

NUTRITION INTERVENTION APPROACHES FOR THE MANAGEMENT OF MALNUTRITION AMONG HOSPITALIZED PATIENTS

Medical Science Liaisons
Scientific & Medical Affairs

Disclosure

- The content of this program has met the continuing education criteria of being evidence-based, fair and balanced, and non-promotional.
- This educational event is supported by Abbott Nutrition Health Institute, Abbott Nutrition.
- I am an employee of Abbott Nutrition

Objectives

1. Review the prevalence, identification, and impact of malnutrition in hospitalized patients
2. Discuss current nutrition intervention strategies
3. Provide a scientific update on the impact of oral nutritional supplements to improve outcomes

REVIEW THE PREVALENCE,
IDENTIFICATION, AND IMPACT
OF MALNUTRITION IN
HOSPITALIZED PATIENTS

The skeleton is still in the closet

In 1974, Butterworth published “The Skeleton in the Hospital Closet” in *Nutrition Today*¹, and wrote,

In 2011, Somanchi published “The Facilitated Early Enteral and Dietary Management Effectiveness Trial in Hospitalized Patients With Malnutrition” in *JPEN J Parenter Enteral Nutr*², and wrote,

1970

1980

1990

2000

2010

2015

“I suspect...that one of the largest pockets of unrecognized malnutrition in US...exists not in rural slums or urban ghettos but in the private rooms or wards of big city hospitals.”

“Malnutrition is a common problem in the hospital setting that often goes unrecognized by healthcare providers. Investigators have reported that malnutrition occurs in 30% to 55% of hospitalized patients.”

The skeleton is still in the closet

In 2011, Vanderwee published “Malnutrition and nutritional care practices in hospital wards for older people” in *J Adv Nursing*¹, and wrote,

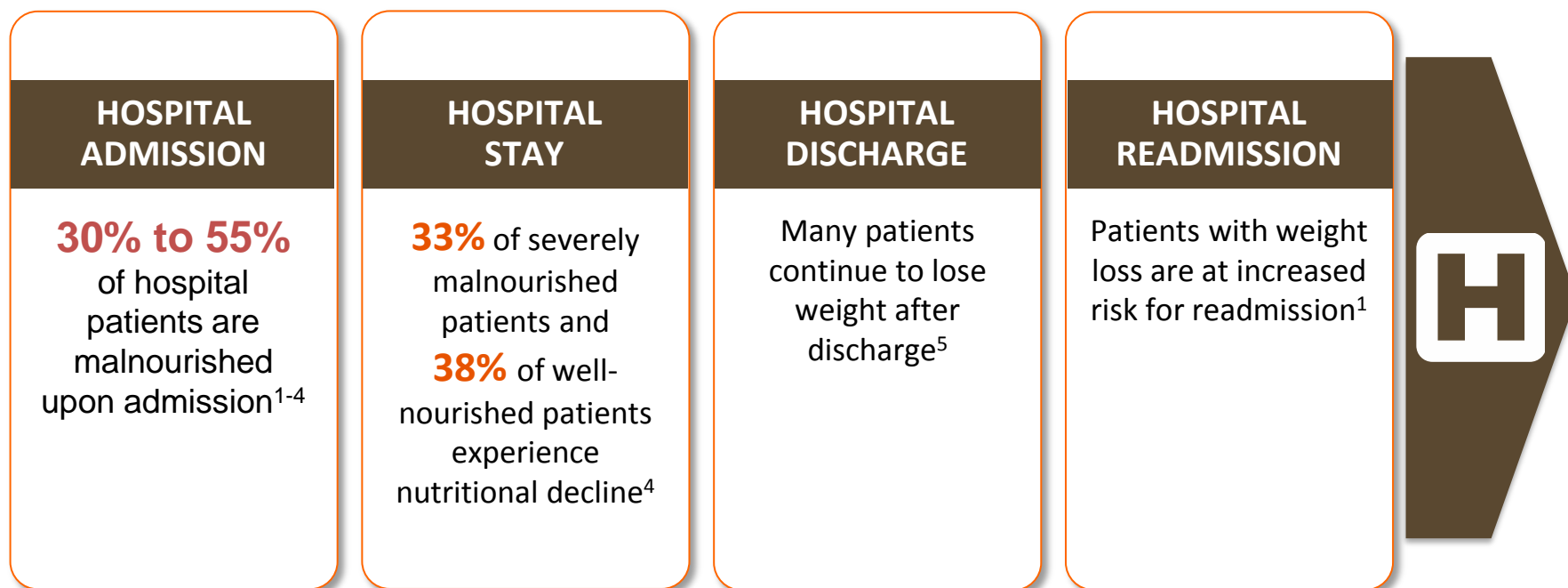
“The overall prevalence rate of malnutrition in wards for older people was 31.9%.”

In 2013, Tappenden published “Critical role of nutrition in improving quality of care: an interdisciplinary call to action to address adult hospital malnutrition.” in *JPEN*², and wrote,

“Unfortunately, malnutrition continues to go unrecognized and untreated in many hospitalized patients.”

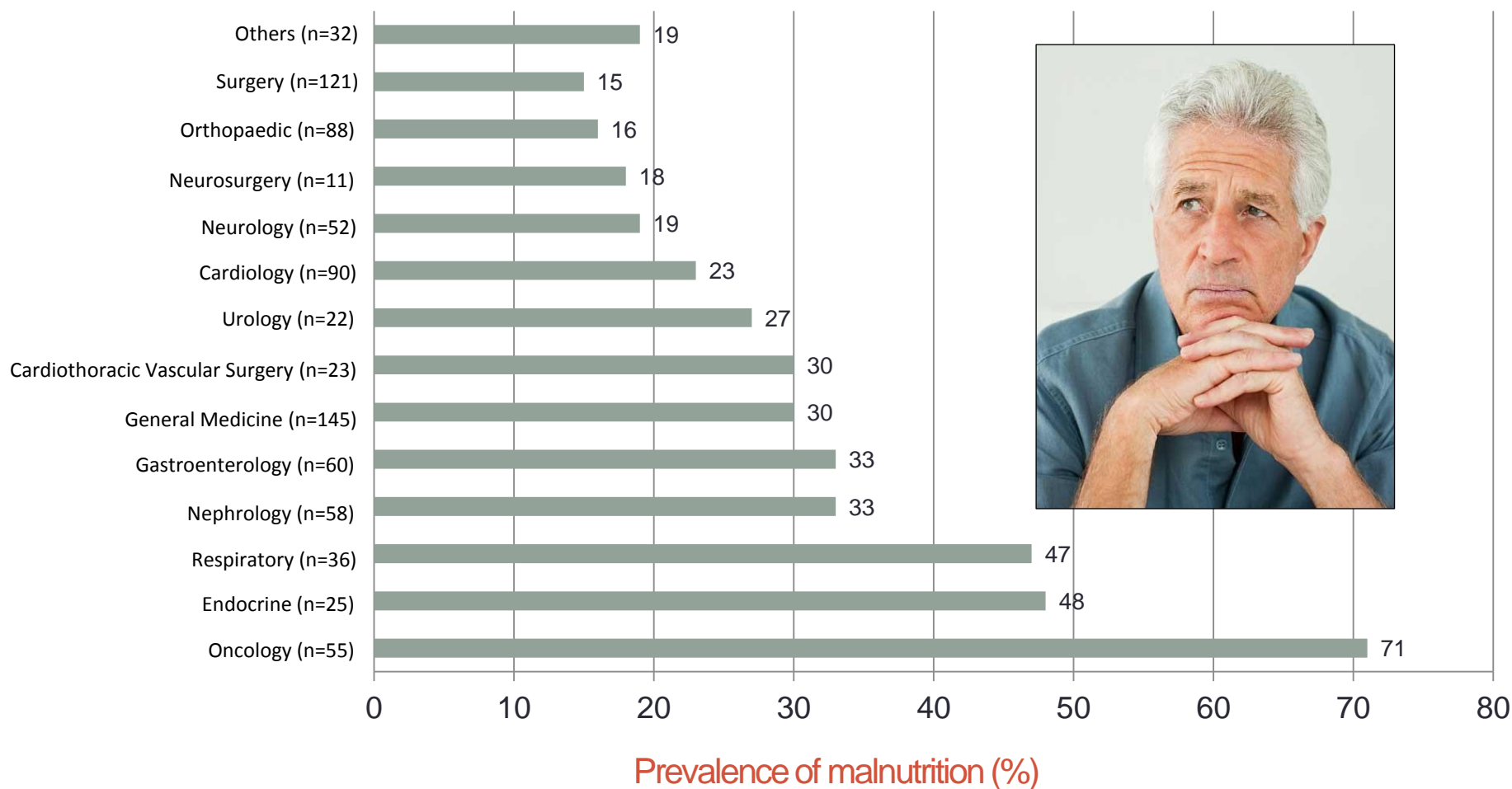
In 2015...

Prevalence of Malnutrition



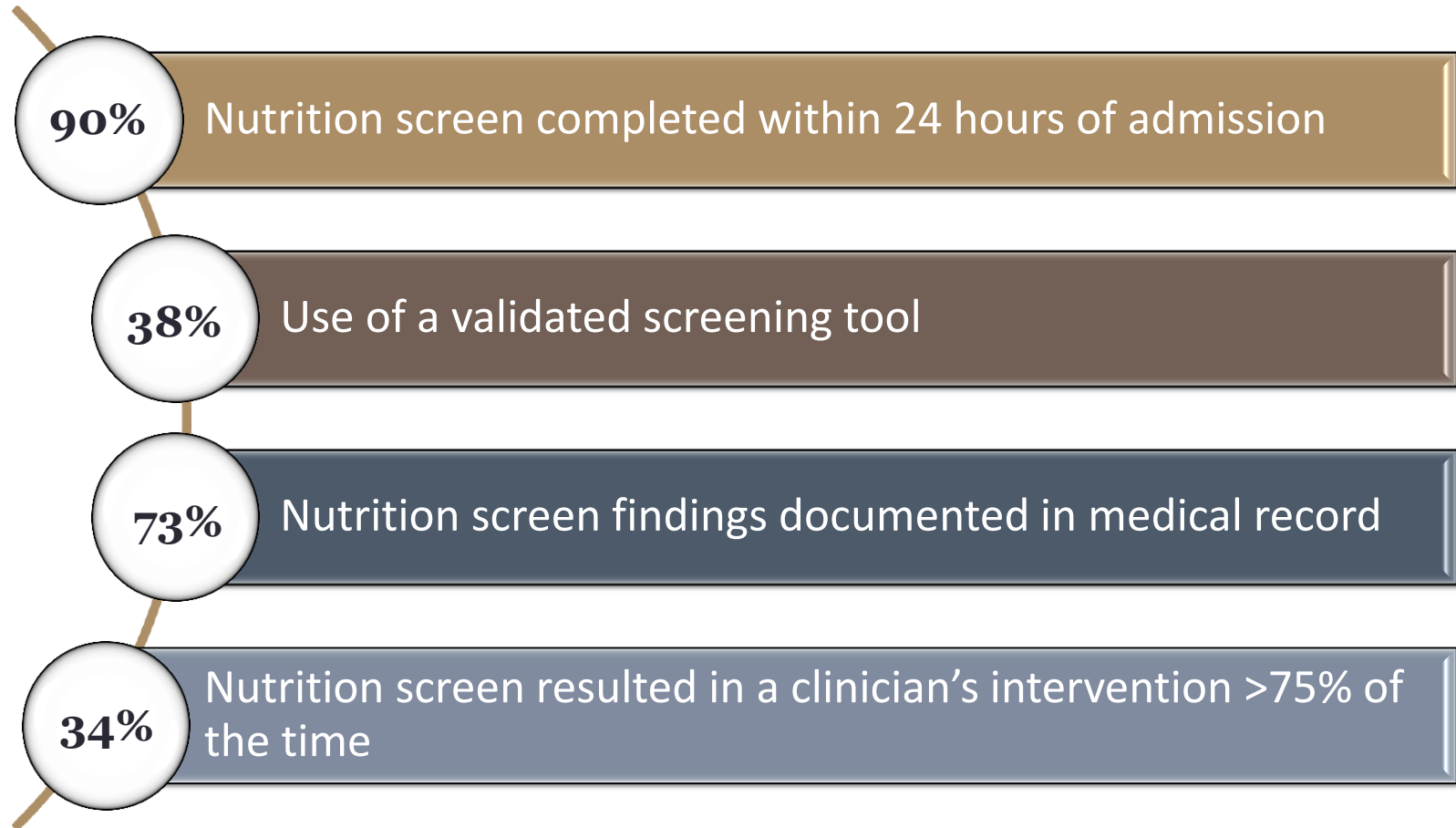
1. Tappenden KA et al. *JPEN J Parenter Enteral Nutr.* 2013;37(4):482-497. 2. Naber TH et al. *Am J Clin Nutr.* 1997;66(5):1232-1239. 3. Somanchi M et al. *JPEN J Parenter Enteral Nutr.* 2011;35(2):209-216. 4. Braunschweig C et al. *J Am Diet Assoc.* 2000;100(11):1316-1322. 5. Beattie AH et al. *Gut.* 2000;46(6):813-818.

Prevalence of malnutrition by condition¹



Current US Hospital Nutrition Care

Survey of US hospital-based professionals on nutrition screening and assessment practices
Data from 2012–2013 Web-based survey of ASPEN, AMSN, and SHM



REVIEW THE PREVALENCE,
IDENTIFICATION, AND IMPACT
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HOSPITALIZED PATIENTS

What is malnutrition?



A state of nutrition in which a deficiency, excess, or imbalance of energy, protein, and other nutrients causes measurable adverse effects on body function and clinical outcome.



What's happened along the timeline in screening, assessing and diagnosing

In **1979**, Blackburn and Thornton published "Nutritional assessment in the hospitalized patient"¹, and wrote,

In **2003**, Waitzberg and Correia published "Nutritional assessment in the hospitalized patient"², and wrote,



“Such **procedures** [*nutrition assessment*] **are pertinent** because immune competence and other organ systems related to survival are dependent on the adequately nourished state.

“**Malnutrition** is highly prevalent in hospitalized patients. Despite this, **it is not routinely assessed** in most hospitals worldwide.”

1. Blackburn, G. L. and P. A. Thornton (1979). Med Clin North Am 63(5): 11103-11115.
2. Waitzberg, Correia (2003). Curr Opin Clin Nutr Metab Care 6:531-538

What's happened along the timeline in screening, assessing and diagnosing

In 2013, Corkins et al published "Malnutrition Diagnosis in Hospitalized Patients: United States 2010,¹ in JPEN and wrote,



“3.2% of all U.S. hospital discharges in 2010 had this [*malnutrition*] diagnosis.”

1. Corkins, M. R., et al. (2014). JPEN; 38(2): 186-195.

What's happened along the timeline in screening, assessing and diagnosing - Today

In June, 2015, Guerra et al published "Usefulness of Six Diagnostic Screening Measures for Undernutrition in predicting Length of Hospital Stay,¹ in JAND and concluded,



*Undernutrition and risk of **undernutrition predict longer LOS** in hospitalized patients and a variety of methodologies **share a similar validity** in predicting LOS.”*

1. Guerra, R. S., et al. (2015). "Usefulness of six diagnostic and screening measures for undernutrition in predicting length of hospital stay: a comparative analysis." J Acad Nutr Diet **115**(6): 927-938.

What's happened along the timeline in screening, assessing and diagnosing - Today

Table 1. Undernutrition parameters included in four undernutrition diagnostic and screening measures

Parameter	AA-CCM ^a	PG-SGA ^b	NRS-2002 ^c	MUST ^d
Body mass index				X
Body mass index+impaired general condition			X	
Weight loss	X	X	X	X
Body fat	X	X		
Muscle mass	X	X		
Fluid accumulation	X	X		
Food/energy intake	X	X	X	
Symptoms		X		
Activities and function		X		
Reduced handgrip strength	X			
Severity of disease			X	
Acute disease effect				X

^aAA-CCM=Academy of Nutrition and Dietetics and the American Society for Parenteral and Enteral Nutrition recommended clinical characteristics of malnutrition.

^bPG-SGA=Patient Generated Subjective Global Assessment.

^cNRS-2002=Nutritional Risk Screening.

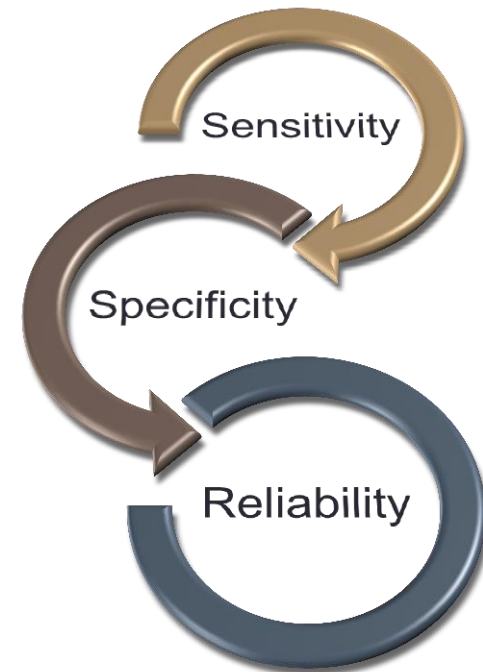
^dMUST=Malnutrition Universal Screening Tool.

1. Guerra, R. S., et al. (2015). "Usefulness of six diagnostic and screening measures for undernutrition in predicting length of hospital stay: a comparative analysis." *J Acad Nutr Diet* **115**(6): 927-938.

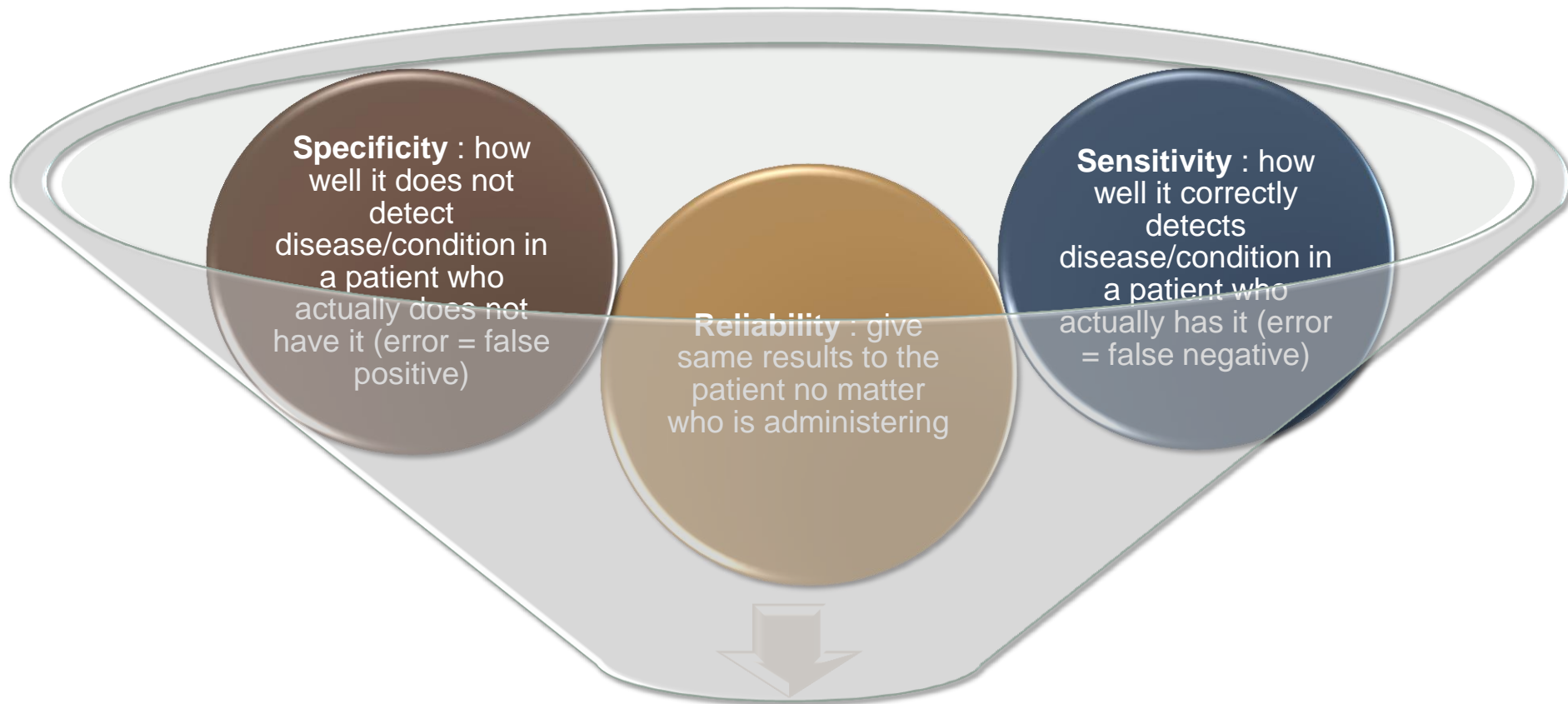
What is a validated tool?

- Process of validation confirms that the tool accurately measures what it is purported to measure
- Adding to/deleting from a validated tool → invalidates

Validity is composed of

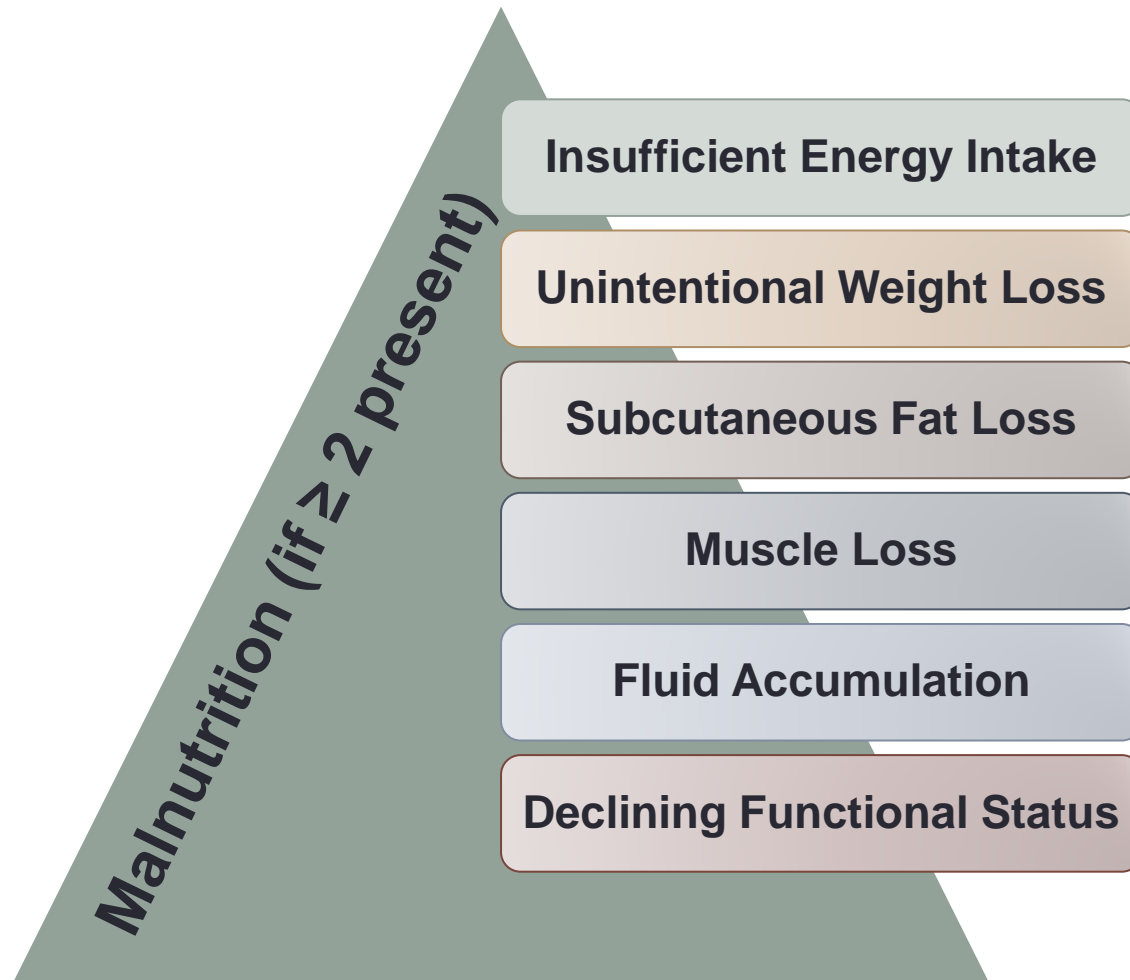


What is a Validated tool?



A well validated screening tool will be highly sensitive, specific and reliable

Use multidisciplinary team to identify 6 characteristics of malnutrition



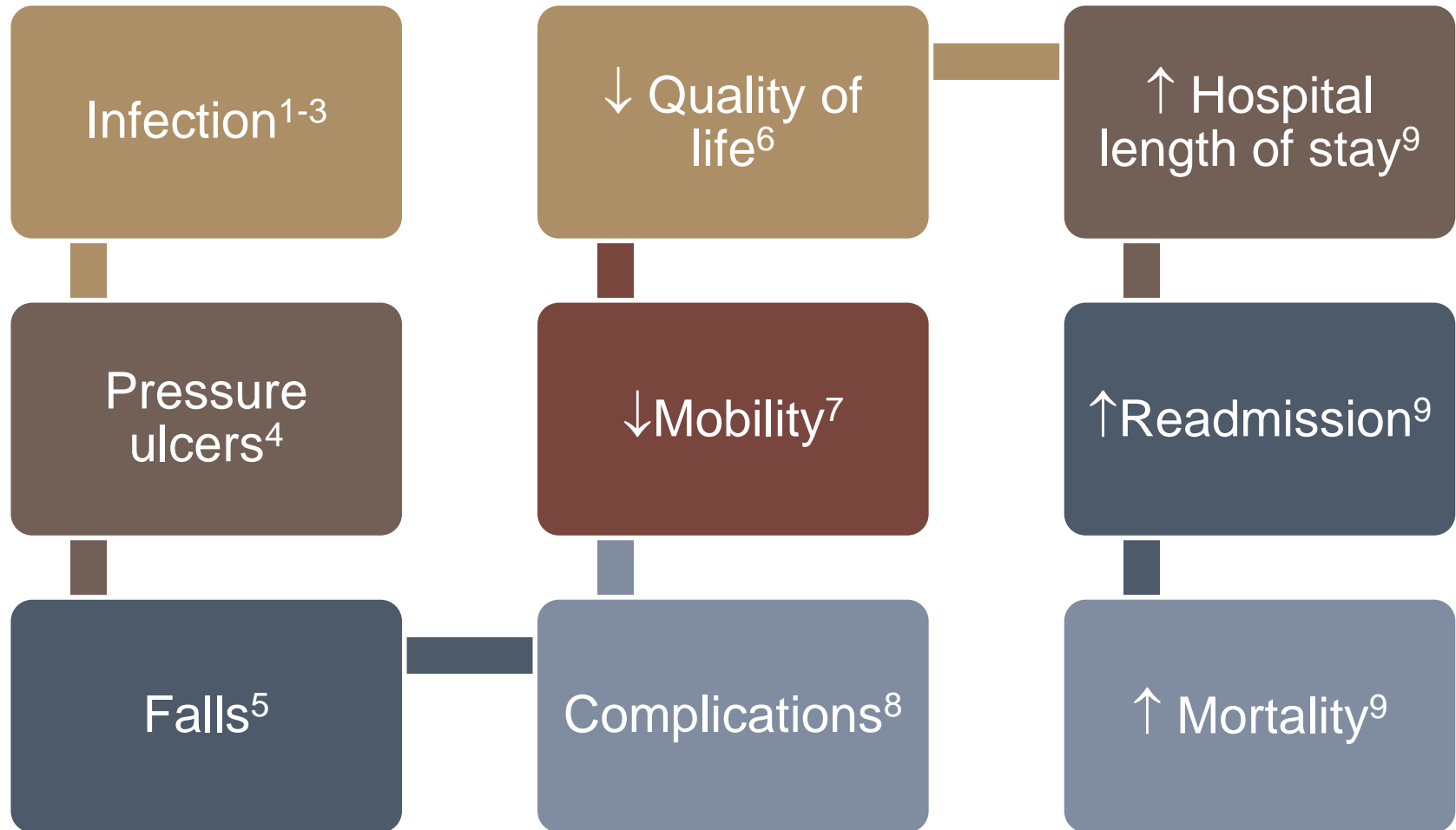
Loss of Muscle Mass & Function can Now Diagnose Malnutrition, Independent of Body Weight

Current US Hospital Nutrition Care

- 1995 – Joint Commission mandated universal screening and assessment of hospitalized patients
- 2016 – Joint Commission removed 131 requirements from hospital programs
 - Have been determined (as part of a larger, multi-phased project to improve the accreditation/certification process) to be a routine part of operations and clinical practice.
 - Deletions are not expected to change an organization's current practice, or have an effect on quality and safety.

REVIEW THE PREVALENCE,
IDENTIFICATION, AND
IMPACT OF MALNUTRITION
IN HOSPITALIZED PATIENTS

Malnutrition is a significant contributor to adverse outcomes



1. Schneider SM, et al. *Br J Nutr.* 2004;92:105-111. 2. Merli M, et al. *Clin Gastroenterol Hepatol.* 2010;8:979-985. 3. Lee S, et al. *Yonsei Med J.* 2003;44:203-209. 4. Fry D et al. *Arch Surg.* 2010;145:148-151; 5. Bauer JD et al. *J Nutr Diet.* 2007;20:558-564. 6. Kvamme JM, et al. *Qual Life Res.* 2010; 7. Vivanti A, et al. *J Nutr Health Aging.* 2011;15:388-391; 8. Sungurtekin H, *J Am Coll Nutr.* 2004;23:227-232; 9. Lim SL, et al. *Clin Nutr.* 2012;31(3):345-350.

Malnutrition in hospitalized patients Higher costs, longer stay & increased mortality

1.95 million

hospital stays involved malnutrition in 2013



Malnutrition is associated with:

Economic Burden

Hospital stays involving malnutrition accounted for

\$42 billion



Human Cost

Most malnutrition-related stays have a substantially higher proportion of in-hospital deaths

1.5x to 5x higher

than those unrelated to malnutrition



Longer Hospital Stays

Most hospital stays were

2x longer

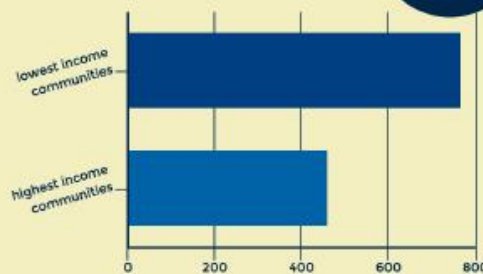
47%-71%

of patients with malnutrition did not have a routine discharge



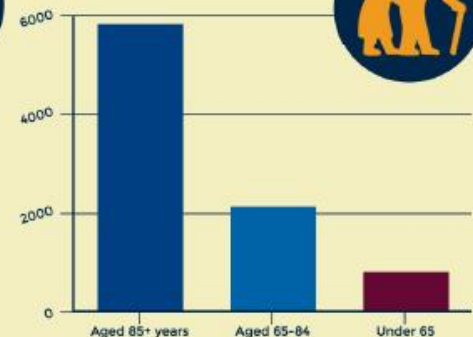
Rate of malnutrition is highest:

In lowest income communities



Malnutrition Related Hospital Stays per 100,000 Population

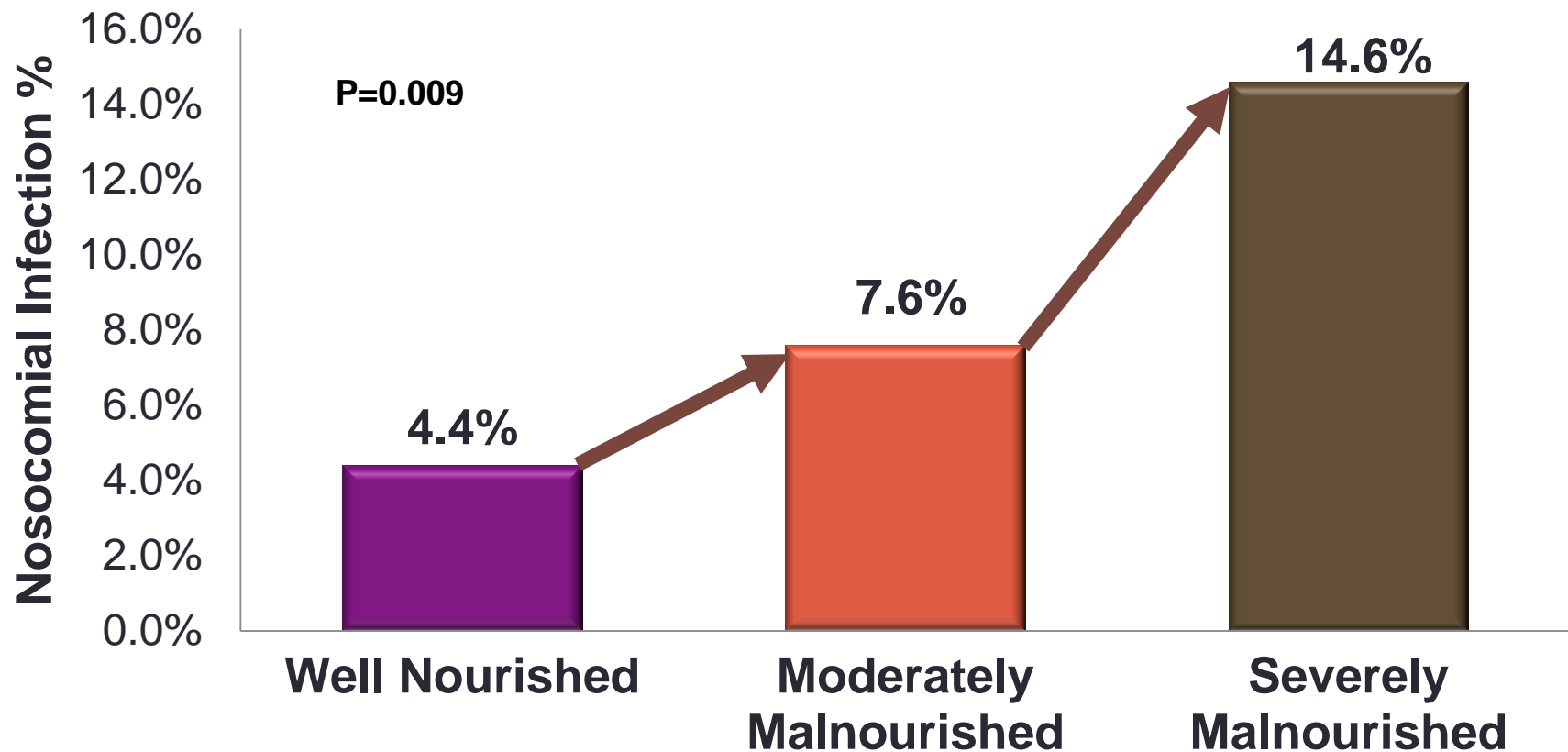
Older Adults



Malnutrition Related Hospital Stays per 100,000 Population

Malnutrition causes increased infection rate

A study in 2004¹ found that malnourished patients had up to 3x higher rate of infections



Malnutrition leads to poor hospitalization outcomes and decreased survival¹

- In a large, prospective cohort:
 - 1,079 patients; mean age 51.9 years
 - 29% of patients in cohort were malnourished as measured by SGA*

Malnourished patients:

Had higher mortality rates at 1 year (34% vs. 4.1%)

Had higher mortality rates at 2 years (42.6% vs. 6.7%) (P=0.001)

Had higher mortality rates at 3 years (48.5% vs. 9.9%)

Longer length of hospital stays (P=0.001)

Were more likely to be readmitted within 15 days (P<0.025)

The study also showed:

The mean difference between actual cost of hospitalization and the average cost for malnourished patients was greater than well-nourished patients (P<0.014)

*Subjective Global Assessment

1. Lim SL, et al. *Clin Nutr.* 2012;31(3):345-350.

Outcomes associated with malnutrition documentation using AND criteria

- Chart review of Veteran's Hospital August 2012 – December 2014 after implementation of Consensus Statement
- Statistical model predicted readmission or death in 84% of all cases

Outcome	Malnourished (n=202)	Nonmalnourished (n=202)	OR (95% CI) Unadjusted
Met composite endpoint†	108 (53%)	36 (18%)	5.30 (3.36-8.34)*
Readmit w/in 30d	63 (21%)	24 (12%)	3.36 (1.99-5.65)*
Died w/in 90d	65 (32%)	16 (8%)	5.52 (3.06-9.95)*
LOS >7d	83 (41%)	28 (14%)	4.33 (2.66-7.06)*
DC nursing home	52 (26%)	24 (11.9%)	
DC home	113 (56%)	165 (81.7%)	
Mean LOS, d (SD)	9.8 (11.5)	4.4 (4.5)	

† Readmitted within 30 days or die within 90 days of discharge

*P<0.001

Length of stay (LOS), Discharge (DC)

DISCUSS CURRENT NUTRITION INTERVENTION STRATEGIES

Malnutrition Quality Improvement Initiative (MQii) reco' for clinical workflow



Malnutrition Screening

Definition: systematic process of identifying an individual who is at risk for malnutrition to establish whether the patient is in need of a malnutrition assessment

- 24 Hrs. Following Patient Admission

Nutrition Assessment

Definition: systematic approach to collect and interpret relevant data from patients, caregivers, patient family members, and the medical record to establish a malnutrition diagnosis and determine a patient's malnutrition severity

- 24 - 48 Hrs. Following A Screening Where Patient is Determined to Be At Risk

Malnutrition Diagnosis

Definition: identification of and labeling of a patient's nutrition problem that requires independent treatment that may be unrelated to the patient's index at hospital admission

- Immediately Following Nutrition Assessment

Malnutrition Care Plan Development

Definition: development of a document outlining comprehensive planned actions with the intention of impacting nutrition-related factors affecting patient health status

- Immediately Following Diagnosis

Intervention Implementation

Definition: implementation of specific actions outlined in the malnutrition treatment care plan

- Within a Maximum of 24 Hrs. Following Diagnosis

Malnutrition Monitoring & Evaluation

Definition: identifies the amount of progress made since patient diagnosis and assesses whether outcomes relevant to the malnutrition diagnosis and treatment goals are being met

- Reassessment & Rescreening Performed Based on Patient Needs & Results of Initial Screening and/or Assessment; See Best Practices Section for More Information

Initiate Dietitian Consult and Malnutrition-Risk Diet Order for At-Risk Patients

- Intervene immediately for at-risk patients with food and/or oral nutritional supplement per malnutrition-risk protocol to accelerate treatment unless contraindicated
- Conduct nutrition assessment as soon as possible
- Following assessment, any active malnutrition-risk diet order should be reevaluated

Discharge Planning

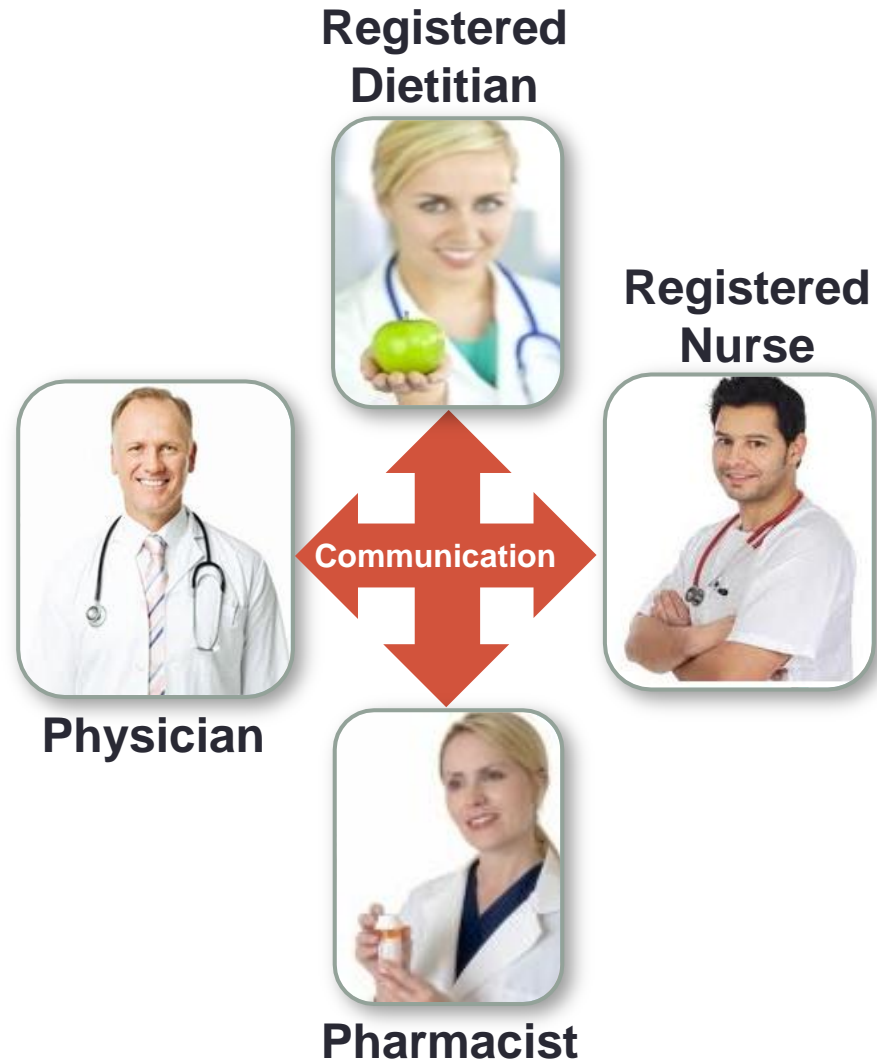
Definition: documentation of malnutrition diagnosis, status, and orders in discharge plan

- 24 Hrs. Prior to Hospital Discharge for Patients Previously Assessed to be At Risk or Malnourished



What steps are important to enact change?

- Utilize evidence-based nutrition support when managing patients
- Establish team approach with roles and responsibilities
- Increase communication within all team members
- Implement automatic nutrition intervention
- Follow up on patient success and overall satisfaction



Examples of counseling approaches to optimize PO intake

- Encourage small amount but frequent meals
- Maximize times of better appetite
- Drink fluids after meals
- Avoid interruptions during meals
- Address dental / oral problems
- Modify food consistency

Nutrition counseling / Education Goal

- Nutrition counseling is clinically shown to improve health outcomes for a variety of conditions and diseases:
 - Malnutrition
 - Diabetes
 - Obesity/Gastric Bypass
 - Cardiovascular Disease
 - Renal Disease
 - Cancer
 - Women's Health / Pregnancy
 - Eating Disorders
 - Gastrointestinal Disease
 - HIV/AIDS

Nutrition counseling to improve recovery after hospital discharge

- Meta analysis including 4 RCTs identified that nutrition counseling provided by a dietitian following hospital discharge resulted in:
 - Improved body weight
 - Improved protein and energy intake
 - No difference in hand grip strength

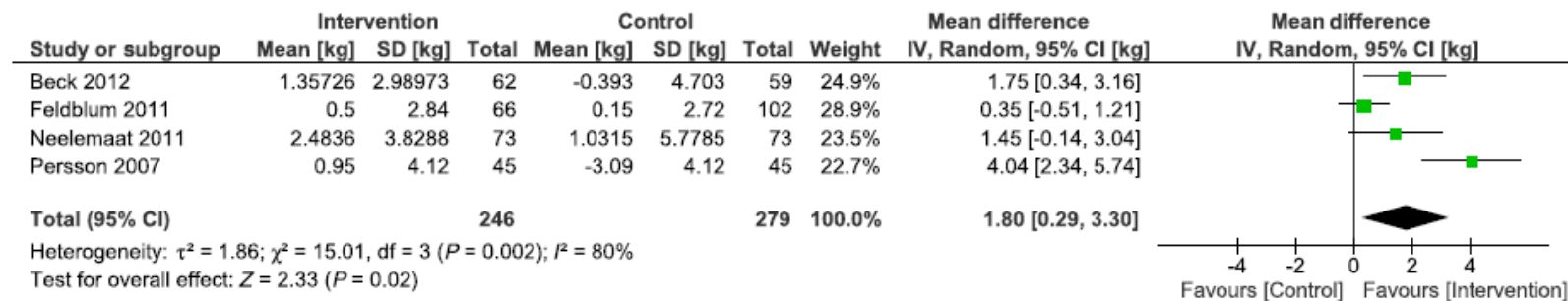


Figure 4 Meta-analysis of the effect of individualised dietary counselling given at home following discharge from an acute hospital compared to standard care on weight change among older patients at nutritional risk. CI, confidence interval.

Effects of nutrition supplement on muscle function & clinical outcomes

Study design and findings	Outcome benefit
Meta-analysis of results from 4 RCTs showed significantly lowered incidence among elderly hospitalized patients (OR 0.75) who used ONS (2-26 weeks) compared to non-users. ¹ Studies were done in Switzerland, Sweden, France, and the Netherlands.	Lower incidence of pressure ulcers
Meta-analysis of results from 4 RCTs showed that ONS users (mean age > 65 years) had significantly improved handgrip strength compared to controls. ² Studies were done in the UK, Sweden, and Germany.	Greater handgrip strength
During a 3-month post-hospitalization interval, malnourished patients who received individualized nutrition care with ONS and dietary counseling scored higher on all 8 QOL scales, compared to only 3 scales with dietary counseling. ³ This study was conducted in Germany.	Improved QoL
Meta-analysis of nutrition trials in older people. ⁴ In subgroup analysis of those who were undernourished, ONS use significantly reduced risk of mortality by more than 20%. Studies were done at sites around the world.	Reduced mortality risk

Randomized, controlled trial, RCT; odds ratio, OR; oral nutrition supplements, ONS; quality of life, QOL

PROVIDE SCIENTIFIC
UPDATE ON THE IMPACT OF
ORAL NUTRITIONAL
SUPPLEMENTS TO IMPROVE
OUTCOMES

Clinical evidence supporting nutrition intervention

	Readmissions	LOS	Complications (Wounds, Infections, Pressure Ulcers)
Cawood 2011 ¹	X	X	X
Gariballa 2006 ²	X		X
Stratton 2010 ³	X		
Norman 2008 ⁴	X		
Somanchi 2011 ⁵		X	
Brugler 1999 ⁶		X	
Milne 2009 ⁷			X
Rana 1992 ⁸			X

1. Cawood AL, Elia M, Stratton EJ. *Ageing Research Reviews*. 2012;11:278-296. 2. Gariballa S, et al. *Am J Med*. 2006;119:693-699. 3. Stratton RJ, Elia M. *proc Nutr Soc Annual Meeting of the Nutrition Society and BAPEN* 2010;1-11. 4. Norman, K., et al., *Clin Nutr*, 2008. 27(1): p. 48-56. 5. Somanchi M et al. *JPEN* 2011;35:209-216. 6. Milne AC, Potter J, Vivanti A, Avenell A. *Cochrane Database Syst Rev* 2009;(2):CD003288. 7. Brugler L et al. *J Qual Improv* 1999;25:191-206. 8. Rana SK, et al. *Clinical Nutrition* 1992, vol 11, pages 337-344.

Clinical evidence supporting ONS intervention

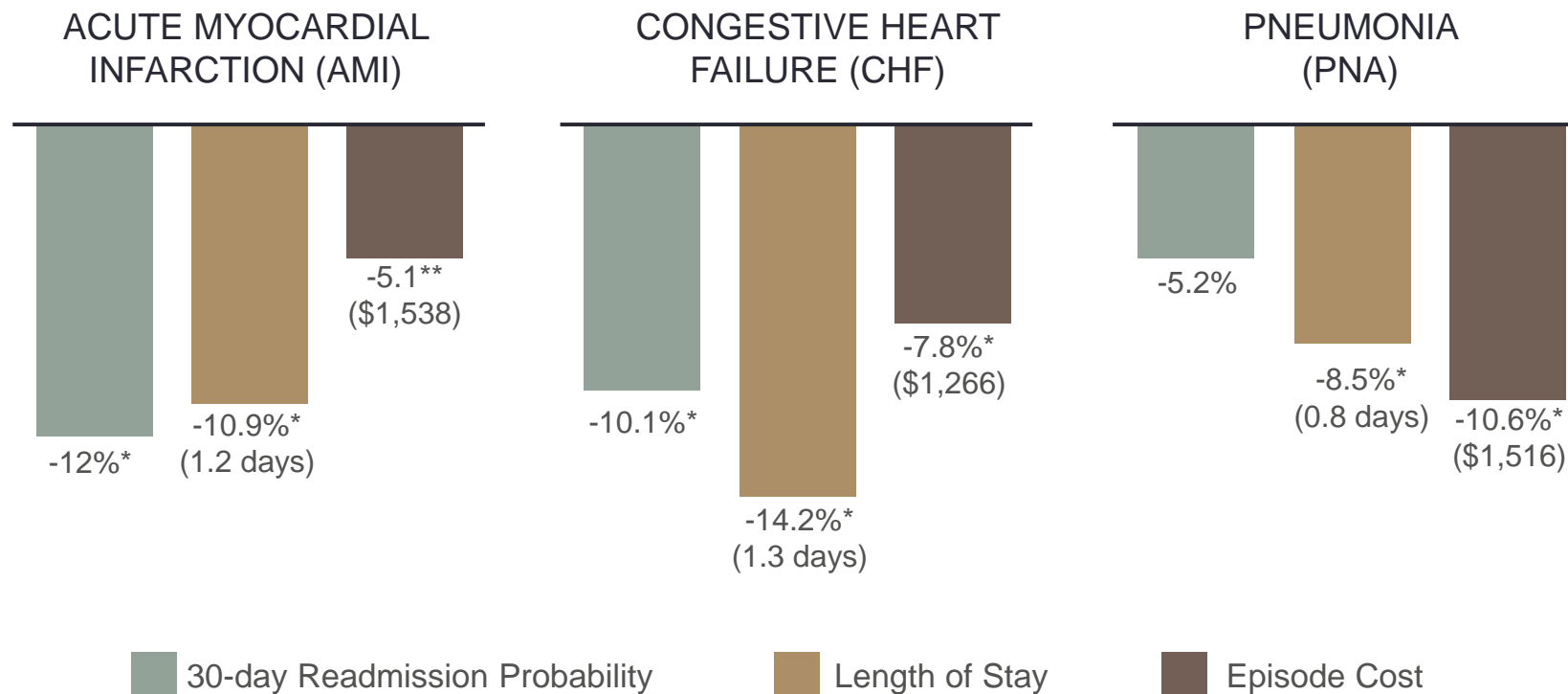
	Post-Surgical	GI	Cancer	Respiratory (COPD+ and Pneumonia)	Elderly	Renal Failure
Keele 1997 ¹	X					
Rana 1992 ²	X					
Jensen 1997 ³	X					
Stratton 2005 ⁴	X				X	
Stratton 2007 ⁵	X		X	X		
Norman 2008 ⁶		X				
Cawood 2012 ⁷				X	X	X
Gariballa 2006 ⁸					X	
Vivanti 2011 ⁹					X	
Neelemaat 2012 ¹⁰					X	
Deutz 2016 ¹¹					X	

1. Keele AM, et al. *Gut* 1997, vol 40, pages 393-399. 2. Rana SK, et al. *Clinical Nutrition* 1992, vol 11, pages 337-344. 3. Jensen M and Hesso I. *Nutrition*. 1997;13:422-430. 4. Stratton RJ, et al. *Ageing Research Rev.* 2005; 4:422-450. 5. Stratton R and Elia M. *Eur J Gastroenterol Hepatol* 2007; 19:353-358. 6. Norman K, et al. *Clin Nutr.* 2008;27:48-56. 7. Cawood AL, Elia M, Stratton EJ. *Ageing Research Reviews.* 2012;11:278-296. 8. Gariballa S, et al. *Am J Med.* 2006;119:693-9. 9. Vivanti AP, et al. *J Nutr Health Aging.* 2011; 15:388-397. 10. Neelemaat F et al. *J Am Geriatr Soc.* 2012;60:691-699. 11 Deutz, NE, et al. *Clin Nutr* 2016;35:18-26.

Can Oral Nutritional Supplements Improve Medicare Patient Outcomes in the Hospital?

- HEOR study published in 2014
- Objective: To assess the effect of ONS on 30-day readmission rates, LOS, and episode costs in hospitalized Medicare patients, aged 65 and over, with diagnoses affected by new Medicare reimbursement rules under the Affordable Care Act (ACA):
 - Acute Myocardial Infarction (AMI)
 - Chronic Heart Failure (CHF)
 - Pneumonia (PNA)
- Patients with these conditions have the highest rates of readmission

ONS Improved Outcomes and Reduced Hospital Cost in Patients ≥ 65 Years with AMI, CHF, and Pneumonia



*Indicates significance at the 1% level

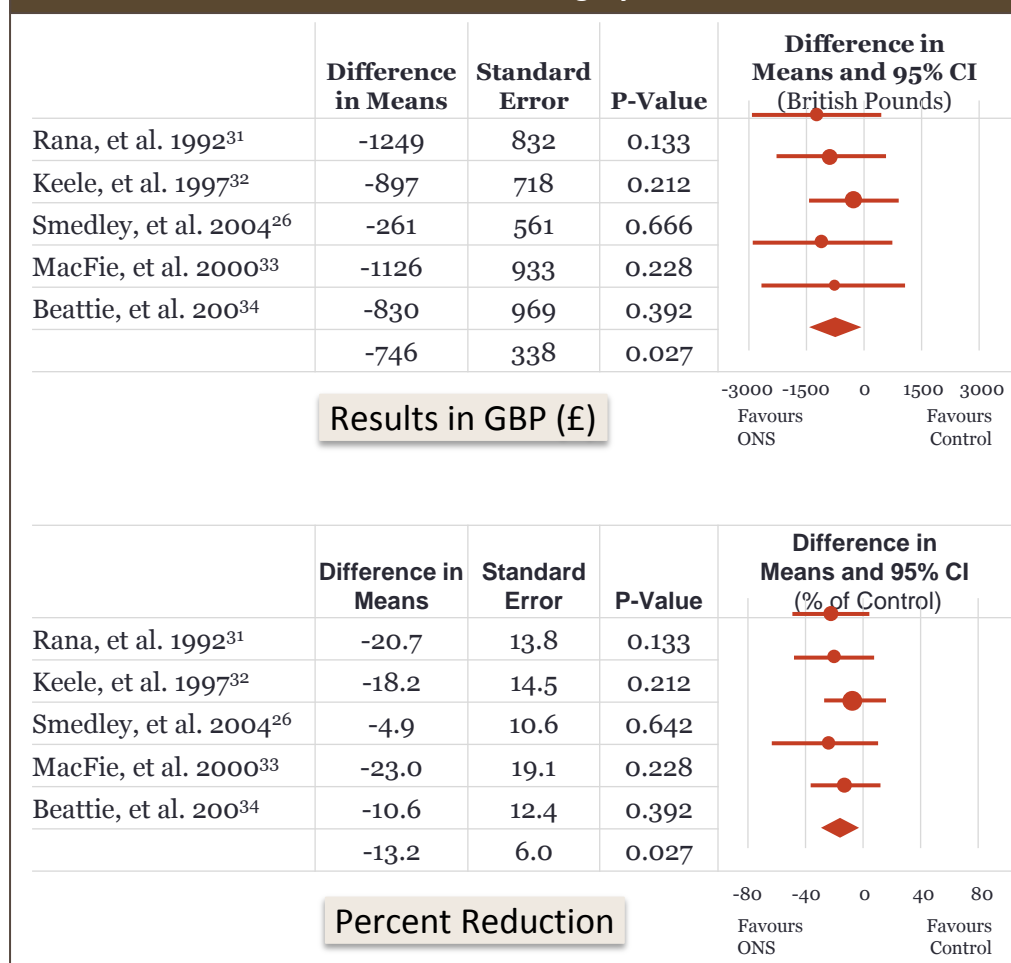
**Indicates significance at the 5% level

Financial savings with ONS in the hospital

2015 Systematic Review determined that ONS provided to hospitalized patients resulted in an average of 12.2% cost savings

- Cost savings from standard ONS was associated with:
 - Reduced mortality (Risk ratio 0.650; $P < 0.05$; $N = 5$ studies)
 - Reduced complications (by 35% of total; $P < 0.001$; $N = 7$ studies)
 - Reduced length of hospital stay (~2 days; $P < 0.05$; $N = 5$ surgical studies)

Figure 2. Meta-analysis of net cost saving of five randomised controlled trials of abdominal surgery in the UK



Financial savings with ONS in community & care home settings

- The use of ONS results in 9.2% cost savings when used for < 3 months ($p < 0.01$) and 5% savings when used for ≥ 3 months ($P > 0.05$).
- ONS use improved clinical outcomes:
 - Lower hospitalizations (by 16.5%, $P < 0.001$)
 - Reduced mortality (RR 0.86, 95% CI, 0.61, 1.22)
 - Other outcomes of ONS use:
 - Improved QoL
 - Reduced infections
 - Reduced minor post- operative complications
 - Reduced falls
 - Reduced functional limitations

Nutrition intervention reduces hospital readmissions

2016 Systematic Review and Meta-Analysis:

22 RCTs with 3,736 participants – medical inpatients with malnutrition or at risk for malnutrition

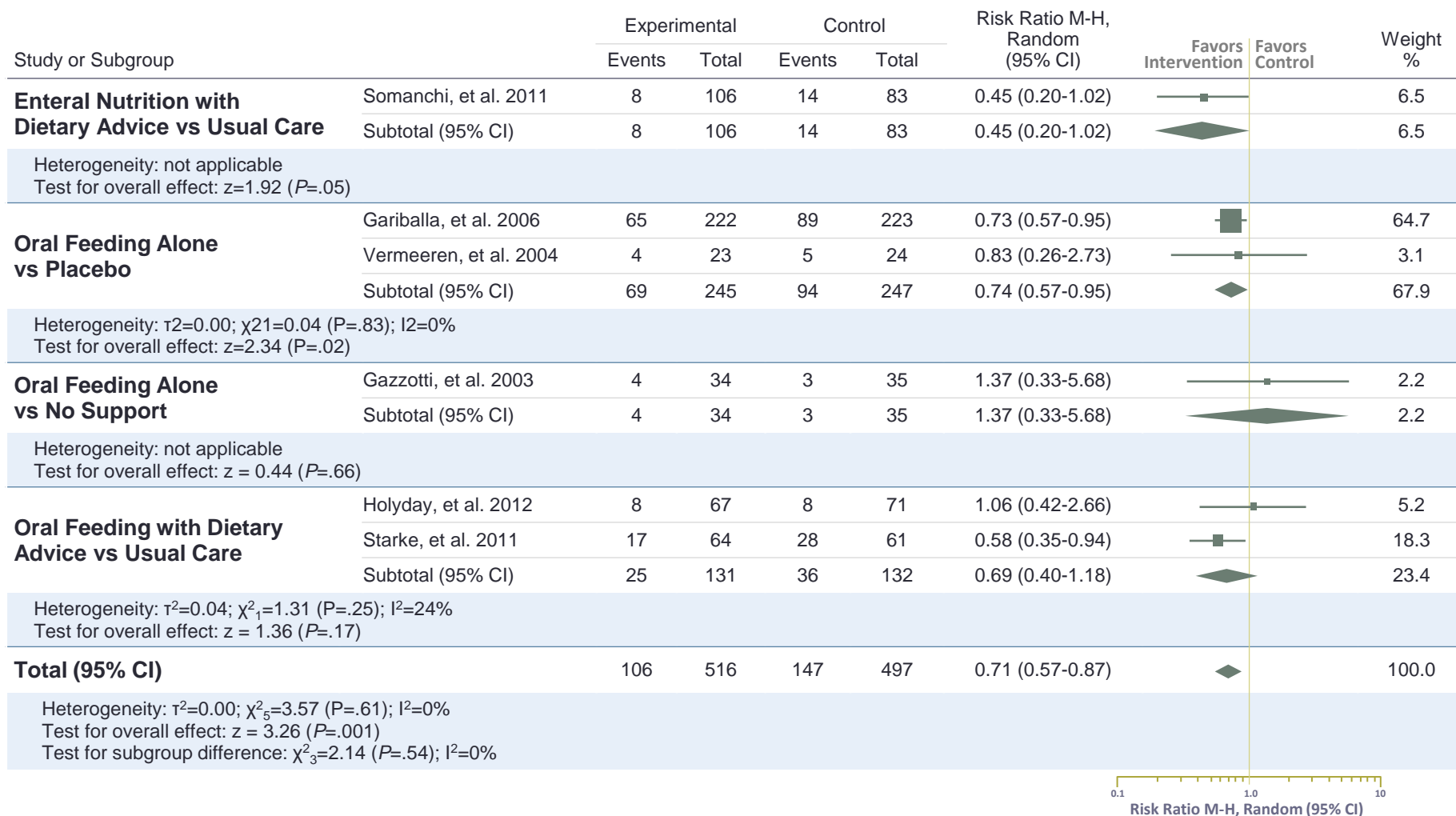
Effects of nutritional support (counseling, oral and enteral feeding) compared with a control group

Results:

- Intervention group:
 - Significantly increased weight (0.72 kg)
 - Significantly increased caloric intake and protein intake (397 calories)
- Non-elective readmissions were significantly decreased by the intervention (20.5% vs. 29.6%)

Nutrition intervention reduces hospital readmissions

Figure 3. Forest Plot Comparing Nutritional Intervention vs Control for Nonelective Readmissions



Conclusion

- Malnutrition continues to be prevalent in both communities and hospitals
- Validated screening and assessment tools should be utilized to increase the recognition and diagnosis of malnutrition
- Nutrition counseling and oral nutrition supplementation are effective strategies to improve the nutritional status and outcomes for patients
- Oral nutrition supplementation can be an effective approach to improve clinical and economic outcomes in multiple populations

THANK YOU
