

# 100% Whey Peptide-Based Formulas Compared To Polymeric Enteral Nutrition Among Children Receiving Home Enteral Nutrition: A Cost-Benefit Analysis

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## Background

100% whey peptide-based formulas (100%-WP) for home enteral nutrition (HEN) are vital for children with malabsorption due to gastrointestinal (GI) dysfunction<sup>1-3</sup>. Standard polymeric formulations (PF) for enteral nutrition typically contain intact proteins and complex nutrients<sup>4,5</sup>, which can lead to GI intolerances in some patients<sup>1-3</sup>. 100%-WP products have been developed to improve digestion and absorption and reduce GI intolerances<sup>1,3</sup>, yet their health economic implications in pediatric care remain unclear<sup>2,3</sup>. This cost-benefit analysis compares 100%-WP with PF among pediatric patients receiving HEN as sole source of calorie intake.

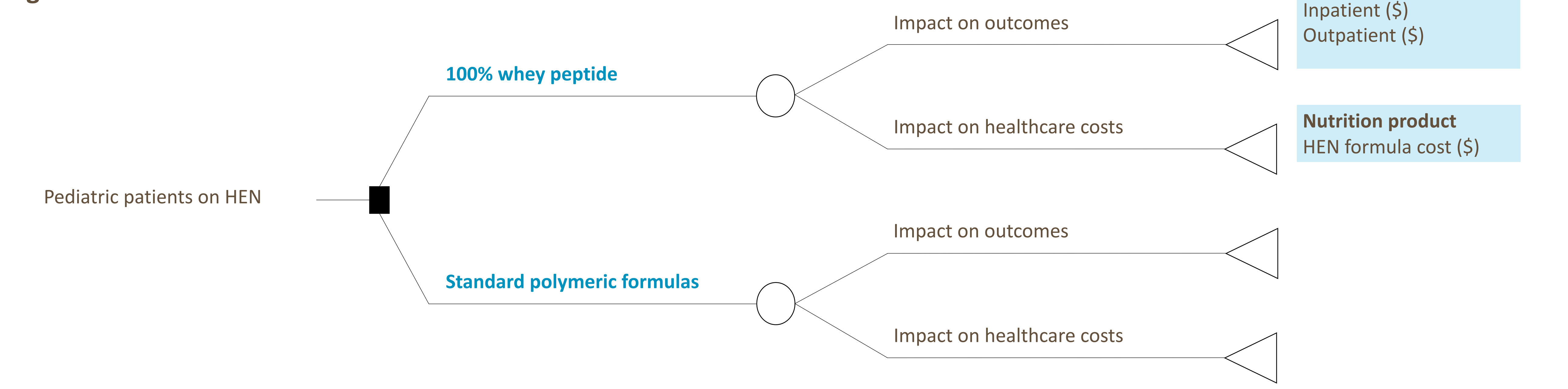
## Methods

- Study design:** A cost-benefit analysis (**Figure 1**) was conducted to compare 100%-WP with PF in pediatric patients (ages 2 to ≤18y) from a US healthcare system perspective with a 1-year time horizon. The model's population reflects pediatric patients receiving HEN in post-acute care settings, as described by LaVallee et al<sup>2</sup>. For standardized comparison, the data were normalized to a hypothetical cohort of 1,000 patients.
- Model inputs:** Cost parameters were drawn from a combination of robust, publicly available US databases and peer-reviewed real-world evidence, encompassing the Agency for Healthcare Research and Quality (AHRQ) for inpatient cost estimation<sup>6</sup>, published claims-based analyses for outpatient and complication-specific costs<sup>7-9</sup>; for routine outpatient visit costs, clinical inputs on GI intolerance rates were obtained from published real-world evidence<sup>2</sup>. Key cost inputs are described in **Table 1**.
- Outcome measure:** Clinical outcome differences in GI intolerance and healthcare resource utilization (HCRU) for inpatient, outpatient, and nutrition product between 100%-WP and PF were used to derive cost savings.
- Subgroup analysis:** Age-stratified caloric targets and formula pack requirements were applied across a base case - with a mean kcal requirement of 1,750 kcal - and three pre-specified subgroups [ages 2–8y (1,500 kcal), 9–13y (2,000 kcal), 14–18y (2,500 kcal)] per low active-lifestyle reference values<sup>10</sup>.

**Table 1: Inpatient, outpatient care and HEN formula costs**

Cost category	Parameter	Value	References
Inpatient care	Cost per hospital stay	\$7,772.00	MS-DRG 392: US data base from Agency for Healthcare Research and Quality (AHRQ) <sup>6</sup>
Inpatient care	Average length of stay	2.7 days	
Outpatient care	Cost per visit	\$441.65	Cost per routine outpatient visit <sup>2</sup> + average cost for a physician office visit per complication (diarrhea <sup>7</sup> , constipation <sup>8</sup> , nausea and vomiting <sup>9</sup> , abdominal pain/cramping <sup>9</sup> , gagging and retching <sup>9</sup> )
HEN formula cost – 100%-WP	Cost per pack (250 mL)	\$8.94	Mean of 100%-WP or PF nutrition product costs obtained from manufacturer websites.
HEN formula cost – PF		\$3.44	

**Figure 1: Cost-benefit model structure**



## Results

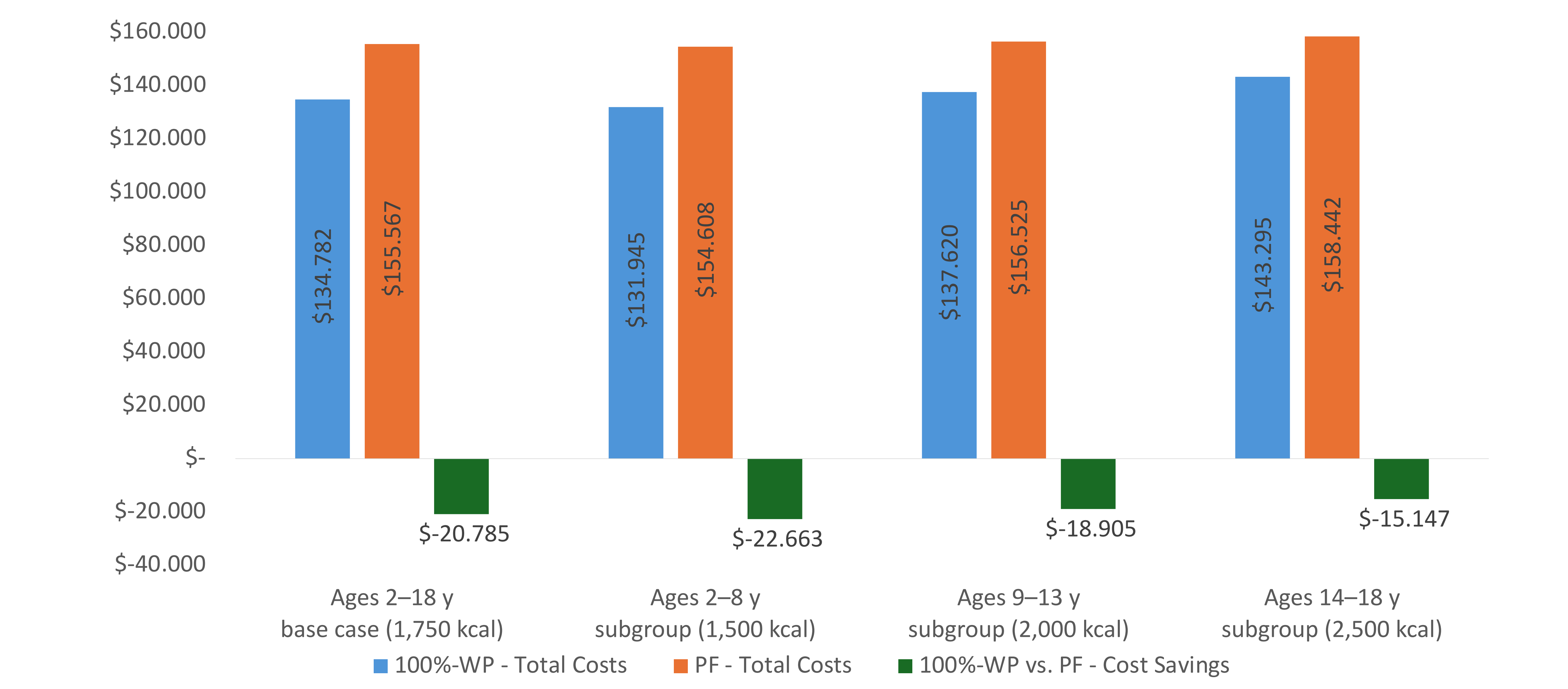
Differences in clinical outcomes, HCRU and costs were observed between 100%-WP and PF. 100%-WP reduced hospital admissions by 371 per 1,000 patients compared to PF, with an average annual decrease in length of stay of 12 days per patient across all stays.

- Total costs per patient per year were \$134,782 for 100%-WP and \$155,567 for PF yielding annual cost savings of \$20,785 per patient. For 1,000 patients, this resulted in total annual cost savings of \$20,784,106 with 100%-WP versus PF (**Table 2**). 100%-WP increased nutrition costs per patient but substantially reduced inpatient hospital costs from \$132,029 (PF) to \$99,066 (100%-WP).
- Additionally, the decline in healthcare facility usage maybe due to decreased GI intolerance frequency with 100%-WP showing 16.6% reduction in such events and 166 fewer incidents for every 1,000 patients treated, compared to PF.
- Base case results were confirmed by subgroup analysis with different calorie requirements as illustrated in **Figure 2**. Findings from the sensitivity analysis support the base case and subgroup analyses.

**Table 2: Total cost outcome per 1,000 patients and year – HEN population**

Total costs	100%-WP	PF	Difference 100%-WP vs. PF
Inpatient	\$99,065,776	\$132,029,123	-\$32,963,347
Outpatient	\$19,872,380	\$18,401,187	\$1,471,192
Nutrition products	\$15,844,331	\$5,136,282	\$10,708,049
Total costs	\$134,782,487	\$155,566,593	-\$20,784,106

**Figure 2: Total costs and total cost savings per patient per year 100%-WP vs. PF**



## Conclusion

100%-WP formulas demonstrated potential cost savings over PF in pediatric patients receiving HEN across all age groups. Despite higher formula acquisition costs, 100%-WP generated potential savings in total annual healthcare costs — driven by reduced hospital admissions, shorter length of stay, and fewer GI intolerance events. These findings support the potential use of 100%-WP as a clinically and economically valuable alternative to PF in this population.

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<sup>1</sup>Elfadil M, O., Steien DB, Narasimhan R, Velapati SR, Epp L, Patel I, et al. Transition to peptide-based diet improved enteral nutrition tolerance and decreased healthcare utilization in pediatric home enteral nutrition. JPEN J Parenter Enteral Nutr. 2022;46(3):626-34.; <sup>2</sup>LaVallee C, Seelam P, Balakrishnan S, Lowen C, Henrikson A, Cekola P, et al. Tolerance, healthcare utilization and cost of enteral peptide-based diets in children in post-acute care in the USA. J Acad Nutr Diet. 2021;7(4):1.; <sup>3</sup>Sankararaman S, Lowen C, Desai A, Cekola P, Kumar P, Mondal S, et al. Gastrointestinal tolerance, healthcare resource utilization, and cost analysis of whey peptide-based enteral formula in pediatric post-acute care: A retrospective study. Clin Nutr ESPEN. 2025;70:352-9.; <sup>4</sup>Bischoff SC, Austin P, Boeykens K, Chourdakis M, Cuerda C, Jonkers-Schuitema C, et al. ESPEN guideline on home enteral nutrition. Clin Nutr. 2020;39(1):5-22.; <sup>5</sup>Turck D, Braegger CP, Colombo C, Declercq D, Morton A, Pancheva R, et al. ESPEN-ESPGHAN-EGFS guidelines on nutrition care for infants, children, and adults with cystic fibrosis. Clinical Nutrition. 2016;35(3):557-77.; <sup>6</sup>Agency for Healthcare Research and Quality (AHRQ). Healthcare Cost and Utilization Project (HCUPnet). HCUPnet Data Tools 2026 [Available from: <https://datatools.ahrq.gov/hcupnet/>]; <sup>7</sup>Buono JL, Mathur K, Averitt AJ, Andrae DA. Economic burden of inadequate symptom control among US commercially insured patients with irritable bowel syndrome with diarrhea. J Med Econ. 2017;20(4):353-62.; <sup>8</sup>Huang H, Taylor DC, Carson RT, Sarocco P, Friedman M, Munsell M, et al. Economic evaluation of linaclotide for the treatment of adult patients with irritable bowel syndrome with constipation in the United States. J Med Econ. 2015;18(4):283-94.; <sup>9</sup>Peery AF, Crockett SD, Murphy CC, Jensen ET, Kim HP, Egberg MD, et al. Burden and Cost of Gastrointestinal, Liver, and Pancreatic Diseases in the United States: Update 2021. Gastroenterology. 2022;162(2):621-44.; <sup>10</sup>U.S. Department of Agriculture (USDA). Dietary Guidelines for Americans, 2020–2025 2025 [Available from: [https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary\\_Guidelines\\_for\\_Americans\\_2020-2025.pdf](https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary_Guidelines_for_Americans_2020-2025.pdf)].

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