

# Real-World Evidence of Treatment, Tolerance, Healthcare Utilization, and Costs Among Adult Post-Acute Care Patients Receiving Enteral Peptide-Based Diets in the United States



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## BACKGROUND & OBJECTIVES

### Background

- Disease-related malnutrition/undernutrition can impair muscle strength, immunity, or wound healing (1), and is associated with a considerable economic burden (2)
- Enteral tube feeding (ETF) is a medical nutrition therapy used to help meet nutritional requirements in patients who have inadequate volitional intake
- Medical conditions and therapies that affect nutrient digestion (i.e., short bowel syndrome, inflammatory bowel disease, cystic fibrosis) may lead to suboptimal nutrient absorption (1, 3-5)
- Standard ETF formulas contain complex nutrients (e.g. whole proteins), which may not be optimal for digestion and adequate nutrient absorption
- Some patients receiving standard ETF formulas experience poor gastrointestinal tolerance, characterized by nausea, vomiting, bloating, constipation and diarrhea (6, 7)
- Poor tolerance is associated with reduced patient quality of life and an increased risk of malnutrition (6, 7)
- Poor tolerance can increase healthcare costs through longer inpatient stays (6) and greater post-acute care use of healthcare resources (8)
- Semi-elemental ETF formulas contain enzymatically hydrolyzed protein and a percentage of fat in the form of medium chain triglycerides, designed to improve digestion and absorption (1). Peptide-based (PB) ETF formulas have been shown to be well-tolerated in a post-acute care setting in patients with malabsorption (8)
- ETF typically begins in a hospital setting and is continued as part of post-acute care, as needed

### Objectives

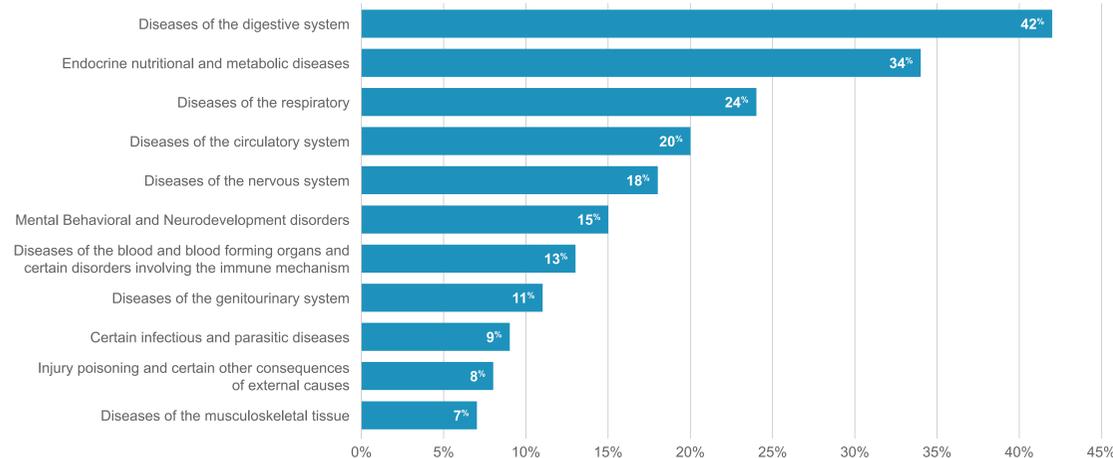
- Our aim was to assess the real-world tolerance, healthcare utilization and -cost of a specialized enzymatically hydrolyzed 100% whey protein complete PB diet (wPBD) via ETF in adults in the post-acute care setting

**Table 1: Patient Demographic Characteristics**

Variables	Age, Group, n (%)						Gender, n (%)		Comorbidities	
	18-24	25-34	35-44	45-54	55-64	≥65	Male	Female	Mean No. of Comorbidities (SD)	Mean CCI Score (SD)
N=1,022	165 (16)	134 (13)	153 (15)	167 (16)	197 (19)	206 (20)	474 (46)	548 (54)	3.22 (1.92)	4.97 (3.69)

Abbreviations: ETF, enteral tube feeding; wPBD, specialized enzymatically hydrolyzed 100% whey protein complete peptide-based diet.

**Figure 1: Most Frequently Reported Underlying Conditions Adult Patients Receiving wPBD ETF**



Abbreviations: ETF, enteral tube feeding; wPBD, specialized enzymatically hydrolyzed 100% whey protein complete peptide-based diet.

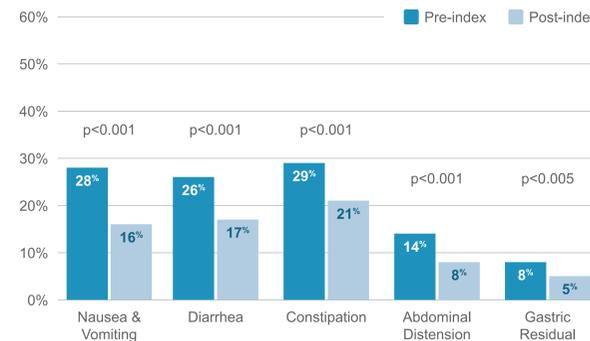
## References

1. Stroud M, Duncan H, Nightingale J. Guidelines for enteral feeding in adult hospital patients. *Gut*. 2003;52(suppl 7):vii1. 2. Amaral TF, Matos LC, Tevares MM, Subtil A, Martins R, Nazare M, et al. The economic impact of disease-related malnutrition at hospital admission. *Clinical Nutrition*. 2007;26(6):778-84. 3. Sundaram A, Koutlikia P, Apovian CM. Nutritional management of short bowel syndrome in adults. *J Clin Gastroenterol*. 2002;34(3):207-20. 4. Dionigi P, Alessiani M, Ferrazi A. Irreversible intestinal failure, nutrition support, and small bowel transplantation. *Nutrition*. 2001 Sep;17(9):747-50. 5. Turk D, Braegger CP, Colombi C, Delecloux D, Morton A, Pancheva R, et al. ESPEN-ESPGHAN-ECFS guidelines on nutrition care for infants, children, and adults with cystic fibrosis. *Clin Nutr*. 2016 Jun;35(3):557-77. 6. Curry AS, Chadda S, Danel A, Nguyen DL. Early introduction of a semi-elemental formula may be cost saving compared to a polymeric formula among critically ill patients requiring enteral nutrition: a cohort cost-consequence model. *ClinicoEconomics and outcomes research*. CEOR. 2018;10:293-300. 7. Hopkins B, Donnelly-Vanderfoote M, Davis B, Madill J. Prevalence and Management of Enteral Nutrition Intolerance in the Non-ICU Setting in Canada. *The Canadian Journal of Clinical Nutrition*. 2017;5(2):82-101. 8. Kuchkuntla A, Hurt R, Mundi M. Retrospective descriptive analysis of demographic characteristics of patients receiving peptide-based diet (RAD Peptide Study). *ASPEN Abstract 2019*, Phoenix, AZ.

## Disclosures

The study was funded by Nestlé Health Science.

**Figure 2: Percentage of Patients Affected by Intolerance Events Pre- and Post-Index (Initiation of wPBD ETF)**



Abbreviations: ETF, enteral tube feeding; wPBD, specialized enzymatically hydrolyzed 100% whey protein complete peptide-based diet.

## METHODS

- Medical claims data were obtained from the Decision Resources Group Real World Evidence Data Repository US database
- The cohort of adult patients (≥18 years old) included those receiving Peptamen® formulas (wPBD) via ETF for any condition after hospital discharge during the period of Q1-2013 through Q4-2017
- Patient observation took place in the post-acute care setting for up to one year after initiation of wPBDs, in the post-acute care setting
- Univariate descriptive statistics, including means, standard deviations, and proportions were calculated for study variables
- Resource use costs were estimated using a multivariate general linearized model, adjusted for age, gender, and Charlson Comorbidity Index score

## RESULTS

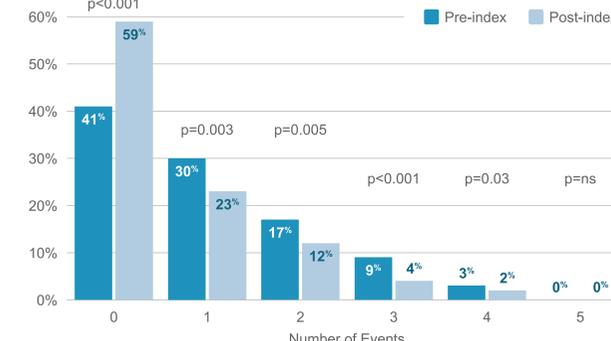
- A total of 1,022 adult patients were eligible for inclusion, with an average age of 47.5 (SD 18.7) years and 46% of patients were male
- The most common observed underlying medical conditions were those of the digestive system 431 (42.2%), endocrine nutritional and metabolic diseases 337 (32.9%), respiratory system 250 (24.5%), circulatory system 207 (20.3%), and nervous system 182 (17.8%) (Figure 1)

**Table 2: Modelled Healthcare Resource Use Costs for Adult Patients on wPBD ETF**

Resource	30 Days	90 Days	180 Days
Inpatient visits	\$1,391 (±282)	\$1,870 (±271)	\$2,683 (±386)
Outpatient visits	\$1,174 (±74)	\$2,437 (±148)	\$3,929 (±240)
Emergency room visits	\$225 (±33)	\$357 (±53)	\$438 (±55)
<b>Total</b>	<b>\$2,790</b>	<b>\$4,664</b>	<b>\$7,050</b>

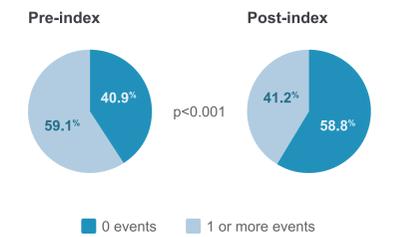
Abbreviations: ETF, enteral tube feeding; wPBD, specialized enzymatically hydrolyzed 100% whey protein complete peptide-based diet.

**Figure 3: Percentage of Patients Experiencing Multiple Intolerance Events Pre- and Post-Index (Initiation of wPBD ETF)**



Abbreviations: ETF, enteral tube feeding; wPBD, specialized enzymatically hydrolyzed 100% whey protein complete peptide-based diet.

**Figure 4: Percentages of Patients Experiencing ≥1 Intolerance Events, Pre- and Post-Index (Initiation of wPBD ETF)**



Abbreviations: ETF, enteral tube feeding; wPBD, specialized enzymatically hydrolyzed 100% whey protein complete peptide-based diet.

- The data showed a statistically significant improvement in tolerance after initiation of wPBD for all outcomes evaluated (Figure 2):
  - Nausea and vomiting, 288 (28.2%) vs 159 (15.6%), p<0.001
  - Diarrhea, 262 (25.6%) vs 177 (17.3%), p<0.001
  - Constipation 295 (28.9%) vs 215 (21.0%), p<0.001
  - Abdominal distension, 144 (14.1%) vs 82 (8.0%), p<0.001
  - Gastric residual, 78 (7.6%) vs 47 (4.6%), p=0.005
- The percentage of patients experiencing one or multiple gastrointestinal intolerance events also declined after initiation of wPBD, with a corresponding increase in the percentage of patients experiencing no gastrointestinal intolerance events (Figure 3)
- Significantly fewer patients experienced three or more adverse gastrointestinal tolerance events after initiation of wPBD (58 [5.7%] vs 127 [12.4%], p<0.001)
- Significantly more patients were entirely free of adverse gastrointestinal tolerance events after initiation of wPBD (58.8% vs 40.9% [p<0.001], Figure 4)
- In the first 30, 90, and 180 days after initiation of wPBD via ETF, the following health care practitioner visits occurred:
  - 42.6%, 56.9%, and 66.4% of patients, respectively, had at least one inpatient visit recorded
  - 99.8%, 100%, and 100% respectively, recorded at least one outpatient visit
- In the first 180 days, the mean number of inpatient and outpatient visits per patient (for those with recorded visits) were 9.38±12.74 and 18.7±15.51
- The modeled cost of inpatient, outpatient and emergency room visits (Table 1) show that of the total 180-day resource use costs of \$ 7,050 per patient, 38% are attributable to inpatient visits, 56% to outpatient visits, and 6% to emergency room visits

## CONCLUSION

- Use of wPBD in the post-acute care setting in adults is associated with a reduction in all measured gastrointestinal intolerance events. More than half of patients experienced no intolerance events
- As expected, all patients with wPBD reported at least one outpatient visit, while in-hospital visits were less common. After the first 30 days following wPBD initiation, outpatient visits represented the largest share of healthcare resource costs, with only a small proportion of the resource use costs being due to emergency room visits