The Physician Nutrition Specialist in 2028

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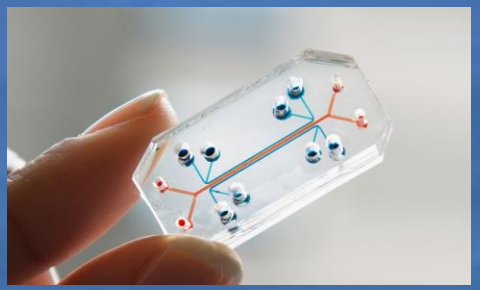
Atlantic Health System

NBPNS NATIONAL BOARD OF PHYSICIAN NUTRITION SPECIALISTS

Jefferson
Philadelphia University + Thomas Jefferson University
HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

The Metabolic Hospital

- On-Demand Testing/Monitoring
  - Body/organ energy utilization
  - Nitrogen intermediary metabolism
  - Protein synthetic rates
  - Extracellular and intracellular electrolytes/minerals
  - Micronutrient stores
  - Real-time caloric intake
  - Genome/epigenome, metabilome, proteome, transcriptome, microbiome
- Therapeutic interventions
  - Patient/disease-specific nutrition
  - Programmed intravenous nutritional infusions
  - Hospital malnutrition prevention
  - ERAS, metabolic prep for physiologic stress



How Did We Create a New Speciality?

2017- Agreement Signed
2018- ASN/NBPNS reengages with NBPNS diplomates, enhances exam, training, value

Metabolic Hospital Systems

- 14 US states, 5 Internationals
- Metabolic Inpatient Care
- Metabolic Outpatient Centers
- Primary Diseases of Nutrition
- Nutritional Disease Management
- Nutritional Disease Prevention

2019- Growth
2020- NBPNSd >1000
2021- ASN/NBPNS achieves ABIM/ABMS recognition

2022- Formal Fellowships
2023- NBPNSd >2000

2024- ASN/NBPNS core curriculum accepted by AAMC for all US Med Schools

Role of the Physician Nutrition Specialist – The "Metabolist"

- Expert knowledge of clinical biochemistry
- Specialized clinical tools
  - Nutrition Focused Physical Exam (NFPE) in malnutrition
  - Nutrition Focused Physical Exam (NFPE) in adiposity
  - Metabolic cart
  - Body Composition
  - Nitrogen balance
  - Micronutrient levels
- Specific nutritional Dx and prescription nutrition (Nx) therapies
- Interface nutrition/exercise with pharmaceutical and surgical treatments
- Expert/authoritative metabolic role among medical colleagues
- Leadership role for hospital administration

Primary Diseases of Nutrition

- **Undernutrition**
  - Protein-calorie malnutrition
  - Marasmus/Kwashiorkor
  - Cachexia
  - Anorexia
  - Sarcopenia
  - Stress metabolism
  - Mineral/electrolyte deficiencies
  - Micronutrient deficiencies

- **Overnutrition**
  - Metabolic syndrome
  - Adiposity
  - Obesity
  - NAFLD
  - Mineral/electrolyte overload/toxicity
  - Micronutrient overload/toxicity

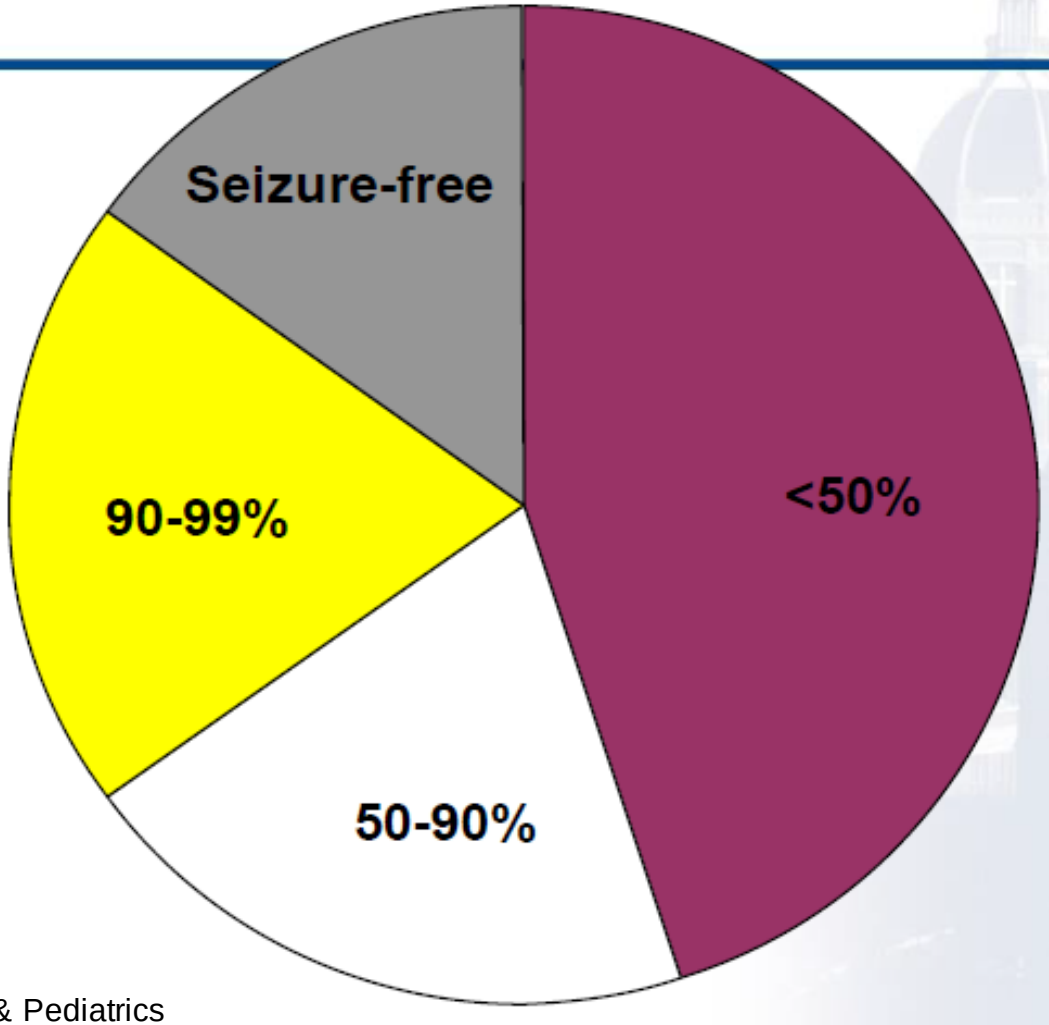
- **Inborn errors of metabolism**
  - Classic syndromes of childhood, adult survivors
  - Partial metabolic errors with unique presentations

Nutritional Disease Management*

- **CNS**: epilepsy (ketogenic), dementia (ketogenic, MCT oil, copper restriction), multiple sclerosis (omega 3), neuropathy (B1, B12, copper)
- **CVS**: atherosclerosis (Mediterranean, omega 3), AF (Mediterranean), cardiac cachexia (carnitine, creatine, coQ10, B1, B2, B3)
- **Pulmonary**: COPD, CF (high fat, low carb, omega 3)
- **GI**: food allergy (elimination diets, FODMAP), IBD (elemental diets, omega 3)
- **Liver**: NAFLD (Mediterranean), hyperammonemia (plant protein, vitamin support)
- **GU**: CRI (protein modulation), HD (nutritional support), nephrolithiasis (calcium, oxalate, urate modulation)
- **Gyn**: PCOS, infertility
- **Skeletomuscular**: osteoporosis (calcium, magnesium, vitamin D),
- myositis (carnitine, creatine, coQ10, B1, B2, B3), arthritis (omega 3)
- **Derm**: psoriasis (vitamin D, omega 3)
- **Endocrine**: metabolic syndrome, DM mgmt (Mediterranean, low carb), DM resolution (pharmacosurgery)
- **Cancer**: prevention (numerous), adjunctive (during therapy), cachexia (nutritional support), others

*Partial List

6-Month Seizure Reduction from Ketogenic Diet

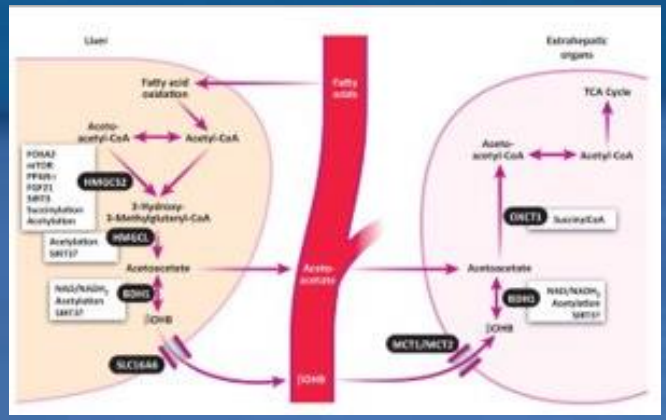


Eric H. Kossoff, MD
Professor, Neurology & Pediatrics
Medical Director, Ketogenic Diet Program

JOHNS HOPKINS MEDICINE

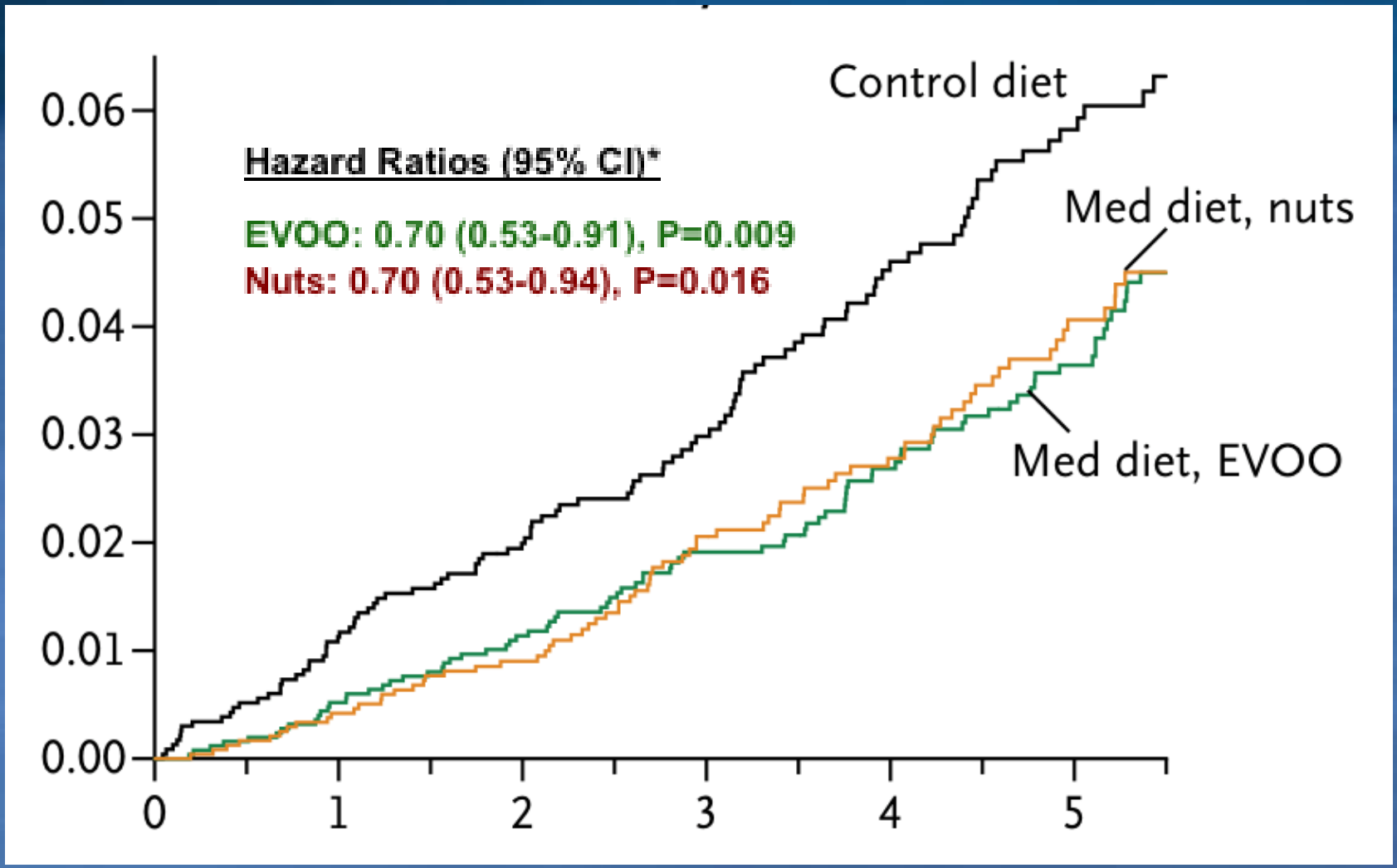
β-OHB Direct Cerebral Signaling

- Increase monocarboxylate transporter genes MCT1 and MCT2
- Inhibition of glutamate uptake into synaptic vesicles
- G-protein-coupled receptor ligand - HCAR2 and FFAR3
- β-OHB inhibition of class I histone deacetylases (HDACs), increasing genes encoding oxidative stress resistance factors FOXO3a and MT2
- **β-OHB reduces sympathetic tone, cerebral metabolic rate**



Newman JC, Verdin E Trends in Endocrinology & Metabolism 25:1, Pages 42-52. January 2014

PREDIMED: Primary Prevention of CVD



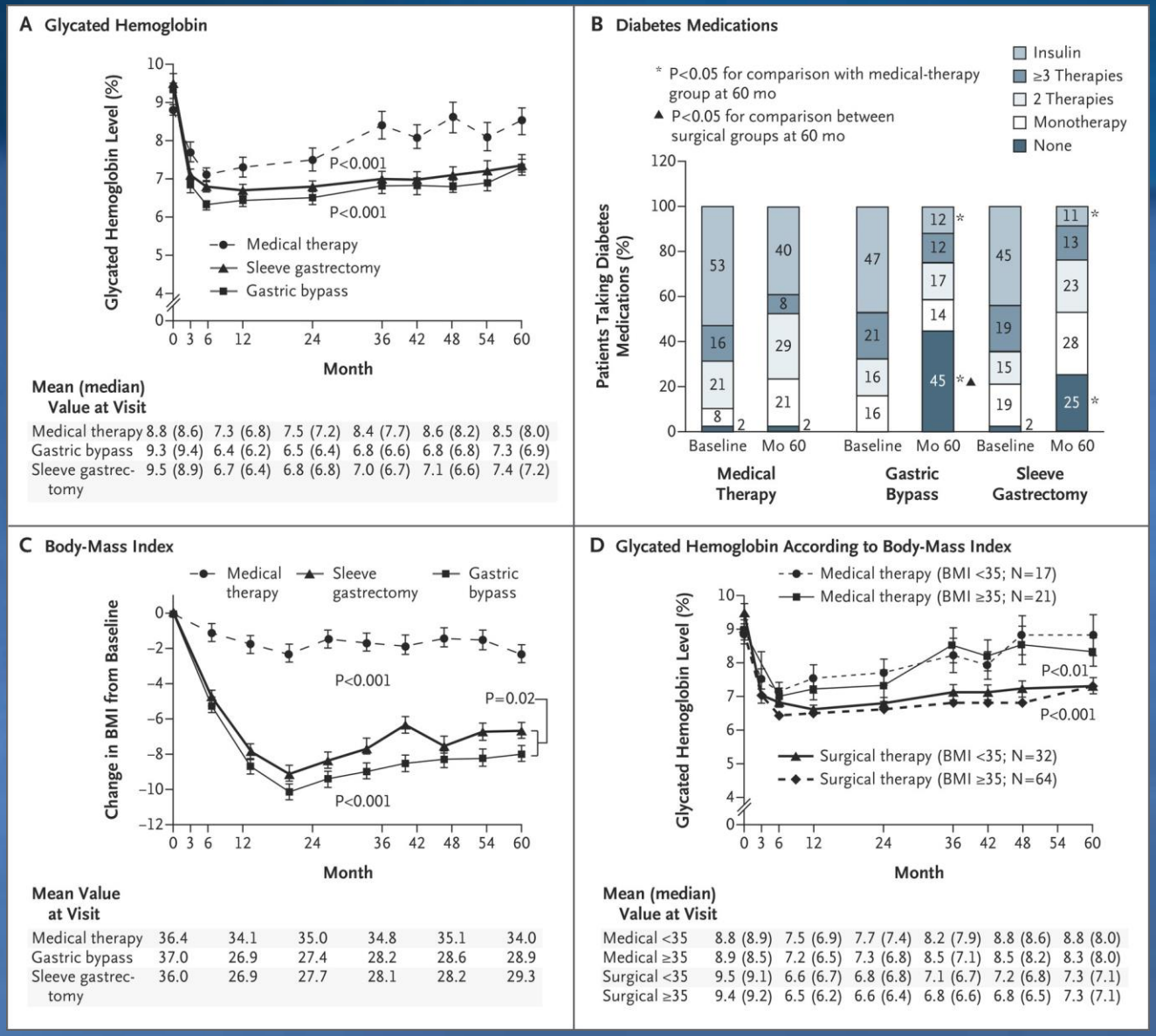
Primary end-point (MI, stroke or death from CV causes)

N Engl J Med 2013; 368:1279-1290

The NEW ENGLAND JOURNAL of MEDICINE

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet

Diabetes Resolution (DMr) after Bariatric Surgery



Mean (median) Value at Visit

Medical therapy	8.8 (8.6)	7.3 (6.8)	7.5 (7.2)	8.4 (7.7)	8.6 (8.2)	8.5 (8.0)
Gastric bypass	9.3 (9.4)	6.4 (6.2)	6.5 (6.4)	6.8 (6.6)	6.8 (6.8)	7.3 (6.9)
Sleeve gastrectomy	9.5 (8.9)	6.7 (6.4)	6.8 (6.8)	7.0 (6.7)	7.1 (6.6)	7.4 (7.2)

Mean Value at Visit

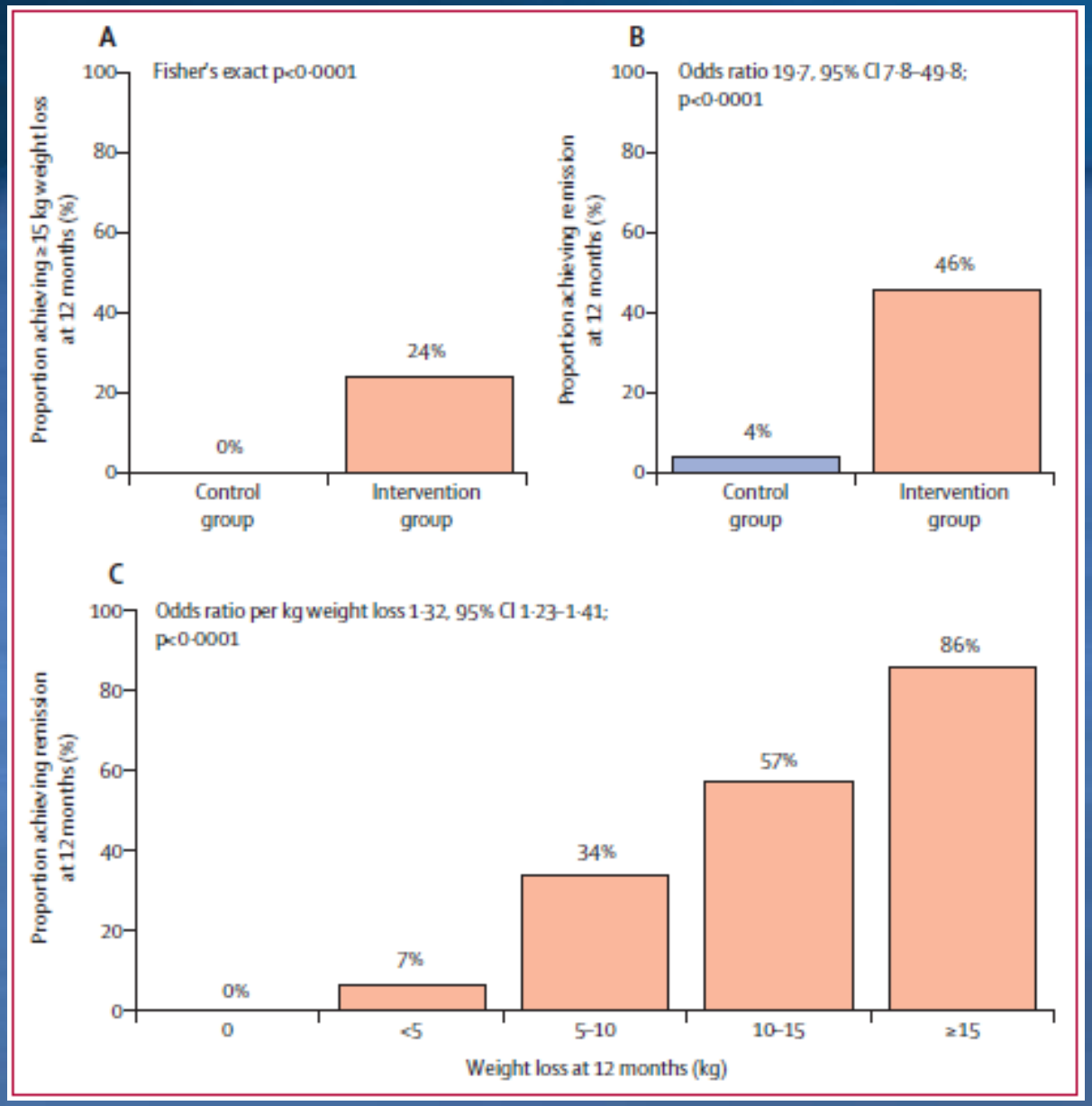
Medical therapy	36.4	34.1	35.0	34.8	35.1	34.0
Gastric bypass	37.0	26.9	27.4	28.2	28.6	28.9
Sleeve gastrectomy	36.0	26.9	27.7	28.1	28.2	29.3

Mean (median) Value at Visit

Medical <35	8.8 (8.9)	7.5 (6.9)	7.7 (7.4)	8.2 (7.9)	8.8 (8.6)	8.8 (8.0)
Medical ≥35	8.9 (8.5)	7.2 (6.5)	7.3 (6.8)	8.5 (7.1)	8.5 (8.2)	8.3 (8.0)
Surgical <35	9.5 (9.1)	6.6 (6.7)	6.8 (6.8)	7.1 (6.7)	7.2 (6.8)	7.3 (7.1)
Surgical ≥35	9.4 (9.2)	6.5 (6.2)	6.6 (6.4)	6.8 (6.6)	6.8 (6.5)	7.3 (7.1)

STAMPEDE trial (25.5% with gastric sleeve; 44.9% with gastric bypass) Schauer, et al. N Engl J Med 2017;376:641-51.

Diabetes Resolution (DMr) after Weight Loss



Primary care-led weight management for remission of type 2 diabetes (DiRECT): an open-label, cluster-randomised trial

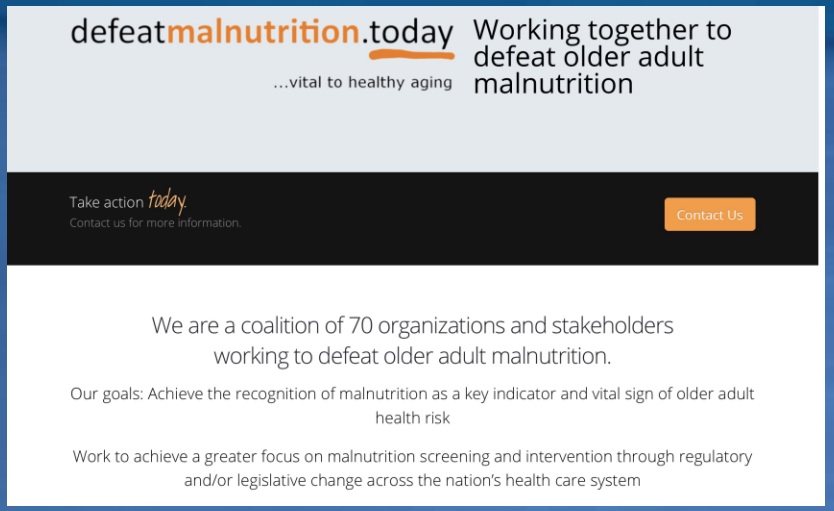
Lean, Michael EJ et al. The Lancet , Volume 391 , Issue 10120 , 541 – 551, 2018

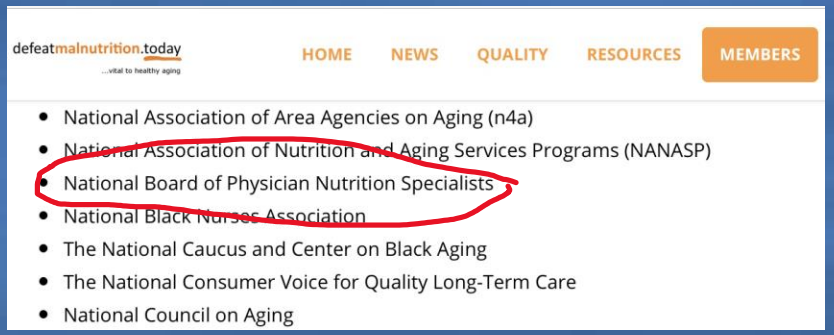
Nutritional Disease Prevention*

- Diabetes
- Cancer
- Alzheimer's
- Hospital Malnutrition Screening
  - NOURISH - Nutrition effect on Unplanned Readmissions and Survival with Hospitalization
- Perioperative Nutrition
  - ERAS - Enhanced Recovery After Surgery

*Partial List

2018 - Defeat Malnutrition Today






Function-Associated Risk Factors
Hunger & Food Insecurity Risk Factors
Social & Mental Health Risk Factors
Malnutrition
Disease-Associated Risk Factors

Goals and Strategies of the National Blueprint: Achieving Quality Malnutrition Care for Older Adults

Goal 1 — Improve Quality of Malnutrition Care Practices

Strategies

1. Establish Science-Based National, State, and Local Goals for Quality Malnutrition Care
2. Identify Quality Gaps in Malnutrition Care
3. Establish and Adopt Quality Malnutrition Care Standards
4. Ensure High-Quality Transitions of Care

Goal 2 — Improve Access to High-Quality Malnutrition Care and Nutrition Services

Strategies

1. Integrate Quality Malnutrition Care in Payment and Delivery Models and Quality Incentive Programs
2. Reduce Barriers to Quality Malnutrition Care
3. Strengthen Nutrition Professional Workforce

Goal 3 — Generate Clinical Research on Malnutrition Quality of Care

Strategies

1. Evaluate Effectiveness and Impact of Best Practices on Patient Outcomes and Clinical Practice
2. Identify and Fill Research Gaps by Conducting and Disseminating Relevant Research
3. Track Clinically Relevant Nutritional Health Data

Goal 4 — Advance Public Health Efforts to Improve Malnutrition Quality of Care

Strategies

1. Train Healthcare Providers, Social Services, and Administrators on Quality Malnutrition Care
2. Educate Older Adults and Caregivers on Malnutrition Impact, Prevention, Treatment, and Available Resources
3. Educate and Raise Visibility with National, State, and Local Policymakers
4. Integrate Malnutrition Care Goals in National, State, and Local Population Health Management Strategies
5. Allocate Education and Financial Resources to HHS- and USDA-Administered Food and Nutrition Programs

http://www.defeatmalnutrition.today/

High Protein ONS vs Usual Care Results in Clinical, Nutritional and Functional Benefits

- systematic review of 36 RCTs
- 3790 subjects (mean age = 74 yoa)
- hip fractures, pressure ulcers, COPD, cancer, GI disease

Nutrition intervention results in significant clinical, nutritional, and functional benefits:		
19% ↓	Reduction in complications	P < 0.001
10% ↓	Reduction in length of hospital stay	P = 0.04
30% ↓	Reduction in hospital readmissions	P = 0.004
Improvement in handgrip strength		P < 0.014
Improvement in body weight		P < 0.001
Increase in muscle mass (MAMC)		P < 0.05
Increase in protein and energy intake with little reduction in normal food intake		P < 0.001

Cawood AL, Elia M, Stratton EJ. *Ageing Research Reviews*. 2012; 11: 278-296.

NOURISH: Nutrition effect on unplanned Readmissions and Survival in Hospitalization

NOURISH → prospective, randomized, double-blind, placebo-controlled, multicenter (n=78) study

Screen

Patients ≥65y, hospitalized with CHF, AMI, COPD or pneumonia (n=42,799)

652 patients with mild → severe malnutrition

PLACEBO plus standard nutr/med care

HP-HMB plus standard nutr/med care

D0 → D30 → D60 → D90

Composite 1° outcome:

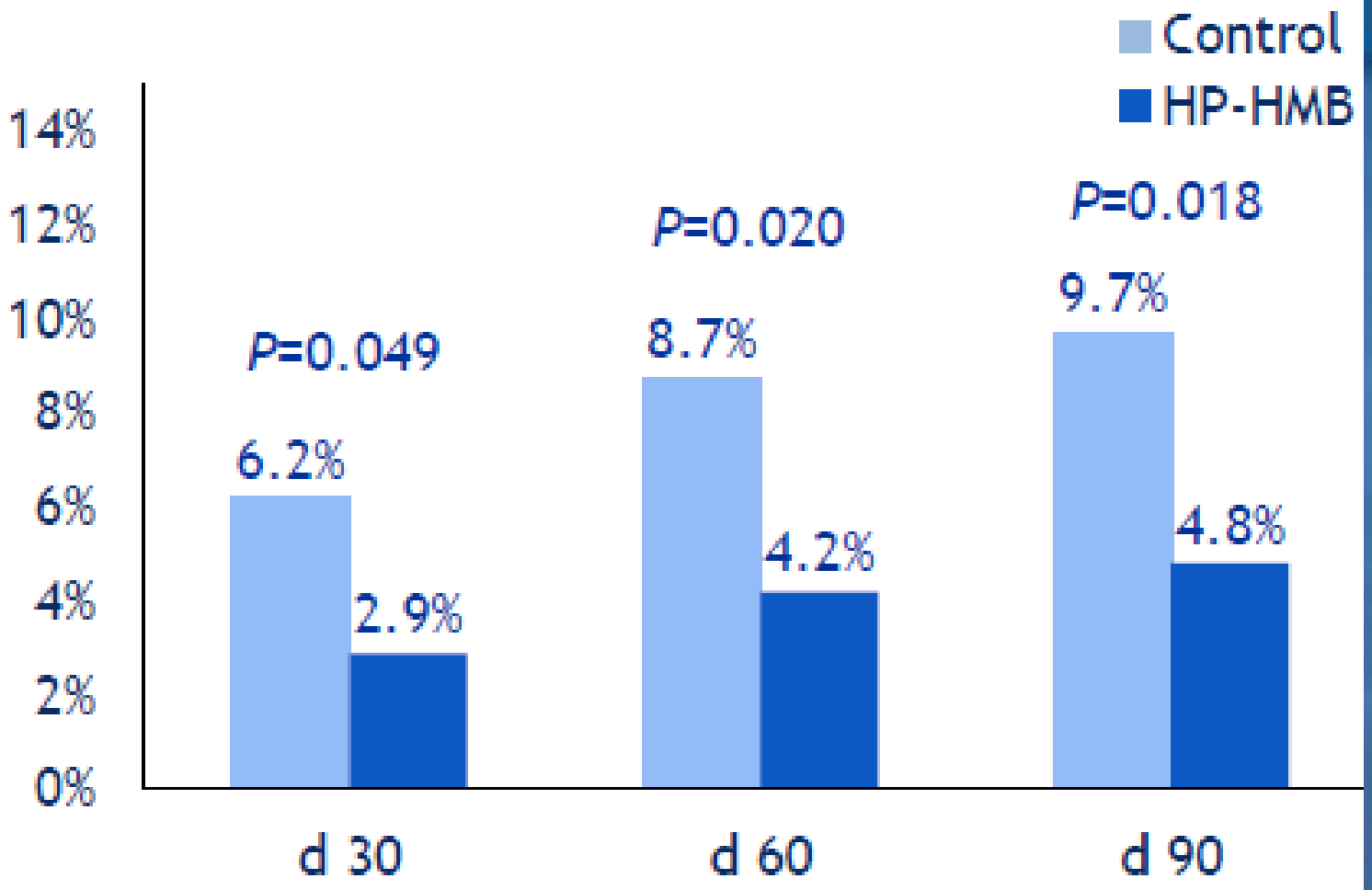
- **Readmission** and **mortality** through 90 days post-discharge.

Seconday outcomes:

- Blood draw
- Handgrip strength
- ADL
- QoL
- MMSE

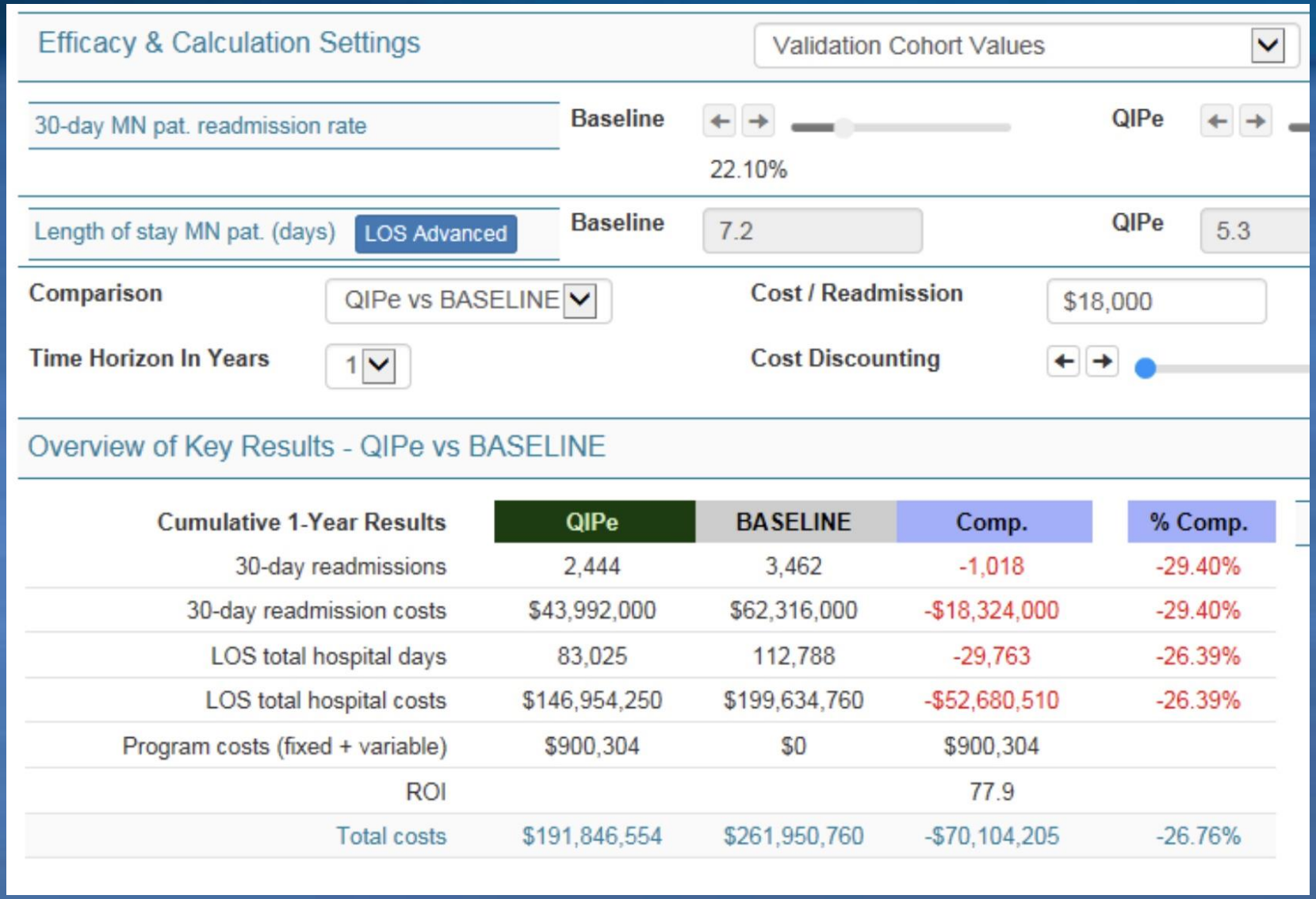
Statistical Analysis: Intention-to-treat; $P<0.05$ statistical significance

Mortality in HP-HMG group lower by 30d and sustained throughout study.



Deutz et al., Clin Nutr 2016;35:18-26

Economic Evaluation of the NOURISH program at Morristown Medical Center (MMC)



Efficacy & Calculation Settings

Validation Cohort Values

30-day MN pat. readmission rate — Baseline 22.10% — QIPe

Length of stay MN pat. (days) LOS Advanced — Baseline 7.2 — QIPe 5.3

Comparison: QIPe vs BASELINE

Cost / Readmission: $18,000

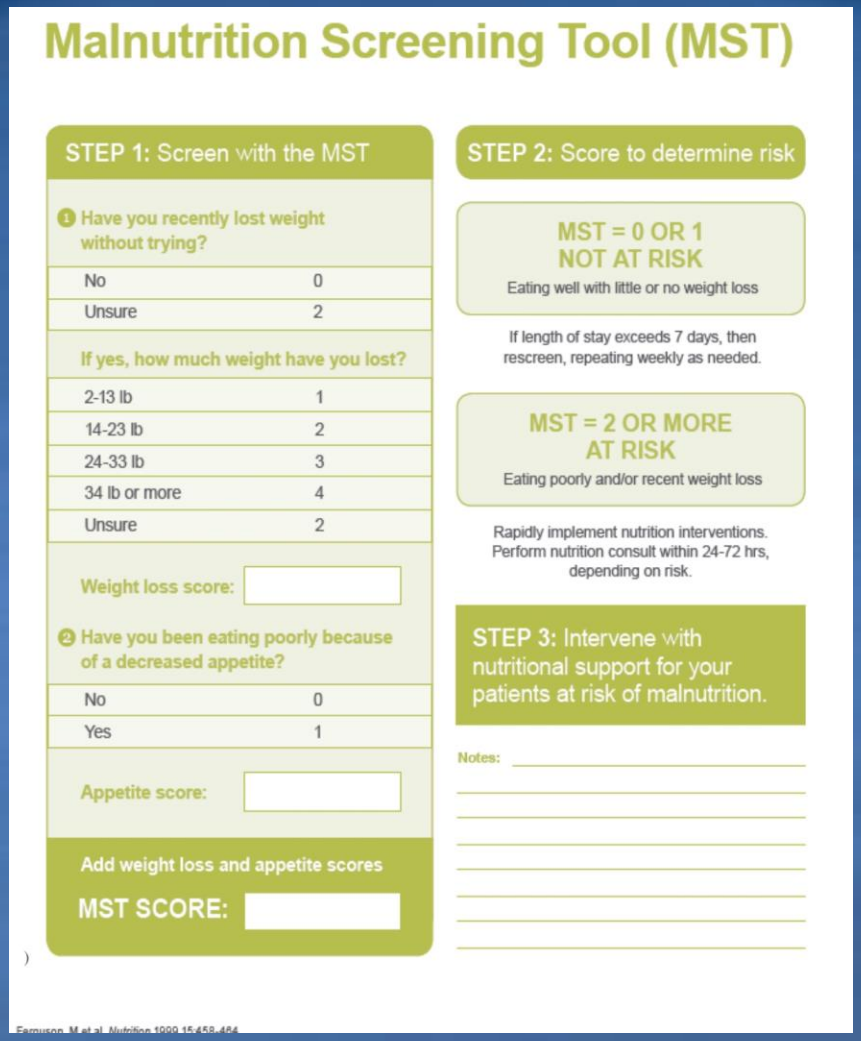
Time Horizon In Years: 1

Cost Discounting

Overview of Key Results - QIPe vs BASELINE

Cumulative 1-Year Results	QIPe	BASELINE	Comp.	% Comp.
30-day readmissions	2,444	3,462	-1,018	-29.40%
30-day readmission costs	$43,992,000	$62,316,000	-$18,324,000	-29.40%
LOS total hospital days	83,025	112,788	-29,763	-26.39%
LOS total hospital costs	$146,954,250	$199,634,760	-$52,680,510	-26.39%
Program costs (fixed + variable)	$900,304	$0	$900,304	
ROI			77.9	
Total costs	$191,846,554	$261,950,760	-$70,104,205	-26.76%

2018 - Applying NOURISH at Morristown Medical Center (MMC)



Malnutrition Screening Tool (MST)

STEP 1: Screen with the MST

1. Have you recently lost weight without trying?

No	0
Unsure	2

If yes, how much weight have you lost?

2-13 lb	1
14-23 lb	2
24-33 lb	3
34 lb or more	4
Unsure	2

Weight loss score:

2. Have you been eating poorly because of a decreased appetite?

No	0
Yes	1

Appetite score:

Add weight loss and appetite scores

MST SCORE:

STEP 2: Score to determine risk

MST = 0 OR 1
NOT AT RISK
Eating well with little or no weight loss

If length of stay exceeds 7 days, then rescreen, repeating weekly as needed.

MST = 2 OR MORE
AT RISK
Eating poorly and/or recent weight loss

Rapidly implement nutrition interventions. Perform nutrition consult within 24-72 hrs, depending on risk.

STEP 3: Intervene with nutritional support for your patients at risk of malnutrition.

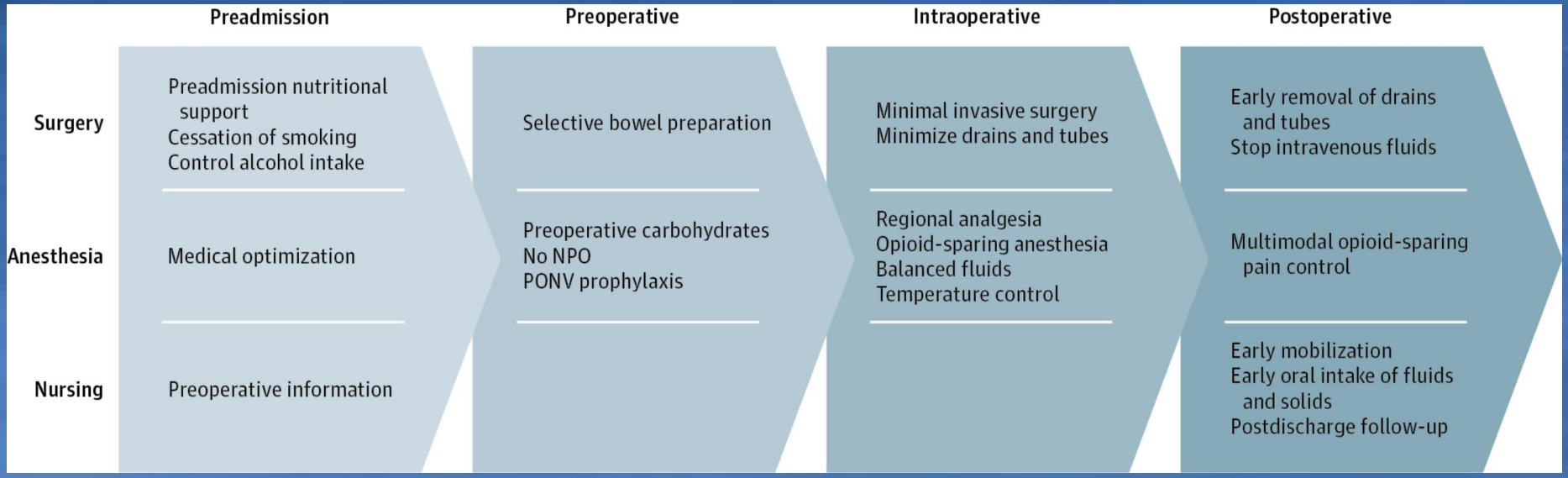
Notes:

Ferguson, M et al. *Nutrition* 1999;15:458-464

- If MST Score ≥ 2
  - Actively encourage patient to consume diet + ONS (Oral Nutritional Supplement) BID
    - Ensure Enlive (700 kcal, 40 gm protein, 3 gm HMB)
    - If DM, Glucerna 1.5 (700 kcal, 40 gm protein)
    - If CRF, Nepro (1000 kcal, 40 gm protein)
- If patient unable to consume diet + ONS BID
  - consider appetite stimulant, tube feeding or PPN/TPN

From: **Enhanced Recovery After SurgeryA Review**

JAMA Surg. 2017;152(3):292-298. doi:10.1001/jamasurg.2016.4952



ERAS Society Guidelines, Published 2012-17: Colonic resection, Rectal resection, Pancreatico-duodenectomy, Cystectomy, Gastric resection, Major gynecology, Bariatric surgery, Liver resection, Head and neck cancer surgery, Breast reconstruction. (Under production: Hip and knee replacement, Thoracic noncardiac surgery, Esophageal resection)

ERAS Protocol Benefits

- 2011 Cochran review – NS
- 2014 Greco Meta-analysis (2,376 patients; 16 RCTs)
  - Reduction of overall morbidity [relative ratio=0.60, (95 % CI 0.46–0.76)]
  - Decreased nonsurgical complications [RR = 0.40, (95 % CI 0.27–0.61)]
  - Shortened hospital stay (WMD = -2.28 days [95 % CI –3.09 to –1.47]), without increasing readmission rate
- 2016 Economic Impact
  - Saved $1768 ($920–$2619) per patient.
  - ROI – every $1 invested in ERAS -> $3.8 ($2.4–$5.1) in return

ERAS Nutritional Approaches

Pre and Post-Op Day	Protocol
Surgical Clinic	• Screen for malnutrition: ○ Weight loss > 10% body weight
Day Prior to Surgery	• Regular diet until 6pm when Golytely starts and then clear liquids (if applicable)
Day of Surgery: **Surgical Admissions Suite (SAS)**	• Clear liquids until 2 hours prior to surgery • Carbohydrate drink for morning of surgery (Gatorade/ Powerade)—20oz bottle
Day of Surgery: **Post anesthesia care unit (PACU)**	• Clear liquids as tolerated
Day of Surgery: Acute Care	• Clear liquid diet immediately after surgery.-Patients are permitted soft diet items as tolerated – ice chips, ice cream, jello, pudding, etc. • Clear liquids as tolerated
POD1	• Clear liquids as tolerated • Transitional (soft) diet to start lunchtime on POD1
POD2	• Regular diet to start on POD2
POD3/Day of Discharge	• Regular diet

AJ Nanavati S Prabhakar, PRACTICAL GASTROENTEROLOGY, APRIL 2016

Economic Evaluation of the ERAS program for Colorectal Surgery – Alberta, Canada 2013-16

Table 3. Health care cost savings with ERAS (2015 Canadian dollars)

Outcome	Total change, d	Unit cost	Base-case analysis			Scenario analysis
			Base case	Low	High	
Primary LOS, d*	–1990	$1566	$3 116 340	$2 017 008	$4 217 238	$3 116 340
Number of ED visits	–57	$904	0	0	0	$51 528
Number of specialist visits	137	$352	0	0	0	–$48 224
Number of GP visits	–109	$196	0	0	0	$21 364
Prevented readmissions	–18	$2696	0	0	0	$48 528
Readmission LOS, d	–419	$1566	0	0	0	$656 154
Total cost			$3 116 340	$2 017 008	$4 217 238	$3 845 690
Cost of ERAS†			$826 210	$826 210	$826 210	$826 210
Total net cost savings			$2 290 130	$1 190 798	$3 391 028	$3 019 480
Net cost savings per patient			$1,768	$920	$2,619	$2332
Return on investment ratio			3.8	2.4	5.1	4.7

ED = emergency department; ERAS = Enhanced Recovery After Surgery; GP = general practitioner; LOS = length of stay in hospital.

*$p < 0.000$.

†$638 per patient × 1295 patients.

Can J Surg, Vol. 59, No. 6, December 2016

2018 - Evaluating ERAS @ MMC - $USD (1768 X 0.75) X 25,000 surgical cases/year = $33,150,000 cost savings per year

Hospital costs can be up to 300% greater for individuals who are malnourished[1]

Malnourished hospitalized adults have 5x higher mortality and 50% higher readmission rates[2]

1 in 2

Up to 1 out of 2 older adults are either at risk of becoming or are malnourished[1]

4 to 6

Number of days by which malnutrition can increase length of hospital stay[1]

$51.3B

Disease-associated malnutrition in older adults is estimated to cost $51.3 billion annually[3]

MALNUTRITION: AN OLDER-ADULT CRISIS

$51.3 Billion
Estimated annual cost of disease-associated malnutrition in older adults in the US[1]

Up to 1 out of 2 older adults
are at risk for malnutrition[2,3]

Up to 60%
of hospitalized older adults may be malnourished[4]

300%
The increase in healthcare costs that can be attributed to poor nutritional status[5]

4 to 6 days
How long malnutrition increases length of hospital stays[3]

Chronic health conditions
lead to increased malnutrition risk

Malnutrition leads to more
complications, falls, and readmissions[6]

Just 3 steps can help improve older-adult malnutrition care

Screen
all patients

+

Assess
nutritional status

+

Intervene
with appropriate nutrition

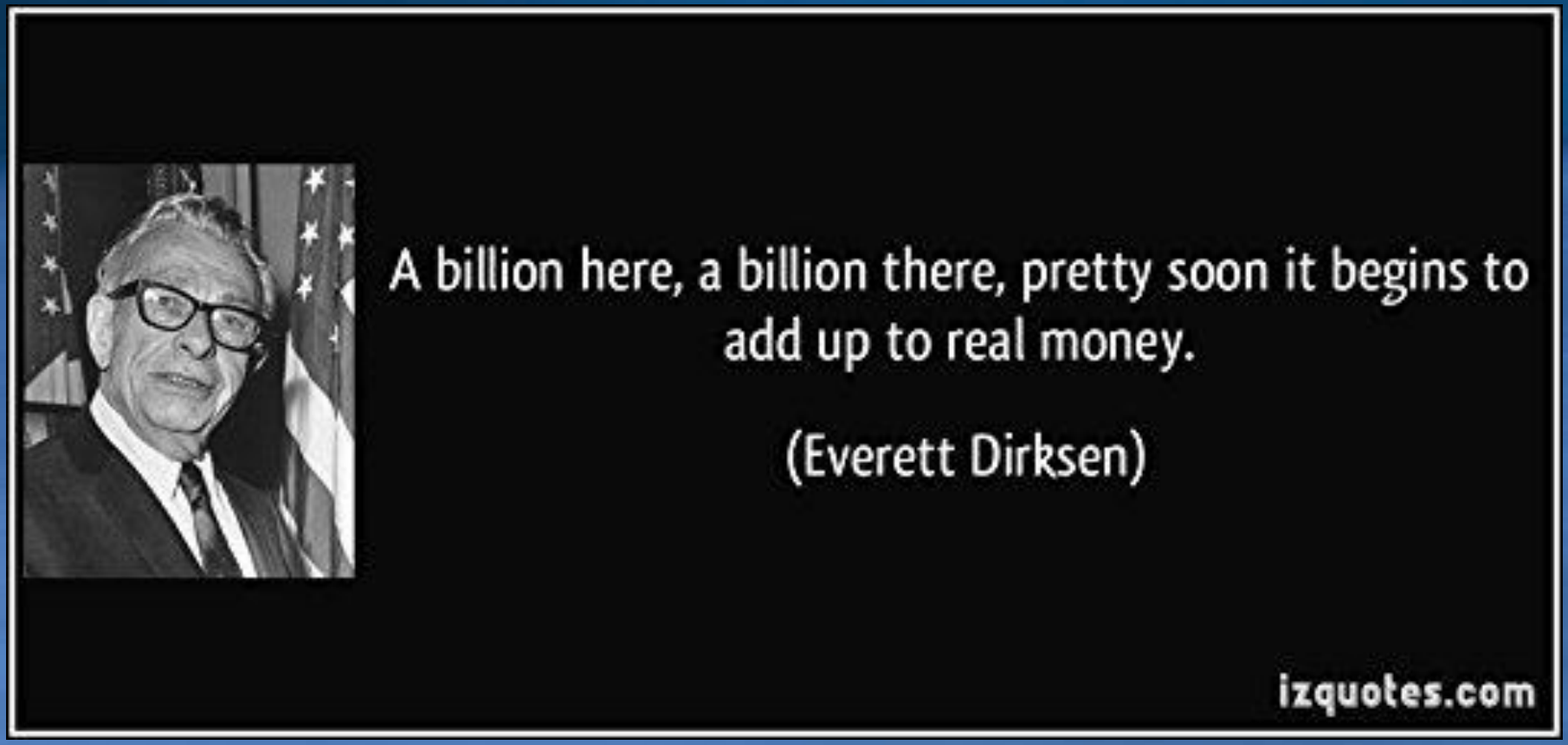
Focusing on malnutrition in healthcare helps:

- ✓ Decrease healthcare costs[7]
- ✓ Improve patient outcomes[7]
- ✓ Reduce readmissions
- ✓ Support healthy aging
- ✓ Improve quality of healthcare

Support policies across the healthcare system that defeat older-adult malnutrition.

Learn more at www.DefeatMalnutrition.Today

References: 1. Snider JT, et al. *JPEN J Parenter Enteral Nutr.* 2014;38(2 Suppl):77S-85S. 2. Kaiser MJ, et al. *J Am Geriatr Soc.* 2010;58(9):1734-1738. 3. Izawa S, et al. *Clin Nutr.* 2006;25(6):962-967. 4. Furman EF. *J Gerontol Nurs.* 2006;32(1):22-27. 5. Correia, et al. *Clin Nutr.* 2003;22(3):235-239. 6. Norman K, et al. *Clin Nutr.* 2008;27(1):5-15. 7. Philipson TJ, et al. *Am J Manag Care.* 2013;19(2):121-128.



Everett McKinley Dirksen (1896-1969)
Illinois Representative (1930-50)
Illinois Senator (1950-69)
Fiscal conservative
Civil rights proponent.

iPad 8:52 AM 60%

nbpns.org

NBPNS

National Board of Physician Nutrition Specialists

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HOW TO GET CERTIFIED

MD DIRECTORY

Given the prevalence of nutritionally related chronic diseases in American society, physicians must play a leadership role in educating the public on the relationship of diet to disease and incorporating best practice nutrition therapy in the prevention and treatment of disease.

http://nbpns.org/

Thank You for Your Kind Attention!

NBPNS

National Board of Physician Nutrition Specialists

Jefferson

Philadelphia University + Thomas Jefferson University

HOME OF SIDNEY KIMMEL MEDICAL COLLEGE

Atlantic Health System