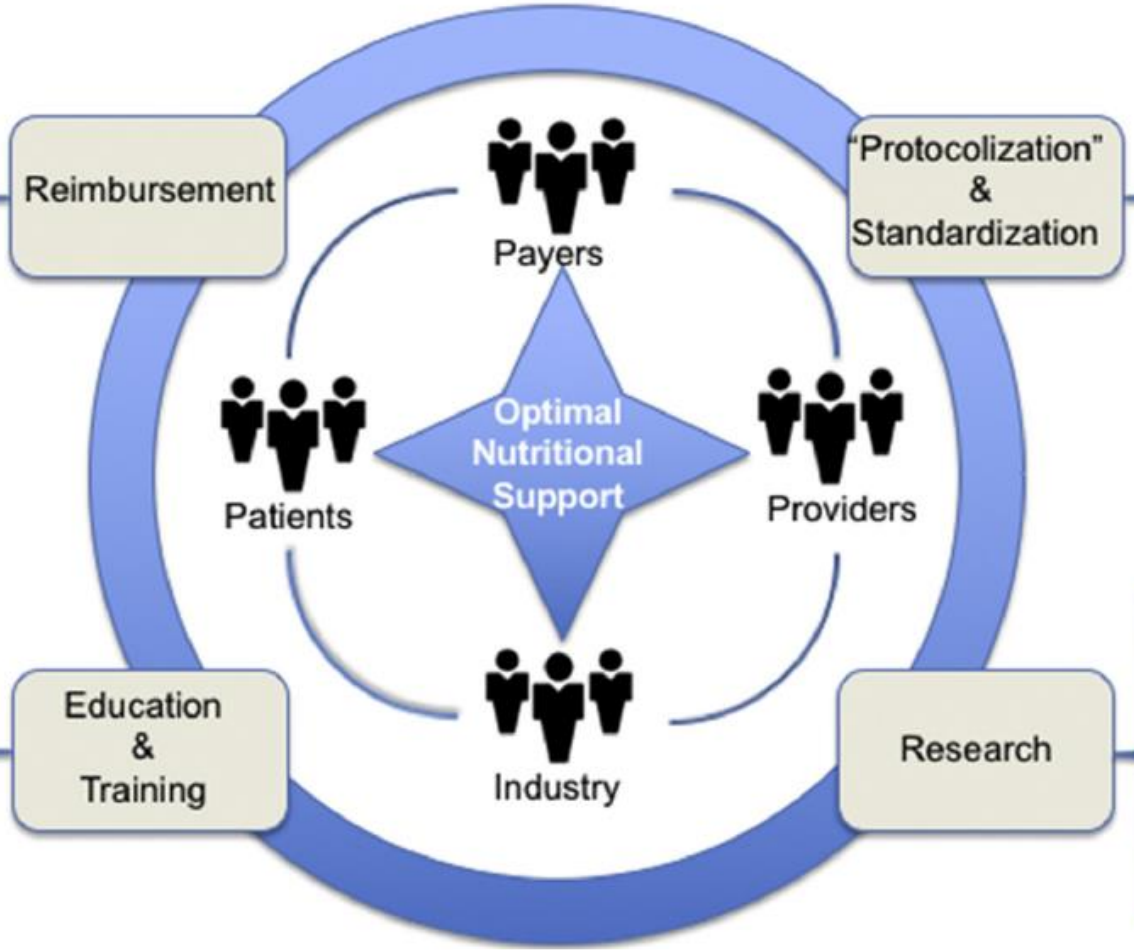
I have a dream …

- Secure reimbursement channels
- Policy/legislation development
- Clinical outcome monitoring/programs



- Strong_for Surgery
- ERAS pathways
- Local protocol development
- Automatized EHR screening alerts

- Medical Student curriculum
- GME training
- Advanced fellowships
- CME training

- Evidence-based guidelines
- Diagnostic & therapeutic development
- QI/Implementation projects

Williams Am J Surg 2017

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