



REVERSE the course: antibiotic consumption trends across Romanian hospitals



Adriana Hristea^{1,2}, Maria-Evelina Gorea¹, Raluca-Mihaela Matoru¹, Raluca-Maria Hrisca³, Codruta-Georgiana Carp³, Daniela Rosca⁵, Tudor Rares Olariu⁵, Aurora Boboc⁴, Gingaras Cosmina⁴, Victoria Birlutiu⁴, Razvan Bobe⁶, Cristina Cheran⁶, Diana Gabriela Iacob⁶, Cristian-Mihail Niculae^{1,2}

¹National Institute for Infectious Diseases "Prof. Dr. Matei Bals", Bucharest, Romania; ²Faculty of Medicine, University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania; ³Central Military Emergency University Hospital "Dr. Carol Davila", Bucharest, Romania; ⁴The Sibiu County Emergency Clinical Hospital, Sibiu, Romania; ⁵Municipal Emergency Clinical Hospital, Timisoara, Romania; ⁶The University Emergency Hospital Bucharest, Romania

BACKGROUND

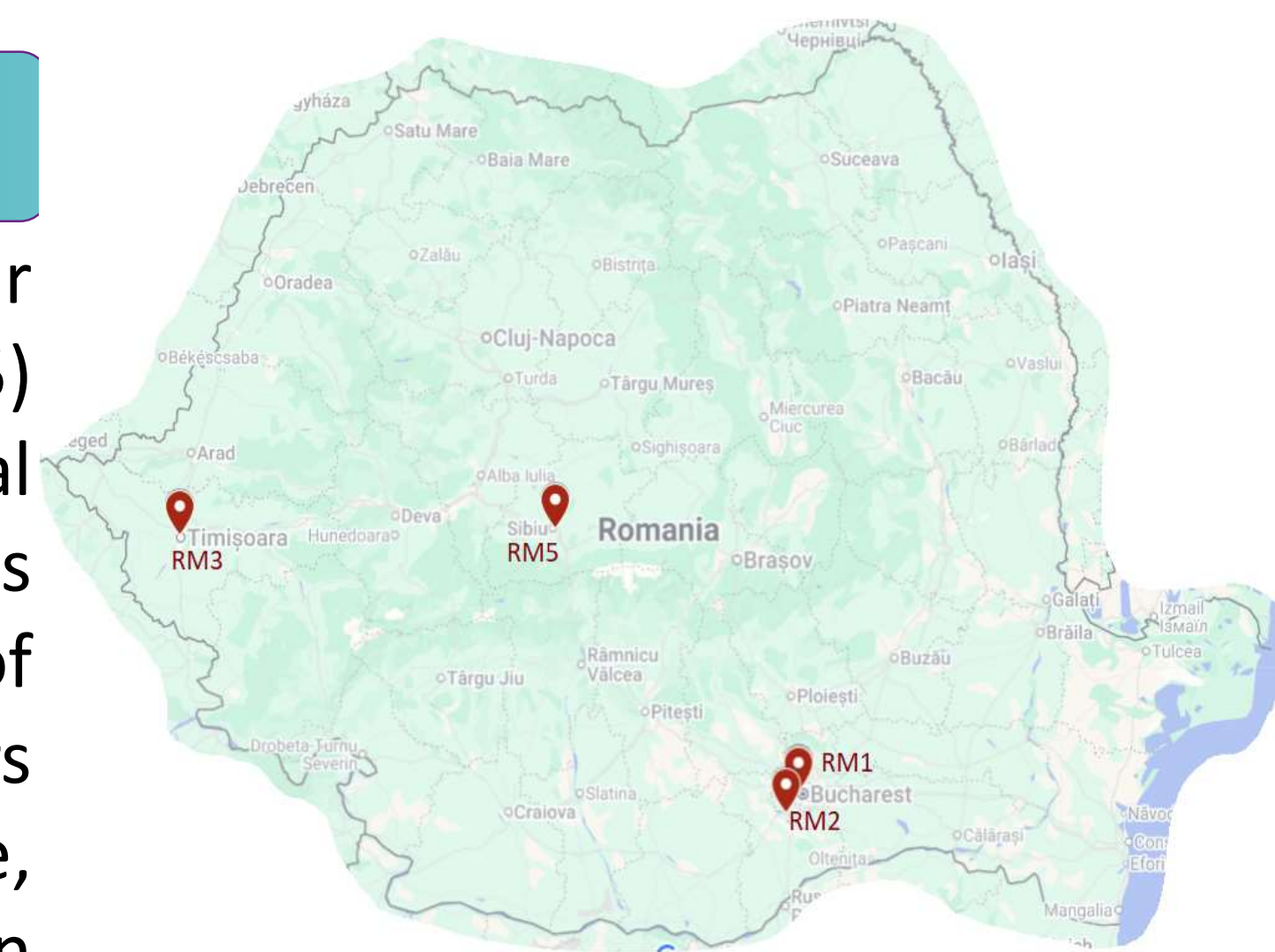
The REVERSE project is an European initiative designed to reduce the burden of antimicrobial resistance in high-prevalence healthcare settings. In Romania, it supports the implementation of specific antimicrobial stewardship (AMS) measures, approaching antibiotic prescription towards WHO AWaRe framework.

OBJECTIVES

This study aimed to evaluate how REVERSE interventions influenced antibiotic consumption patterns across the AWaRe categories.

METHODS

Antibiotic utilization data were collected prospectively from four REVERSE Romanian hospitals (RM1, RM2, RM3 and RM5) between April 2022 and September 2024. Evaluation of temporal trends across AWaRe categories was done. For three hospitals with complete datasets, we conducted a comparative analysis of antibiotic consumption between two consecutive trimesters preceding and following implementation of the first AMS bundle, targeting optimization of surgical prophylaxis and reduction in asymptomatic bacteriuria treatment.



RESULTS

- Over the 30-month period, **ACCESS** antibiotics use remained stable (13.0% to 13.6%, p=0.5). **WATCH** antibiotics use remained unchanged (76.7% to 77.6%, p=0.2) with significant increase in two of the hospitals (p=0.03 and p=0.002 respectively). In contrast, **RESERVE** antibiotics use showed a total decline from 10.3% to 8.8% (p=0.01), mostly driven by reduction in one hospital.
- In the pre- and post-intervention analysis, overall **ACCESS** antibiotics remained unchanged, except for RM5 with a notable 10.4% increase. **WATCH** antibiotics use increased overall by 6.9%, although institutional trends varied, with a substantial reduction in RM3 (10.8%), a moderate increase in RM1 (4.5%), and a marked rise in RM5 (16.1%). **RESERVE** antibiotics consumption showed an important overall decline by 7.9%, mostly in RM1 (4.3%) and RM5 (16.5%).

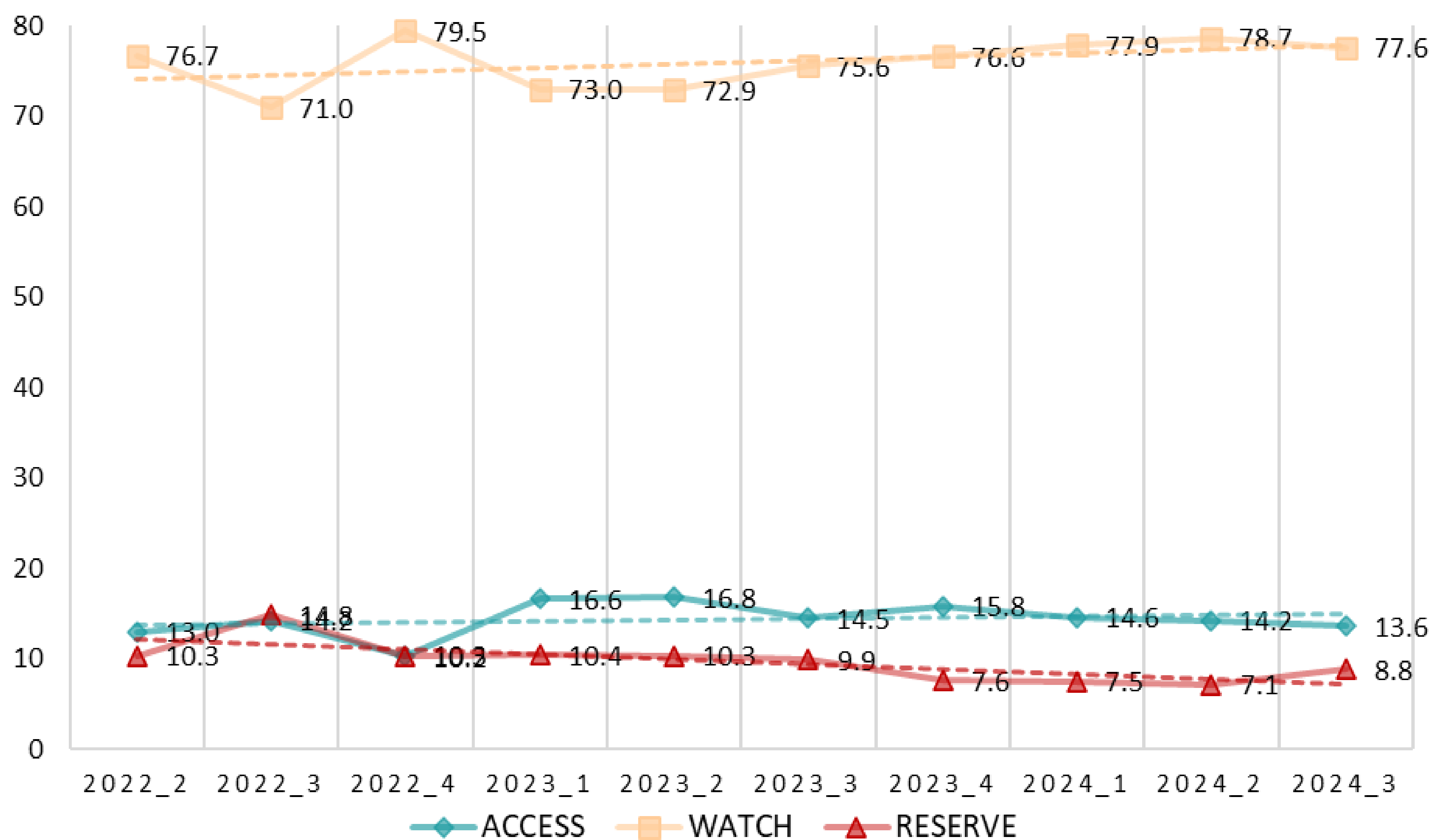


Figure 1: Temporal trends of antibiotic utilization across AWaRe categories in all hospitals, over the 30-month period.

Hospital	ACCESS start (%)	ACCESS end (%)	p	WATCH start (%)	WATCH end (%)	p	RESERVE start (%)	RESERVE end (%)	p
RM1	58.3	41.7	0.3	26.9	43.6	0.03	14.8	14.7	0.1
RM2	2.3	2.8	0.3	92.5	93.4	0.8	5	3.8	0.3
RM3	12.9	19.8	0.4	72.2	66.1	0.3	14.9	14.1	0.6
RM5	16.4	12.1	0.3	60.8	76.8	0.002	22.8	11.1	0.004
TOTAL	13.0	13.6	0.5	76.7	77.6	0.2	10.3	8.8	0.01

Table 1: Analysis of temporal trends in antibiotic utilization across AWaRe categories in each hospital and overall (all hospitals combined), over the 30-month period.

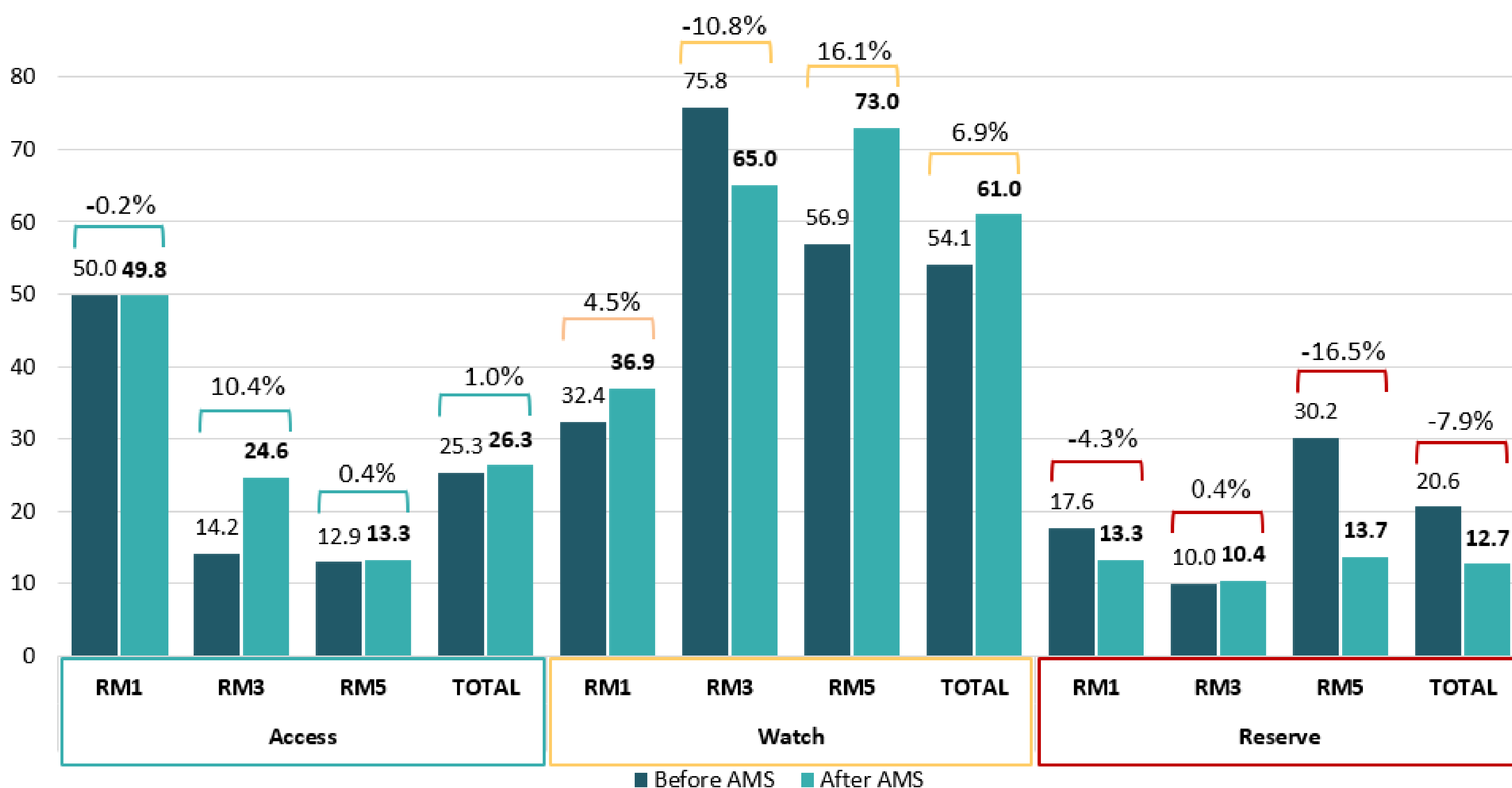


Figure 2: Comparison of antibiotic consumption across AWaRe categories before and after implementation of the first AMS bundle in each hospital.

CONCLUSIONS

- The overall trends showed a marked long-term reduction in **RESERVE** antibiotics use, while **ACCESS** and **WATCH** categories remained stable.
- After implementation of the AMS measures, **ACCESS** antibiotics use increased slightly, while increase in **WATCH** category overlaps with a decline in **RESERVE** agents.
- These differences may reflect variation in local prescribing practices, adherence to AMS recommendations, and specific epidemiological pressures.
- The findings demonstrate the impact of AMS interventions and emphasize the need for following optimization to better correlate with WHO targets.

ACKNOWLEDGEMENTS

REVERSE has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 965265. The content of this article reflects the authors views only and the European Commission is not responsible for any use that may be made of the information in this article.