Population - Level Impact of Emicizumab in Algeria : A 25-Year Projection

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INTRODUCTION

Hemophilia A is a significant and escalating public health challenge in Algeria. With 2,124 patients reported in 2023[1], the estimated annual cost reaches 69 million euros[2]. A major driver of this economic burden and a source of considerable morbidity is the development of factor VIII (FVIII) inhibitors. This complication severely impairs patient quality of life, particularly in the pediatric population, by complicating treatment[3].

The emergence of innovative prophylactic therapies like Emicizumab, a non-factor replacement treatment that restores coagulation pathway activity despite FVIII inhibitors, could profoundly reshape the disease landscape[4]. To accurately assess the value of such a therapeutic paradigm shift, it is essential to project its long-term, population-level impact.

OBJECTIVE

Address the impact of Emicizumab from a populational level perspective by quantifying its intrinsic socio-economic value for the Algerian health system, with a focus on the pediatric population.

METHOD

A statistical projection model was used to assess the clinical, economic, and societal consequences of introducing Emicizumab in Algeria.

The target population comprised 633 Algerian pediatric patients (<18 years old) with severe hemophilia A and no inhibitors (INH-).
This population was stratified into three age groups for analysis:

- Under 2 years;
- 2 to 12 years;
- 12 to 18 years.

The model compared two scenarios over a 25-year time horizon:

- Reference Scenario (without Emicizumab): Therapeutic options were limited to Factor VIII, used for prophylaxis or on-demand;
- Prospective Scenario (with Emicizumab): Simulation of the progressive introduction of Emicizumab as a prophylactic treatment, with an estimated adoption rate reaching 75% of the target population within five years.

Key outcome measures included

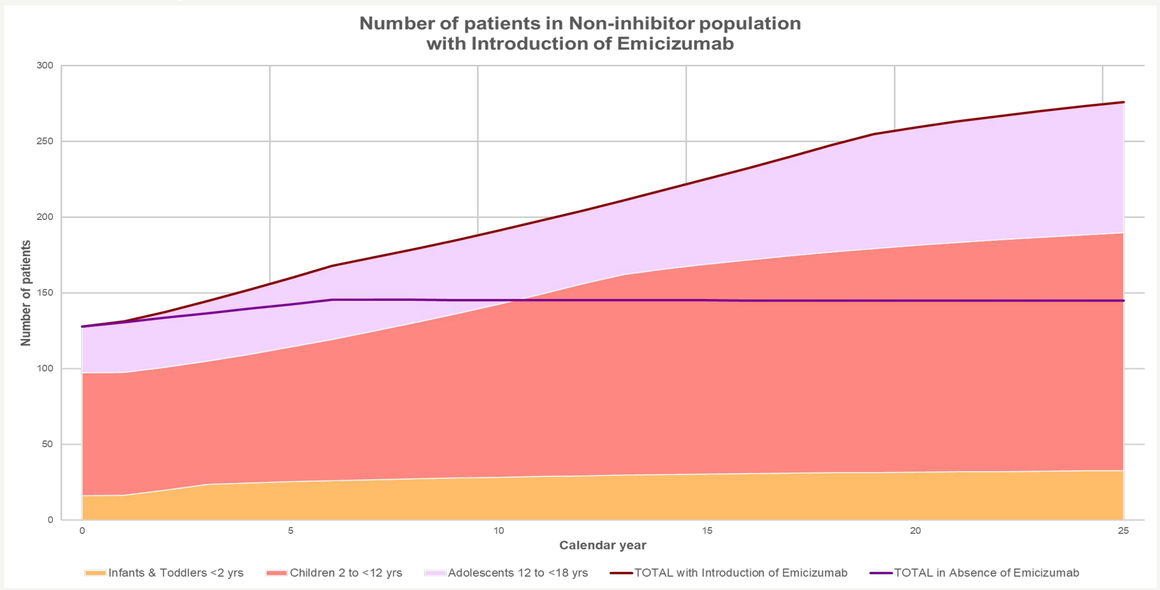
- Clinical impacts (Number of bleeds, inhibitor incidence);
- Economic impacts (direct and indirect medical costs);
- Societal impacts (unworked days by caregivers, Quality-Adjusted Life Years).

The parameters and data used were documented through a comprehensive literature review of databases such as Google Scholar and Science Direct for the period 2015-2025, and institutional sources.

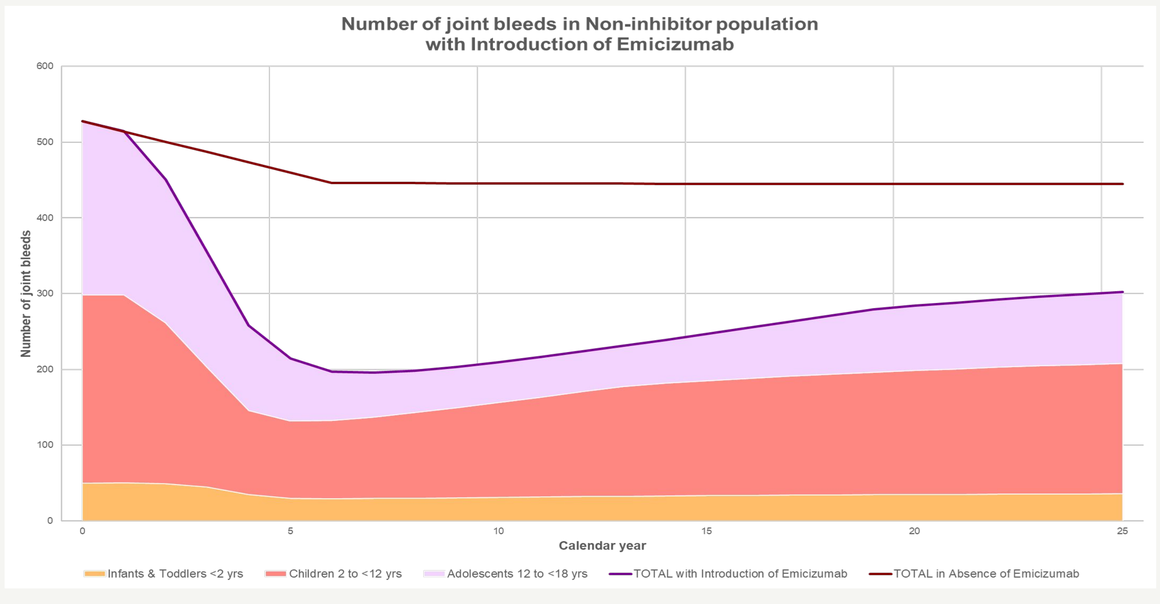
RESULTS

The model showed a decrease in the incidence of Factor VIII inhibitors, with the proportion of INH- patients reaching 78% of the cohort by the 25th year. The clinical improvements resulted in a gain of 1,276 QALYs over 25 years (an average of +49 QALYs per year) and a reduction in absenteeism (an average of -1,721 days per year). Direct medical costs decreased by 39%, in the scenario with Emicizumab versus the scenario without, generating 778 million DZD (5.1 million euros) in savings over 25 years. Indirect costs were reduced by approximatively 60 million DZD (396k euros) over the same period.

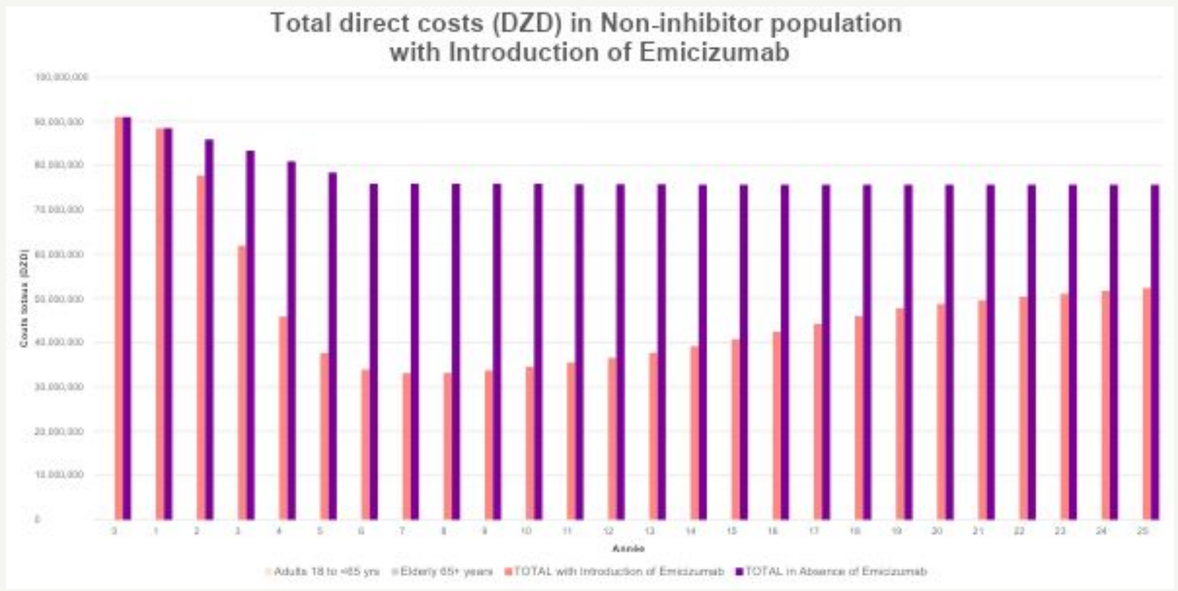
Clinical impact



Total Bleeds	16253	10013	-39%
Joint Bleeds	11865	7310	



Economic and Societal Impact



Days not worked (caregivers)	117060	72326	-39%
Indirect costs	148 637 407 DZD	91 836 670 DZD	

+ 45% of improvement through out the 25 years projection
+ 49 QALYs gained per year on average
+1276 QALYs gained through out the 25 years projection

DISCUSSION

The data reveal a significant temporal dynamic: the outcomes initially decreases before rising and stabilizing. This effect, observed around year 8 post-introduction, aligns with the model's assumption that treatment adoption plateaus around the sixth year. This plateau maximizes the difference from the reference scenario (without Emicizumab) before cohort demographics stabilize the effect. This finding underscores the necessity of long-term projections, as shorter-term analyses (e.g., 5-10 years) could lead to an inaccurate understanding of the therapy's long-term utility.

CONCLUSIONS

The adoption of Emicizumab demonstrates substantial clinical and socio-economic benefits for the Algerian population. In the long term perspective the significant reduction in bleeding rates translates into a notable improvement in quality of life and will generate savings on direct and indirect costs. Moreover the potential to prevent the development of Factor VIII inhibitor reduces the high risk of complications and their associated high costs.

REFRENCES

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