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Background

- Malnutrition is a pressing global health challenge for children, undermining growth, development, and imposing economic burdens on societies.
- Disease-related malnutrition (DRM) is a significant yet underappreciated comorbidity in hospitalized children, driven by disease-induced inflammation, increased metabolic demands, and inadequate nutrient intake.

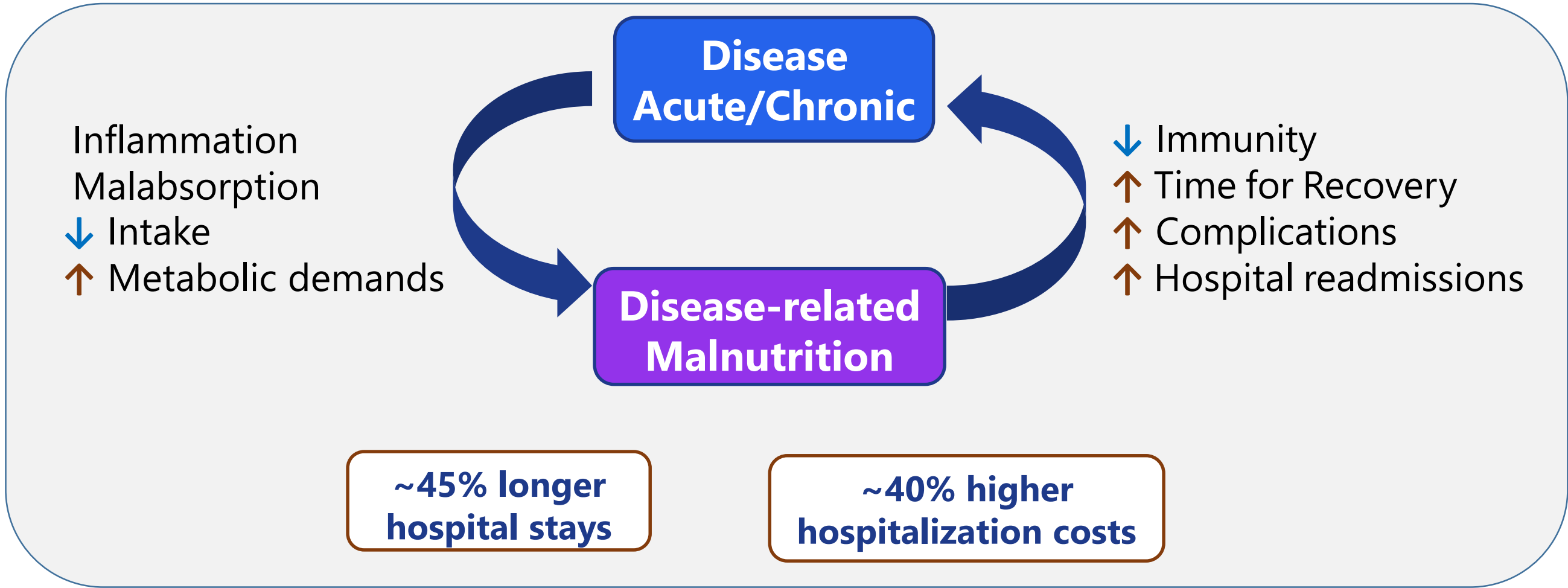


Figure 1:Vicious Cycle of Disease & DRM

- Evidence Gap:** Despite this burden among hospitalized children, data on prevalence and economic effects, particularly in the Middle East are few.
- Nutritional interventions are clinically useful in DRM management. Energy and nutrient-dense formulas (ENDFs) are well tolerated and demonstrate clinical benefits, including catch-up growth, shorter hospital stays, and reduced antibiotic use.
- Intervention Gap:** The economic impact of ENDFs in pediatric DRM remains poorly quantified.

Objectives

Estimate the budget impact and potential cost savings of introducing energy- and nutrient-dense formulas (ENDFs) for hospitalized pediatric DRM patients aged 0–5 years across public and private sectors in Egypt, Saudi Arabia, Kuwait, and the United Arab Emirates– representing the first multi-country analysis of its kind in the Middle East.

Methods

A budget impact analysis was conducted using an Excel-based model to compare energy- and nutrient-dense formulas (ENDFs) versus standard nutrition in hospitalized pediatric DRM patients across four Middle Eastern countries

Table1. Model Setting for the Budget Impact Analysis	
Parameter	Details
Perspective	Public & Private Healthcare Payers
Countries	Egypt, Saudi Arabia (KSA), Kuwait, United Arab Emirates (UAE)
Currency	Local Currency: EGP(Egypt), SAR (KSA), KWD (Kuwait), AED (UAE)
Time Horizon	1 year
Population	Hospitalized infants (0-1yr) & children (1-5yr) with DRM
Intervention	ENDFs (Infatrini®, Nutrini®)
Comparator	Standard Nutritional Formula (<i>Iso-caloric formula</i>)
Primary Data Source	Expert elicitation from 24 Key Opinion Leaders (KOLs), nutritionists, pediatricians, and payers
Key Assumptions	<ul style="list-style-type: none">All DRM patients were modeled as receiving standard formula (comparator) vs. ENDFs (intervention)Direct costs reflect daily hospitalization (ward + ICU); disease-specific medications excluded.

Data Sources



Model Inputs

Population	<ul style="list-style-type: none">Annual Pediatric Hospitalizations (0-1 yr, 1-5 yr)% DRM Prevalence in Ward% Require ICU after ward stay
Hospital Resources Utilization	<ul style="list-style-type: none">LOS: Ward (Standard/ENDF)LOS: ICU (Standard/ENDF)
Cost Inputs	<ul style="list-style-type: none">Ward daily cost per patientICU daily cost per patientNutrition costs (Standard vs ENDFs)

Calculations &Outcomes

- Clinical Outcomes Calculated:**
- % Reduction in LOS (ward & ICU)
- Economic Outcomes Calculated:**
- Hospitalization costs
 - Nutrition Cost
 - Total costs for patients per scenario
 - Incremental cost savings
 - % cost savings
- Sensitivity Analysis:**
- A one-way sensitivity analysis was conducted using Microsoft Excel and R (4.4.2) to assess model robustness by varying key input parameters ±20% from their base-case values.

Figure2: Model Development Process

Results

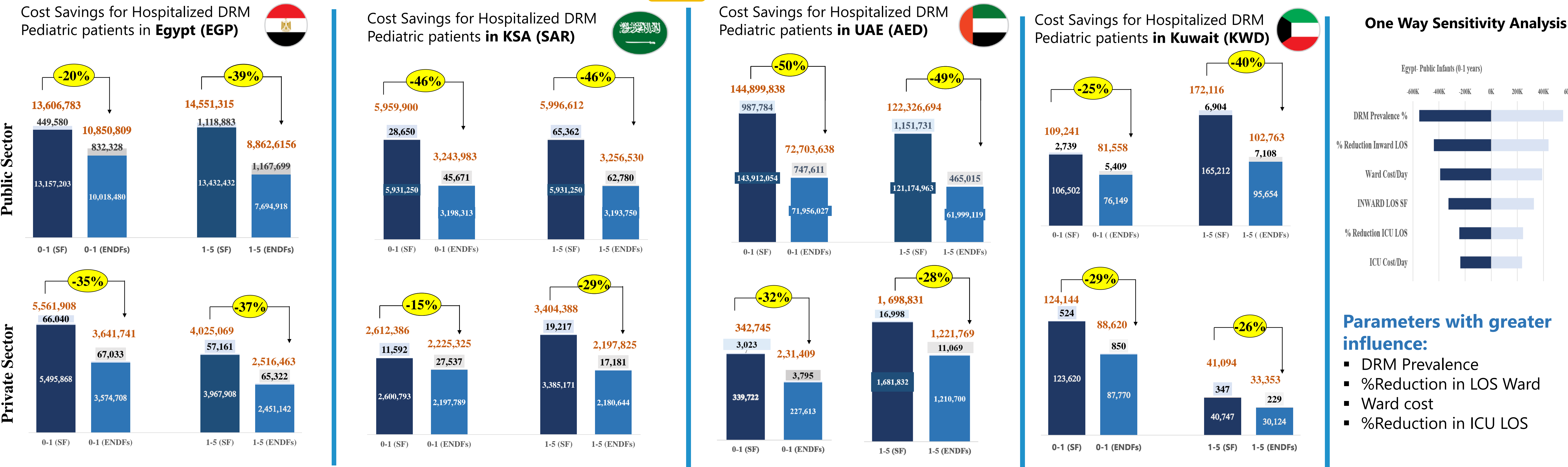


Figure 3. Budget impact of standard formula (SF) vs. (ENDFs) formulas across four Middle Eastern countries. Results are shown separately for public (top row) and private (bottom row) payer perspectives. Dark blue = SF hospitalization costs (ward + ICU); Bright blue = ENDFs hospitalization costs (ward + ICU). Each bar includes an upper, smaller (lighter) segment = nutrition cost for the respective scenario. Orange labels indicate total scenario costs, and percentage values show relative cost savings with ENDFs compared to SF.

Discussion

- Introducing ENDFs for children aged 0–5 years yielded budget savings of 15–50% across the four studied countries, in both public and private hospitals.
- Savings were mainly driven by reductions in hospital length of stay (LOS), which translated into lower hospitalization costs, the dominant component (>95%) of total expenditures, while nutrition costs were minimal.
- ENDFs consistently reduced LOS by 19–50% across wards and ICUs, in both sectors and pediatric age groups.
- In all scenarios, cost savings remained positive, with the most influential drivers being pediatric DRM prevalence, percentage reduction in ward LOS, and baseline LOS under standard formulas—confirming model robustness
- Epidemiological insights: this study provides scarce real-world evidence on pediatric DRM prevalence, showing wide variability (21–68% public vs. 4–13% private), consistent with global estimates (2.5–60%) and filling a critical local data gap.

Conclusion:

- Findings confirm the intrinsic connection between nutritional intervention & economic outcome: **improved nutritional status → faster recovery → reduced LOS → substantial cost savings, positioning specialized nutrition as a strategic, value-based investment.**
- The findings demonstrate **the clinical and economic value of ENDFs in managing pediatric DRM, primarily through reduced hospital length of stay and associated costs, supporting their broader adoption**

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