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Improving healthcare decisions

Nutrition Economics – Are We Ready For A New Approach? Opportunities To Advance The Science

Tuesday, May 17, 2022 11:45-12:45

Moreno Perugini, MBA, USA
Karen Freyer, PhD, Netherlands
Amarsinh Desai, PhD, USA
Tricia Johnson, PhD, USA

Agenda

Item #	Time	Topic	Presenter(s)
1	11:45	Introductions	Moreno
2	11:50	Nutrition & the Start of the Special Interest Group- Nutrition Economics	Karen
3	12:00	Role of Nutrition in Older Adults	Amarsinh
4	12:10	Role of Nutrition in Premature Infants	Tricia
5	12:20	Discussion	Moreno
6	12:45-1:15	SIG Information	Everyone

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Author’s Disclosure

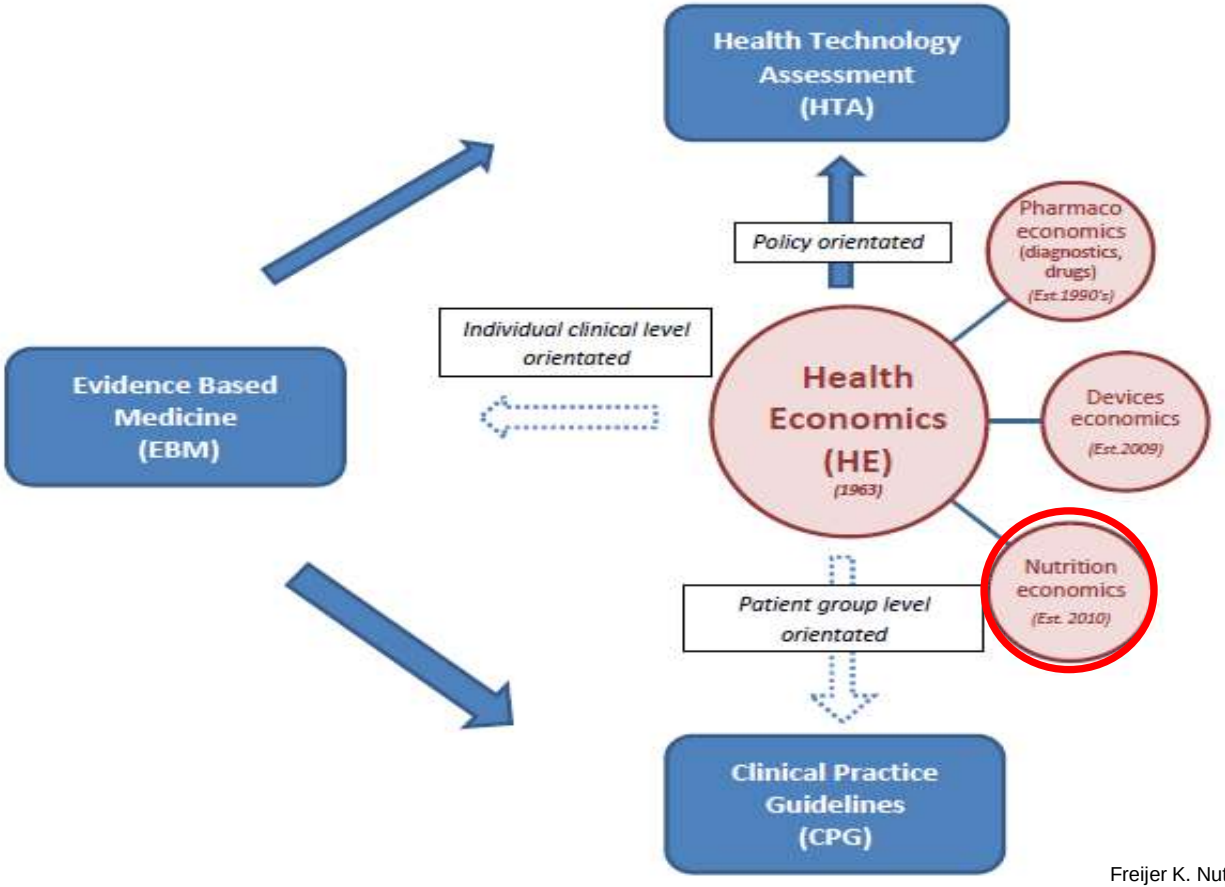
Moreno Perugini is an employee of Aimmune, Brisbane, US

Amarsinh Desai is an employee of Nestlé Health Science, Bridgewater, US

1

Nutrition & the Start of the Special Interest Group- Nutrition Economics

Nutrition Economics



Freijer K. Nutrition Economics: DRM & Economic value of medical nutrition-PhDThesis 2014, Maastricht University NL

(Medical) Nutrition

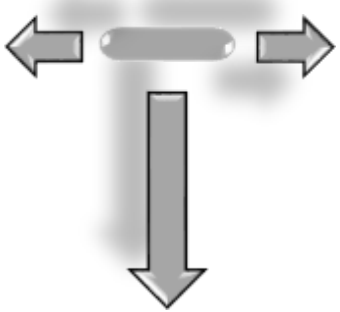
*Novel synergistic **combinations** of nutrients*

Nutrients focus on *multiple* physiological systems, safety has been proven

Mostly as *part of total treatment*
→ *on top of daily individual diet*

Pharma

(New) Chemical Entity (one compound)



Focus on *single* intervention, adverse events

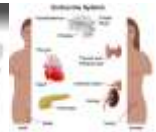
Nutrition/Food

Energy (KH, Fat), Construction (Protein), vit, min

Protein (chain of amino-acids)

→ **Immune system/ defense**

→ **Hb for O2; globulines**



→ **Enzymes, hormones**

→ **Blood (wound healing, pH, albumine)**

Vitamins

A → **Skin, immune system**

B → **Metabolism protein, kh,fat**

C → **Enzymes, hormones; fibrous tissue**

etc

Minerals **Trace elements**

Fe, Ca, I, Na, K Se, Cr... → **Metabolism, construction protein, muscle fuction, balance fluid-salt, enzymes, etc**

KH, Fat, Fibre

Nutrition/Food

Energy (KH, Fat), Construction (Protein), vit, min

Protein (chain of amino-acids)

Vitamins

A → Skin, immune system

B → Metabolism protein, kh,fat

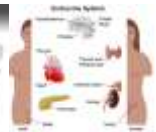
C → Enzymes, hormones; fibrous tissue

etc

nutrients are *plolyvalent, act in concert* and *depend on one and another*

→ Hb for O2; globulines

Fe, Ca, I, Na, K Se, Cr... → Metabolism, construction protein, muscle fuction, balance fluid-salt, enzymes, etc

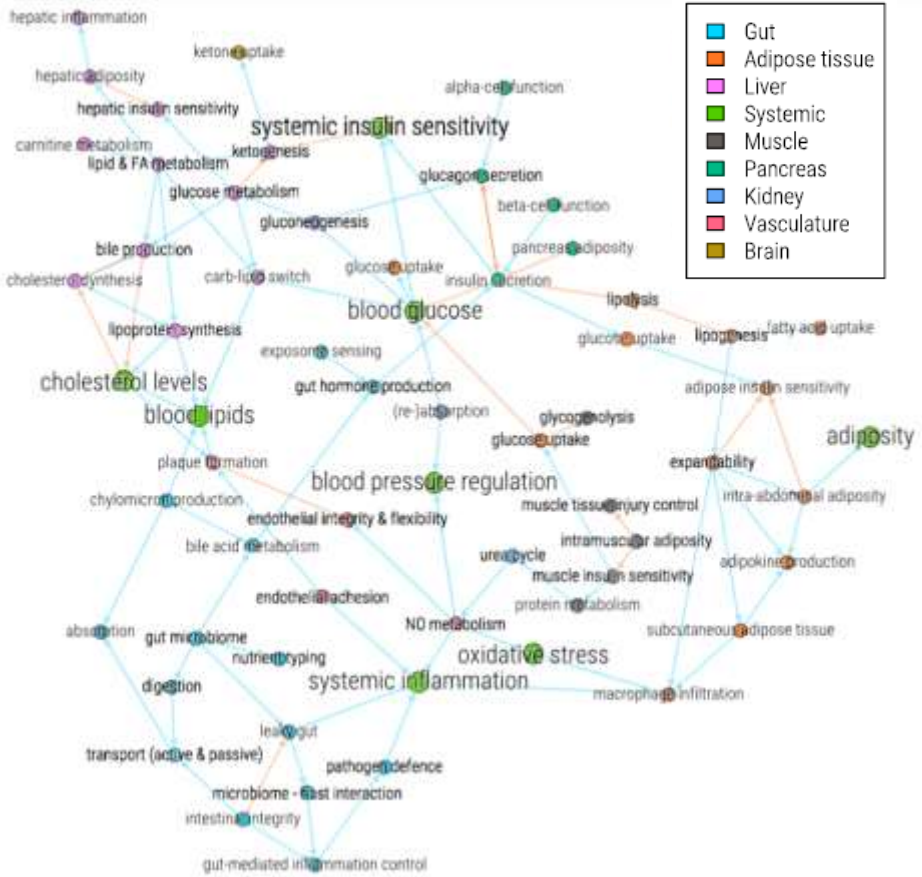


→ Enzymes, hormones

KH, Fat, Fibre

→ Blood (woundhealing, pH, albumine)

Highly interconnected physiological & metabolic processes related to nutrients intake



Frontiers Endocrinology 2018

Health & Nutrition

General nutrition

Conventional food	Survival, energy, health, pleasure
Functional food	Targets specific body functions/risk factors
Infant formula/food	Age – specific needs

Expert Meetings 1 & 2

British Journal of Nutrition 2011;105:157-166
British Journal of Nutrition 2013;108:1714–1720

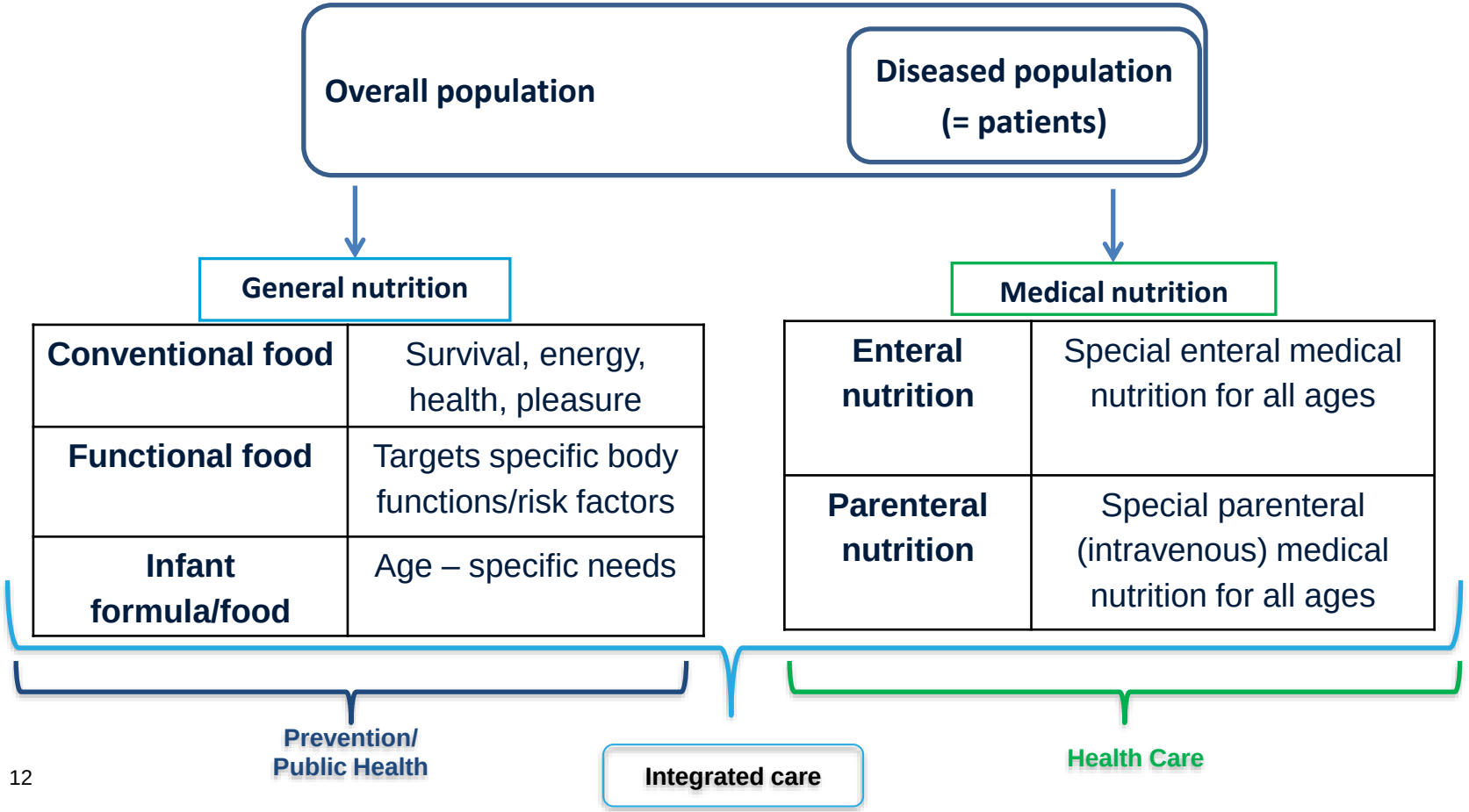
Medical nutrition

Enteral nutrition	Special enteral medical nutrition for all ages
Parenteral nutrition	Special parenteral (intravenous) medical nutrition for all ages

Expert Meeting 3

European Journal of Clinical Nutrition 2015;69:539–545

Health & Nutrition



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ISPOR Report

Medical Nutrition Terminology and Regulations in the United States and Europe—A Scoping Review: Report of the ISPOR Nutrition Economics Special Interest Group

Karen Freijer, PhD, RDN [1,,†], Sheri Volger, MS, RDN [2,†], Janos G. Pitter, PhD, MD [3,†], Elizabeth Molsen-David, RN [4,†], Clarissa Cooblall, MPH [4,†], Silvia Evers, PhD, MSc [1], Mickaël Hiligsmann, PhD [5], Aurelie Danel, PharmD [6], Irene Lenoir-Wijnkoop, PhD, RDN [7,†], on behalf of the ISPOR Nutrition Economics Medical Nutrition Terms & Definitions Working Group's Leadership Team[‡]*

[1]*School for Public Health and Primary Care (CAPHRI), Maastricht University, Maastricht, The Netherlands;* [2]*Clinical Development Immunology Gastroenterology, Janssen R&D, Spring House, PA, USA;* [3]*Syreon Research Institute, Budapest, Hungary;* [4]*Scientific & Health Policy Initiatives, ISPOR, Lawrenceville, NJ, USA;* [5]*Department of Health Services Research of Maastricht University, Maastricht, Netherlands;* [6]*Nestle Health Science, Vevey, Switzerland;* [7]*Department of Pharmaceutical Sciences, Utrecht University, Utrecht, The Netherlands*

OBJECTIVES

- To examine MN terminology and definitions to provide a foundation for the development of emerging good practices for the economic evaluation of MN products.
- To identify MN regulations in Europe and the USA.
- To assess the proportion and types of current MN cost-effectiveness analyses.

ABSTRACT

Background: The term medical nutrition (MN) refers to nutritional products used under medical supervision to manage disease- or condition-related dietary needs. Standardized MN definitions, aligned with regulatory definitions, are needed to facilitate outcomes research

included. The most frequently mentioned and defined terms were enteral nutrition and malnutrition. Less than 5% of the records referenced any MN regulation. The health economic impact of MN was rarely and insufficiently (n = 19 [4.1%]) assessed, although an

VALUE HEALTH. 2022; 25(5):677–684

ISPOR Report

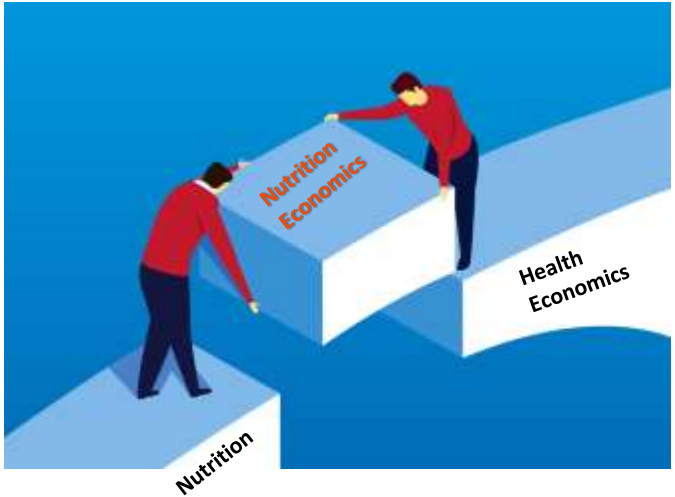
Are We Ready for a New Approach to Comparing Coverage and Reimbursement Policies for Medical Nutrition in Key Markets: An ISPOR Special Interest Group Report

Moreno Perugini, MBA, MHE, Tricia J. Johnson, PhD, Tania Maria Beume, MSc, Olivia M. Dong, PhD, John Guerino, MHS, Hao Hu, PhD, Kirk Kerr, PhD, Shannon Kindilien, MA, Mark Nuijten, PhD, MD, Theresa U. Ofili, PharmD, Matthew Taylor, PhD, Alvin Wong, MS, Karen Freijer, PhD

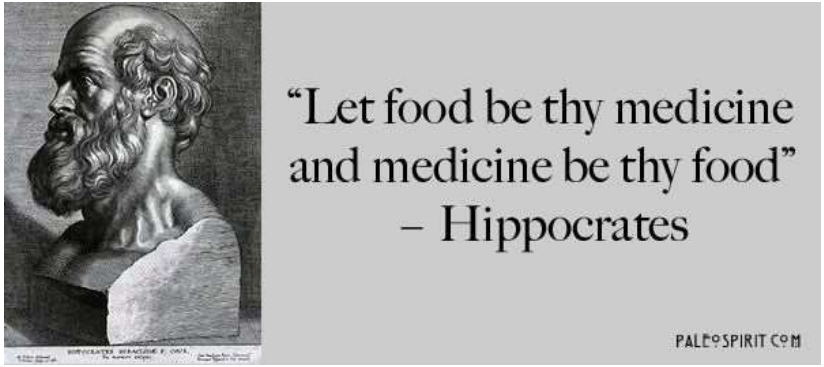
ABSTRACT

Objectives: Healthcare policy makers should ensure optimal patient access to medical nutrition (MN) as part of the management of nutrition-related disorders and conditions. Questions remain whether current healthcare policies reflect the clinical and economic benefits of MN. The objective of this article is to characterize coverage and reimbursement of MN, defined as food for special medical purposes/medical food for a diverse set of countries, including Australia, Belgium, Brazil, Canada, China, France, Germany, Hong Kong, Italy, Japan, The Netherlands, Singapore, Spain, United Kingdom, and United States.

- Merging of nutrition and health economics discipline
- Interdependency between nutritional habits, health and public expenses
- To illustrate health and economic aspects of specific changes in the daily nutrition and nutrition recommendations through the lens of cost-effectiveness



- Nutrition economics is defined as "**a discipline dedicated to researching and characterizing health and economic outcomes in nutrition for the benefit of society**"[1]



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Methods: Data sources included published literature and online sources. ISPOR's Nutrition Economics Special Interest Group developed a data collection form to guide data extraction that included reimbursement coverage, years that reimbursement policies were established, and presence of a formal health technology assessment (HTA) for MN technologies.

Results: Reimbursement coverage of MN technologies varied across the countries that were reviewed. All but 3 countries limited coverage to specific formulations of products, regardless of demonstrated clinical benefit. The year that reimburse-

Table 1. Coverage of FSMP/MF reimbursement by country across different settings.

Country	Hospital	Outpatient	Community
Australia	Yes	Yes, limited to some disease conditions; might differ across provinces	
Belgium	Yes	Yes, limited to patients discharged from hospital	No
Brazil	Yes	Yes, limited to specific disease conditions and varies by state and municipalities	Yes, limited to some disease conditions
Canada	Yes	Yes, limited to some disease conditions; might differ across provinces	
China	No	No	No
France	Yes	Yes	Yes
Germany	Yes	Yes	Yes
Hong Kong	Yes	Yes, limited to low-income individuals*	No
Italy	Yes	No	Yes; might vary by region
Japan	Yes	Yes, limited to enteral tube feeding	
The Netherlands	Yes	Yes	Yes
Singapore	Yes	Yes, limited to low-income individuals†	Yes, limited to nursing homes
Spain	Yes	Yes	Yes
United Kingdom	Yes, limited to the public system under certain circumstances for malnourished patients		
United States Centers for Medicare & Medicaid Services	Yes, limited‡	Yes, limited‡	Yes, limited‡

Note. Definition of the various settings according to ISPOR Nutrition Economics SIG publication on terminology and regulations.[10]
FSMP/MF indicates food for special medical purposes/medical food; GI, gastrointestinal; MN, medical nutrition; SIG, Special Interest Group.
*Eligible individuals who qualify for Comprehensive Social Security Assistance will receive reimbursement.[30]
†Individuals are means tested to determine eligibility, and approval is on a case-by-case basis.
‡Limited to a diagnosis of a functional GI impairment requiring enteral tube feeding through a prosthesis (feeding tube) for conditions deemed permanent (lasting at least 90 days per physician assessment). Flexible Spending Accounts and Health Spending Accounts may be used for the reimbursement of MN in the community, when justified with a letter of medical necessity.

Table 3. Comparison of HTA for drugs and FSMP/MF by country.

Country	HTA for drugs	HTA for MN
Australia	Y	N
Belgium	Y	N
Brazil	Y	Y*
Canada	Y	N
China	N	N
France	Y	Y
Germany	Y	N
Hong Kong	Y	N
Italy	Y	N
Japan	Y	N
The Netherlands	Y	N
Singapore	Y	N
Spain	Y	N
United Kingdom	Y	N†
United States	N‡	N

FSMP/MF indicates food for special medical purposes/medical food; HTA, health technology assessment; MN, medical nutrition; N, no; NICE, National Institute for Health and Care Excellence; Y, yes.
*Brazilian guidelines for HTA are directed to all health technologies, with the same guidelines for drugs, MN, and other health technologies.
†NICE did not review any MN product with a single technology appraisal but issued a clinical guideline in 2006.[31]
‡No official HTA is in place for drugs; individual insurance plans have assessment procedures, but these are usually not made public.

should evaluate within-country variations in coverage and reimbursement and the extent to which such variations create inequities in access to MN.

No Formal HTA Assessment for FSMP/MF Is in Place in Most of the Countries

It is interesting to note that most of the countries in this review have a well-established HTA process for drug interventions; usually this process leads to an innovation rate linked to price and reimbursement determinations. Nevertheless, most countries do not use HTA for enteral MN products, and this lack of HTA undermines the possibility for decision makers to make informed decisions aligned with the innovation and health impact that these health technologies have demonstrated.

This may translate into inequities in access to FSMP/MF compared with the benefits these healthcare interventions bring. The lack of a formal assessment process triggers at least 2 important consequences: the impact on awarded price and implications for reimbursement.

Due to the lack of formal assessments of FSMP/MF in most of the countries examined, prices are set based on the macronutrients included in the formulation of FSMP/MF and by the quantity of specific ingredients (eg, units of protein for protein-dense formulas, units of calories) rather than on the demonstrated health outcomes (cost plus method vs value-based pricing). In a few countries, prices are set based on a basket of reference countries. In both cases, the lack of product-specific considerations of health benefits in the assessment commonly translates to very low prices regardless of the demonstrated benefit for the product.[47] This leads to a scenario where a parenteral nutritional product (which

Potential themes to further explore from current paper:

1) HTA for Medical Nutrition
2) Regional Differences in Medical Nutrition
3) Payer archetypes and Medical Nutrition

Ongoing workstreams:

- Journal club
- Webinars
- Research papers

2

Role of Nutrition in Older Adults

Disease-related malnutrition arises due to the negative consequences of disease

- Older adults are at increased risk for malnutrition
- Aging itself is an independent risk factor
- Many factors contribute to change in nutritional status:

↑ nutrient losses/ altered metabolic requirements

↑ resting energy expenditure

↑ caloric and protein needs

Malabsorption

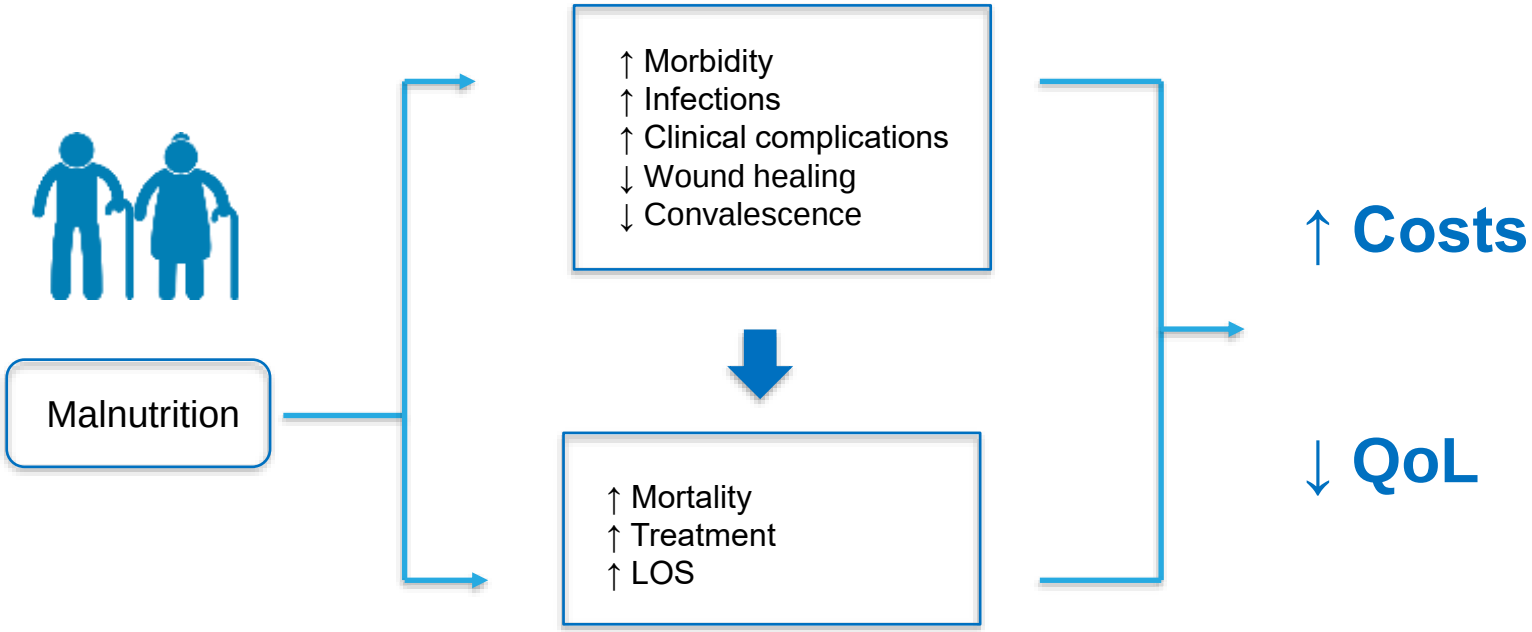
Decreased appetite

Poly pharmacy

Comorbidities

Nutritional Status

Prognostic Impact of Malnutrition



"Better care through better nutrition: Value and effects of Medical Nutrition" (2018)
Norman K, et al. Clinical nutrition. 2008;27(1):5-15.

Benefits of Medical Nutrition

Nutritional Benefits

- ↑ Weight gain
- ↑ Total energy intake
- ↑ Protein intake
- ↑ Micronutrient's intake
- ↑ Lean body mass

Clinical Benefits

- ↓ Mortality
- ↓ Complications
  - Pressure ulcers
  - Infections
  - Cardiac complications
  - Hip fractures

Functional Benefits

- ↑ HRQoL
- ↑ Hand-grip strength
- ↑ ADL - Mobility
- ↑ Lean body mass/ muscle strength
  - Prevent fall
  - Reduces risk of fracture
- ↑ General health

Hospital

- ↓ Hospitalization
- ↓ LOS
- ↓ HCRU
  - Antibiotic/ Rx use

Community

- ↑ rehabilitation outcomes
  - More likely to discharge home
- ↓ Readmissions
- ↓ Visits

Economic Benefits

- Cost saving
- Cost-effective
- Cost-benefit

"Better care through better nutrition: Value and effects of Medical Nutrition" (2018)

Study Characteristics

Author & Year	Title	Selection Criteria/ Methodology	Study population	Outcomes	Settings
Milne et al., 2009	Protein and energy supplementation in elderly people at risk from malnutrition Objective: To review clinical trials for improvement in nutritional status and clinical outcomes	▪ **62 Randomized and quasi-randomized controlled trials** ▪ Oral protein and energy supplementation ▪ Study period: until 2007	Older adults	▪ Primary outcomes: o Mortality o Morbidity/ complications o Functional status ▪ Additional outcomes: o HRQoL o LOS o Adverse effects o Nutritional status	▪ Hospital ▪ Community
Bandayrel et al., 2011	SLR of RCTs assessing the effectiveness of nutrition interventions in community-dwelling older adults	▪ **15 RCTs** ▪ Community dwelling older adults ▪ Age ≥ 55 ▪ At least one nutritional outcome ▪ Study period: 1990 – 2008	Older adults	Nutrition-related	Community
Allen et al., 2013	Use of nutritional complete supplements in older adults with dementia: Systematic review and meta-analysis of clinical outcomes	▪ **12 studies (RCTs, Quasi CTs, all research methodologies)** ▪ Patients with long-term cognitive impairment ▪ Study period: until January 2012	Older adults with dementia	▪ Mortality ▪ Anthropometric data ▪ Cognitive performance ▪ Functional ability	Community

Study Characteristics

Author & Year	Title	Selection Criteria/ Methodology	Study population	Outcomes	Settings
Cawood et al., 2012	Systematic review and meta-analysis of the effects of high protein oral nutritional supplements	▪ **36 RCTs** ▪ Adults 18 years and over ▪ Any nutritional status (well nourished or malnourished) ▪ Based in any setting ▪ Any sample size ▪ Multi-nutrient high protein ONS	Adults & Older adults ○ Mean age: 74 years ○ 83% of trials in patients >65 years	▪ Clinical and HCU ○ Complications ○ Mortality ○ LOS ▪ Functional ▪ Nutritional	▪ Hospital ▪ Community
Poscia et al., 2017	Effectiveness of nutritional interventions addressed to elderly persons: **umbrella systematic review** with meta-analysis	▪ Only SLRs and meta-analysis performed in elderly population ▪ Jan 2000 to May 2016 ▪ **Total of 28 SLRs and Meta-analysis** ○ RCT, CCT, non-RCT, case-control, time series, cohort, pre-post, cross-sectional	Older adults	▪ Functional outcomes ▪ Anthropometric ▪ Nutritional ▪ Other	Any settings
Li et al., 2021	Effectiveness of ONS on older people with anorexia: A systematic review and meta-analysis of randomized controlled trials	▪ **17 RCT, non-randomized studies** ▪ Older people with any health conditions ▪ Treatment that used ONS of any kind ▪ Comparators: Standard diets with or without placebo ▪ Outcomes With at least one assessment among appetite, intake, and weight ▪ From 1994 – 2016	Older adults with anorexia	▪ Nutritional outcomes ▪ Appetite ▪ Diarrhea ▪ Pressure sores ▪ QoL ▪ Total costs	Any settings

Evidence exists…..

P Older Adults

I Oral Nutritional Supplements (ONS), High protein ONS, Enteral, Parenteral

C Any comparator

O Nutritional, Functional, Clinical & Economic

S RCTs, SLR, Meta-Analysis

Evidence gap

There is a gap in literature with evidence synthesis that exclusively captures **RWE** data on the role of nutrition in the older adults

ISPOR SIG Activities 2022-2023

Objectives

Primary:

Targeted literature review on RWE studies demonstrating role of nutrition in older adults

Secondary:

Based on subgroup:

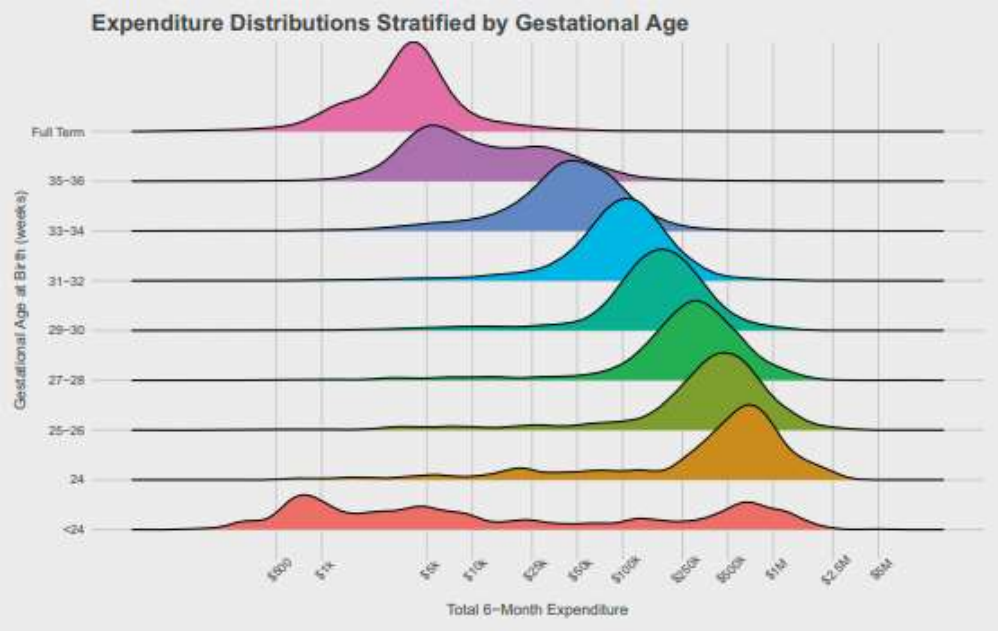
- Settings: Hospital, Post-acute/Community
- Therapeutic conditions: Hip fractures, Dementia, Malnutrition

3

Role of Nutrition in Premature Infants

The cost of prematurity is high

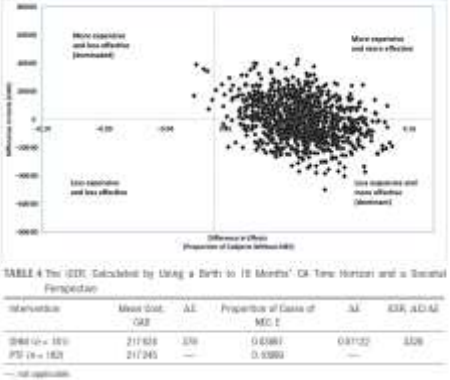
- ✓ 5% of births worldwide are extremely preterm (<32 weeks gestational age)
- ✓ Prematurity increases the risk of multiple neonatal complications that are reduced with maternal breastmilk
- ✓ Donor human milk is superior to formula for reducing the risk of necrotizing enterocolitis, but it is expensive and not readily available worldwide
- ✓ Prematurity is costly



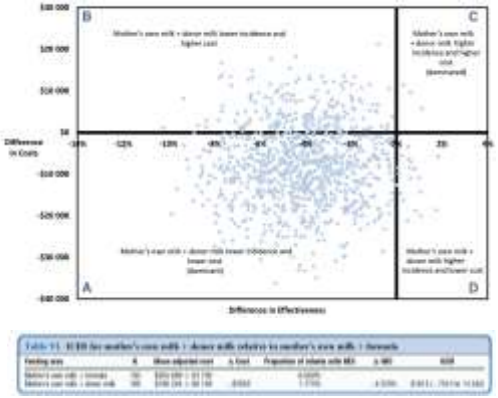
Source: Beam et al, 2020

Few economic evaluations of nutrition for very preterm infants in the neonatal intensive care unit

Cost-Effectiveness of Donor Milk Supplementation
Canada (Trang et al 2018)

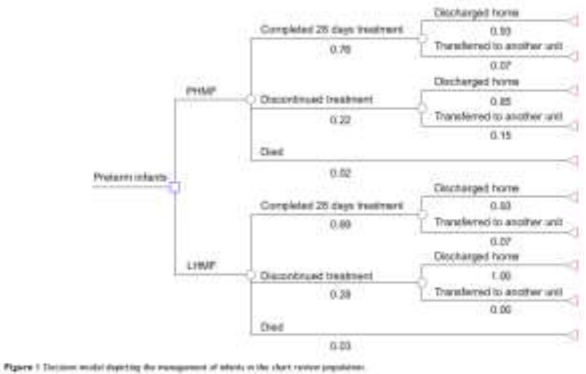


Cost-Effectiveness of Maternal Breastmilk and Donor Milk
USA (Johnson et al 2020)



Cost-Consequences of Alternative Donor Milk Preservation Methods
Poland (Wesolowska et al 2020)

Cost-Effectiveness of Liquid Human Milk Fortifiers
USA (Guest et al 2017)



Need more evidence of the cost-effectiveness of nutrition for this vulnerable and expensive population

- What is the incremental cost-effectiveness by duration of exclusive maternal breastmilk versus formula (versus donor human milk) in different regions of the world for very preterm infants?
- What is the cost-effectiveness of human milk fortification in very preterm infants?
- What is the cost-effectiveness of different strategies to increase dose of maternal breastmilk in very preterm infants?
- What is the cost-effectiveness of achieving exclusive maternal breastmilk intake through 6 months of life for very preterm infants?

Click to add text

Click to add text

We know very little about the cost-effectiveness of different nutritional approaches in vulnerable, high risk infants

4

Discussion

Discussion / Questions

Sign up to join our Special Interest Group

ISPOR Special Interest Group

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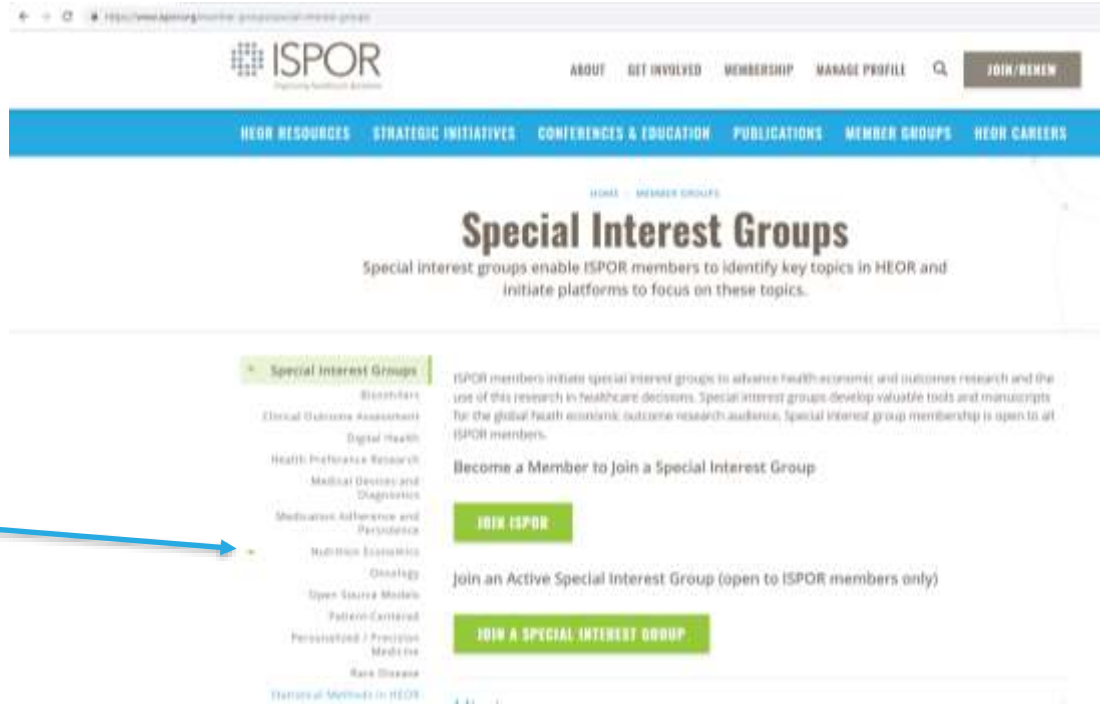

Thank you

For questions or more information, please contact:

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- Moreno Perugini: moreno.perugini@us.nestle.com
- Karen Freyer: karen.freyer@hotmail.com
- Amarsinh Desai: amarsinh.desai@us.nestle.com

5

SIG information

Potential themes to further explore from current paper:

1) HTA for Medical Nutrition
2) Regional Differences in Medical Nutrition
3) Payer archetypes and Medical Nutrition

Ongoing workstreams:

- Journal club
- Webinars
- Research papers

SIG Leadership Positions

Chair-Elect: This is a one-year term, that progresses from Chair-Elect to Chair, then Past-Chair, each served for 1 year, making a 3-year commitment. Responsibilities are:

- Provide overall direction and leadership of the Special Interest Group
- Identifying topics for the group to address and the appropriate platforms for that delivery
- Work with the working group co-chairs to ensure the timeliness of all projects and address any issues within the group
- Provide updates to the Special Interest Group membership and report on the progress of the Special Interest Group via the yearly business plan to ISPOR Scientific Officers
- Recruit new members

Member Engagement Co-Chairs: This is a 1-year term, renewable. These chairs develop and implement projects that encourage member participation and facilitate in disseminating topic content, for example, organizing journal clubs and educational webinars. Responsibilities are:

- Provide direction and leadership for the different member engagement projects
- Work with the SIG chairs to provide updates for the yearly business plan
- Communicate Special Interest Group activities to members
- Engage new Special Interest Group members