

# A New Complement Inhibitor: Impact of Ravulizumab on Eculizumab and Future Biosimilars Use, and Role of Paris Public University Hospitals (AP-HP)



Romero C<sup>1</sup>, Fusier I<sup>1</sup>, Siorat V<sup>1</sup>, Mougenot P<sup>1</sup>, Paubel P<sup>1,2,3</sup>  
<sup>1</sup> General Agency of Equipment Health Product (AGEPS), AP-HP, Paris, France  
<sup>2</sup> Health Law Institute, INSERM UMR S 1145, Paris Cité University, Paris, France  
<sup>3</sup> Faculty of Pharmacy, Paris Cité University, Paris, France



## OBJECTIVES

Until 2022, only one laboratory had a market authorization in France for a C5 inhibitor (C5i), eculizumab. With the patent expiring and biosimilars entering the market, this laboratory released a new form of its drug, ravulizumab that is administered less frequently, thus providing costly anti-biosimilar competition for the national health insurance.

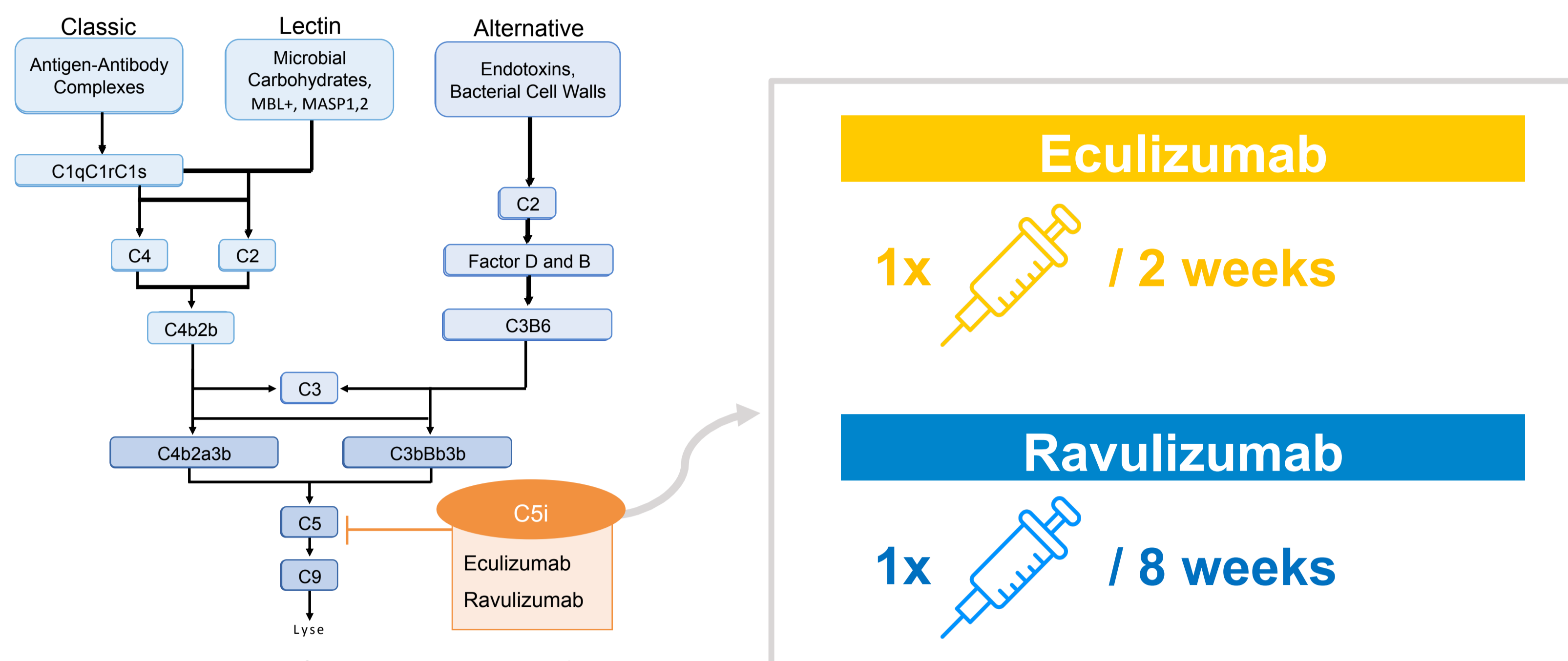


Fig 1. Complement cascade

Table 1. Comparison of Ravulizumab and Eculizumab

DCI	Ravulizumab		Eculizumab
Class	C5i		
Form	Infusion solution		
Dosage	300 mg/3 mL	1100 mg/11 mL	300 mg/30 mL
Route and frequency	IV 1 x/ 8 weeks		IV 1 x/ 2 weeks
Dosing	Loading dose		PNH: 600 mg 1/week during 4 weeks Excluding PNH: 900 mg 1/week during 4 weeks
	Maintenance		PNH: 900 mg /2 weeks Excluding PNH: 1200 mg/2 weeks
Price/vial	4 287,88 €	15 722,22 €	3 401,075 €
DTC (Maintenance 70 kg)	PNH : 842 €/d (+16 % / Eculizumab)		PNH : 729 €/d
	Excluding PNH : 842 €/d (-13% / Eculizumab)		Excluding PNH : 972 €/d
Administration cost	47 176 €		PNH : 10 203 € Excluding PNH : 13 604 €
Cost / year (maintenance)	307 330 €		PNH : 266 085 € Excluding PNH : 354 780 €
Number Day hospital/year	6		26

DTC: daily treatment cost; PNH: paroxysmal nocturnal hemoglobinuria

This study examines the consequences of the launch of this new drug on consumption at the University hospitals of Paris (AP-HP) and the impact of the COMED (Pharmacy and therapeutic committee in AP-HP) recommendations on the use of the new C5i and the promotion of biosimilars (ravulizumab limitation for use in chronic treatment, Eculizumab and biosimilar for the others use).

## METHODS

The data for this study was collected between Q4 2022 and Q1 2023 through a survey distributed to hospital pharmacists and by accessing AP-HP databases (consumptions/expenditures).

## RESULTS

The data from 12 hospitals has been categorized by indication: paroxysmal nocturnal hemoglobinuria (PNH), atypical hemolytic-uremic syndrome (aHUS), generalised myasthenia gravis (MG), neuromyelitis optica spectrum disorder, and other indications, for eculizumab and ravulizumab.

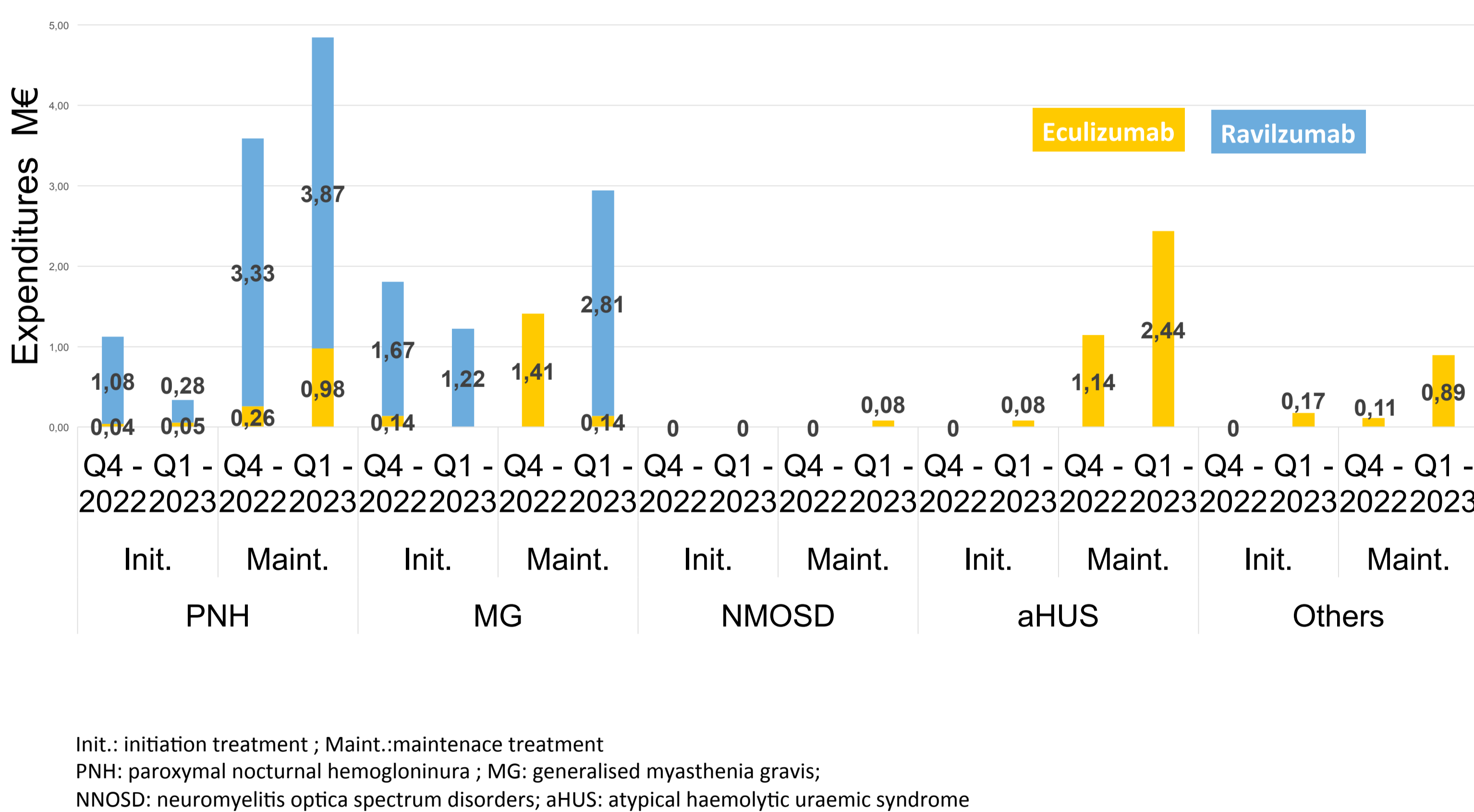


Fig 2. Expenditures by indication: quarterly tracking Q4 - 2022 and Q1 - 2023

Between Q4 2022 and Q1 2023, 15 patients were initiated on treatment with eculizumab (PNH: 4, MG: 2, aHUS: 2, Other: 7), and 62 patients with ravulizumab (PNH: 32, MG: 30).

There were 151 patients on maintenance treatment with eculizumab (PNH: 45, MG: 29, aHUS: 60, other: 16), and 139 patients with ravulizumab (PNH: 108, MG: 31).

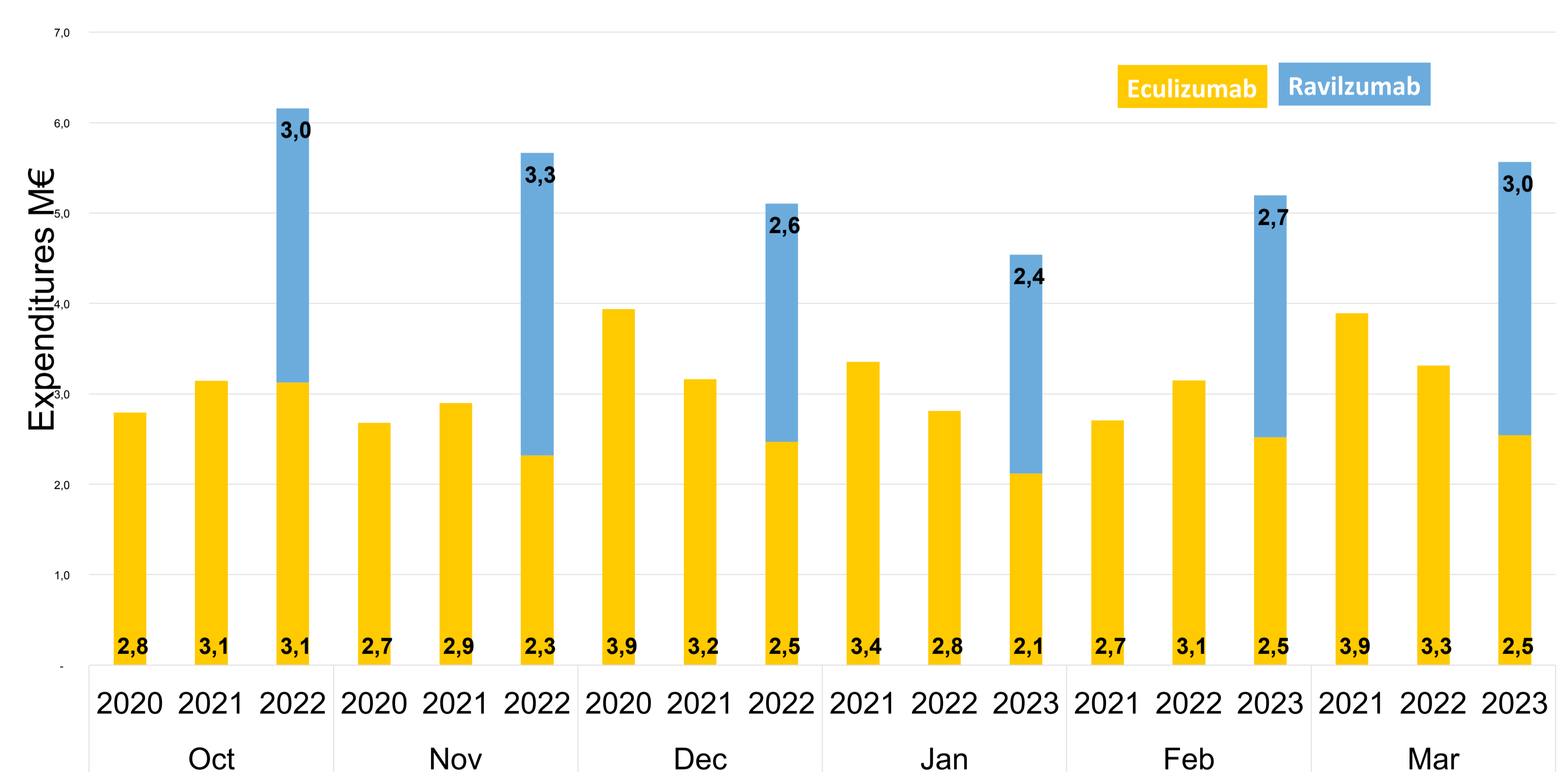


Fig 3. Expenditures for the period Oct-Mar (6 months), 2020 to 2023.

The overall expenses on C5i increased by 70.84% for Q4 2022 - Q1 2023 compared to Q4 2021 - Q1 2022 and ravulizumab accounted for 67% of the total C5i expenses during Q4 2022 – Q1 2023.

## CONCLUSION

Ravulizumab's launch increased treatment initiation and expenditures, indicating its significant impact on consumption patterns and costs. Hospitals adhered to COMED's PNH recommendations, but MG exhibited center-dependent overconsumption despite available alternatives. The launch of eculizumab biosimilars is expected in 2023 for PNH and in 2024 for aHUS, which will determine their market share.