**Introduction**

- Atopic dermatitis (AD) places a significant economic burden on the healthcare system and patient’s families. Infants with first-degree relatives with a history of AD have a “high” risk of manifestation (33%).
- Protein hydrolysis decreases the allergenicity of infant formulas. Extensively-hydrolyzed infant formulas (EHF-Whey or Casein) have been used in treatment and sometimes prevention of allergies associated with consumption of standard cow’s milk based formula (SF).
- A specific brand of 100% whey-based partially-hydrolyzed formula, manufactured by Nestlé S.A as NIDAL EXCEL HA (PHF-W) in France, has been proven more effective than SF in the prevention of AD, and comparable to EHF. Furthermore, PHF-W has lower rates of discontinuation than EHF due to better taste, texture or other factors.

**Objectives**

- A pharmacoeconomic analysis was performed to determine costs, consequences and cost-effectiveness of PHF-W as compared to SF in the prevention of AD in “at risk” infants who cannot be breastfed or for whom breastfeeding duration is shorter than recommended.
- A secondary analysis was undertaken in comparison to EHF although EHF is not officially indicated for prevention in France.

**Methods**

- A “predictive modelling” approach (Figure 1) depicting AD treatment pathways as well as resource utilization and associated costs was applied to explore the costs and consequences of listing a new milk formula on the public health insurance plan.

This economic evaluation was undertaken from three perspectives: the Ministry of Health (MOH), the family of the subject (including productivity related and indirect costs) and society as a whole (which included both previous perspectives).

- All formulas were assumed to be reimbursed at 65% by the MOH (same rate for prevention as applied to some formulas for treatment purposes).
- A time horizon of 12 months including six months of formula consumption by newborns was selected as it represented the time during which most cases of AD first occur while going beyond the period of milk consumption.
- Inputs were gathered from the literature, official formularies and expert opinion. Specifically,
  a) Incidence rates of AD were derived from a meta-analysis by Szajewska et al.
  b) An expert panel consisting of three expert clinicians (a hospital-based pediatrician, a pediatric allergist and a pediatric dermatologist) was convened firstly to define and validate treatment pathways and secondly to identify and value resources consumed in the management of AD.
  c) The cohort entering the model was determined by applying the following equation: [(Birth cohort in France in 2008) x (1 – Average Exclusice Breastfeeding rate)] x (Rate of “at risk” infants).
- The treatment pathways included a dietary management approach (formula change), a medical treatment approach (corticosteroid use) and a combination thereof, as illustrated in Figures 2, 3 and 4.
- The final outcome was the expected incremental cost per avoided AD case for PHF-W in comparison to other formulas.

**Results**

Please consult Tables 1 and 2 for a summary of the findings of the base case analysis.

In a cohort of 801,000 newborns, 185,298 subjects were deemed “at risk” of developing AD symptoms. In turn, 34,356 cases of AD (42%) were assumed to be avoided by selecting PHF-W over SF, as seen in Table 1, resulting for society in a cost of €719 per avoided case with PHF-W, as seen in Table 2.

PHF-W demonstrated cost savings when compared to EHF, namely savings of €98 million vs. EHF-Whey and €116 million vs. EHF-Casein including respective savings of €64 million and €76 million from the MOH perspective.

One-way and probabilistic sensitivity analyses confirmed the robustness of the model and the direction of the results.

**Discussion and Conclusions**

- The expected incremental costs per avoided case of AD for PHF-W compare favourably to the costs of treating AD as published for various European countries (ranging between €500 and €2400) while PHF-W also offers a reduction of the clinical burden by approximately half.
- From all three perspectives, the highest cost was attributable to formula.
- In a hypothetical scenario wherein EHF is considered for prevention and not only treatment of AD symptoms, PHF-W yields similar outcomes but at lower costs, with savings vs. EHF in the order of €100 million or approximately 3 € per day per child in the cohort.
- This predictive model may contain a certain amount of bias and limitations, however, in all possible cases, the analyses were performed with the bias set against PHF-W effectively making this economic evaluation as conservative as possible.
- In conclusion, PHF-W appears to be the product best positioned in prevention at a reasonable cost when compared to SF and with a cost saving when compared to EHF.

![Figure 1](image-url)