

From restrictive antibiotic stewardship to a handshake model: early outcomes from the REVERSE Project in a tertiary Hospital in Northern Italy

A. Zaffagnini¹, A. Tedesco¹, G. Bertoli¹, F. Rizzolo¹, M. Soprana², C. Monaco², A. Albiero², P. Berloni², E. Bertocchi³, V. Montesor⁴, F. Postal⁵, A. Angheben¹, F. G. Gobbi¹

¹ Department of Infectious, Tropical Diseases & Microbiology, IRCCS Sacro Cuore Don Calabria Hospital, Negrar di Valpolicella, Verona, Italy.
² Division of General Medicine, IRCCS Sacro Cuore Don Calabria Hospital, Negrar di Valpolicella, Verona, Italy.
³ General Surgery Unit, IRCCS Sacro Cuore Don Calabria Hospital, Negrar di Valpolicella, Verona, Italy.
⁴ Service of Hospital Pharmacy, IRCCS Sacro Cuore Don Calabria Hospital, Negrar di Valpolicella, Verona, Italy.
⁵ IT Systems Services, IRCCS Sacro Cuore Don Calabria Hospital, Negrar di Valpolicella, Verona, Italy.

Background

Hospital-acquired infections (HAIs) caused by multidrug-resistant organisms (MDROs) remain a major public health concern and highlight the need to limit unnecessary antibiotic use. Antibiotic stewardship (ABS) is crucial to counter antimicrobial resistance (AMR).^{1,2}

Methods

REVERSE is an H2020-funded project designed to reduce AMR in high-prevalence hospital settings through the implementation of three bundled programs: microbiology and diagnostic stewardship, infection prevention and control, and ABS.



Figure 1. Reverse Project strategies

Regarding the ABS intervention, at the Hospital of Negrar (Verona), the restrictive pre-authorization ABS system was replaced with the REVERSE non-restrictive approach. The intervention included structured staff education with trained departmental champions, locally adapted guidelines, and regular audit and feedback. Updated prophylaxis protocols and printed empiric antibiotic guidelines were introduced in February and June 2025, respectively, followed by a digital app version in July 2025. The guidelines were tailored to the local epidemiology to ensure context-specific prescribing recommendations. The hospital's ABS program switched from the restrictive model to the post-authorization approach in July 2025. Audit and feedback activities—assessing a median of 40 patients per month—began in October 2024 and continued throughout the non-restrictive phase.

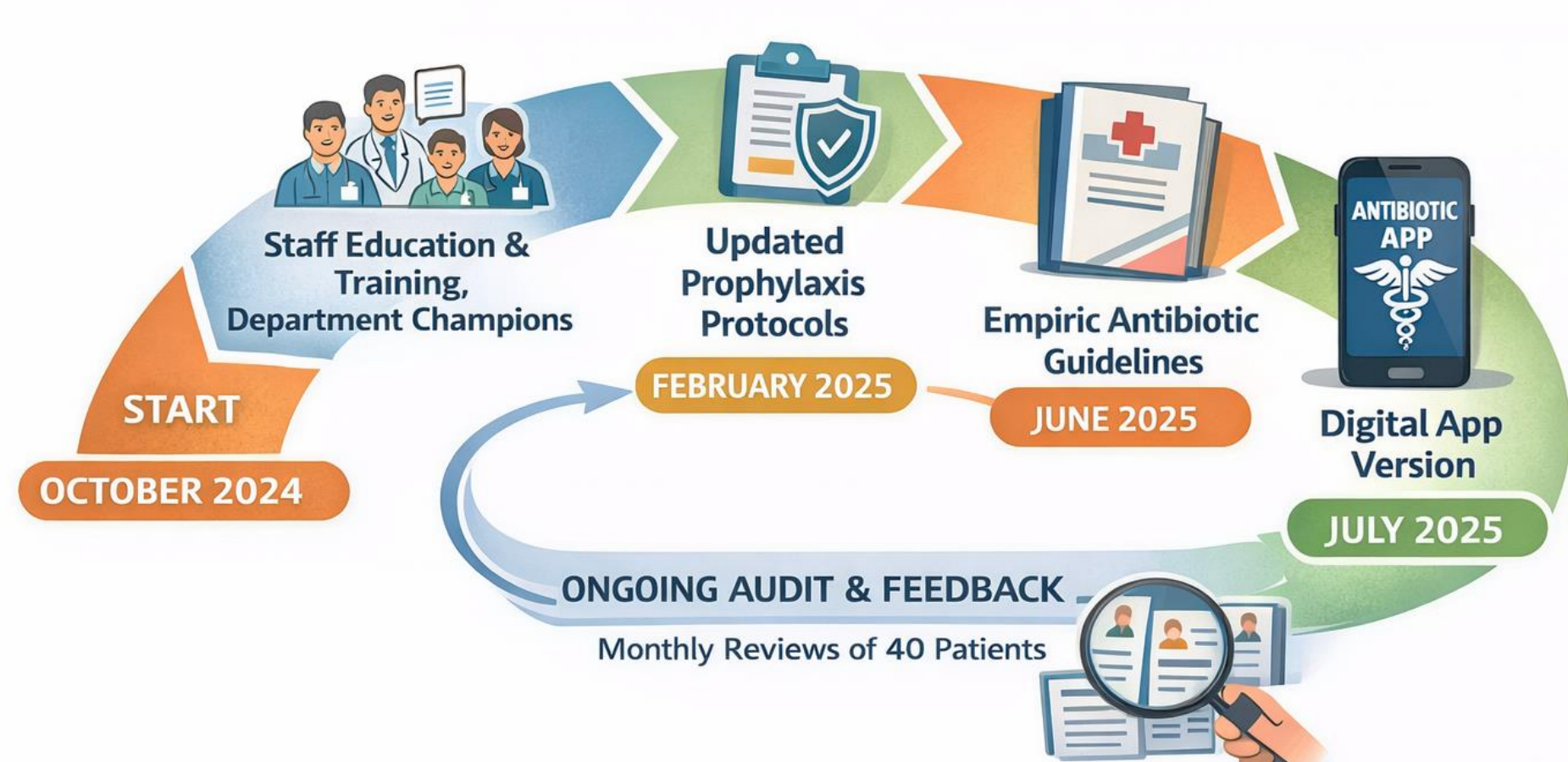


Figure 2. Study timeline

Results

In the medical unit, 28 audits covered 139 patients and 170 antibiotic therapies, while in the surgical departments 20 audits assessed 256 prophylaxis prescriptions. In the medical department overall appropriateness remained stable at approximately 75%, including during the handshake non-restrictive phase (Fig. 3).

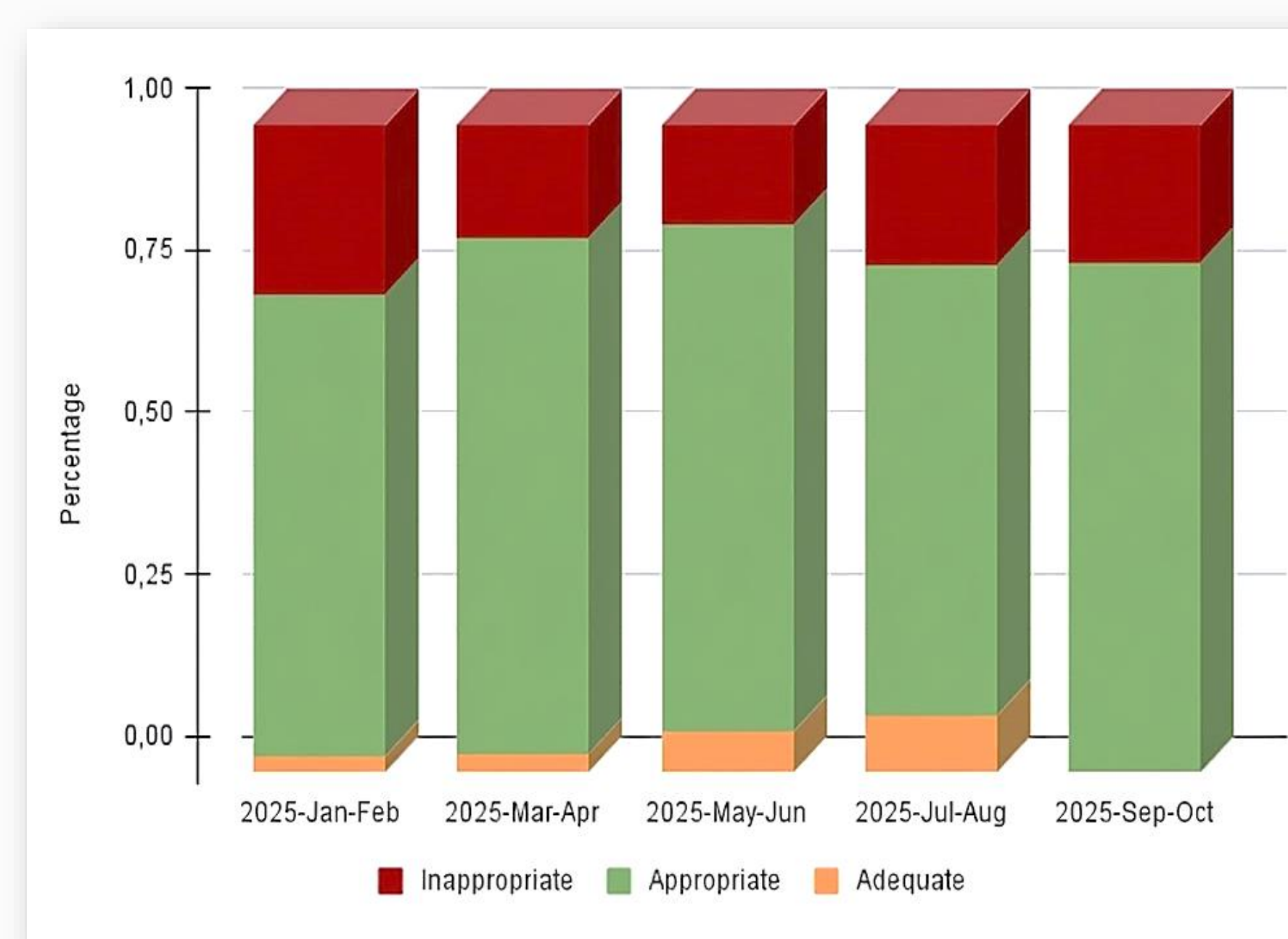


Figure 3. Antibiotic prescription appropriateness by two-month period (January–October 2025) in medical department

In the surgical departments, the revision of antibiotic prophylaxis protocols together with targeted educational meetings led to improved appropriateness, which was further strengthened through subsequent audit and feedback cycles (Fig. 4).

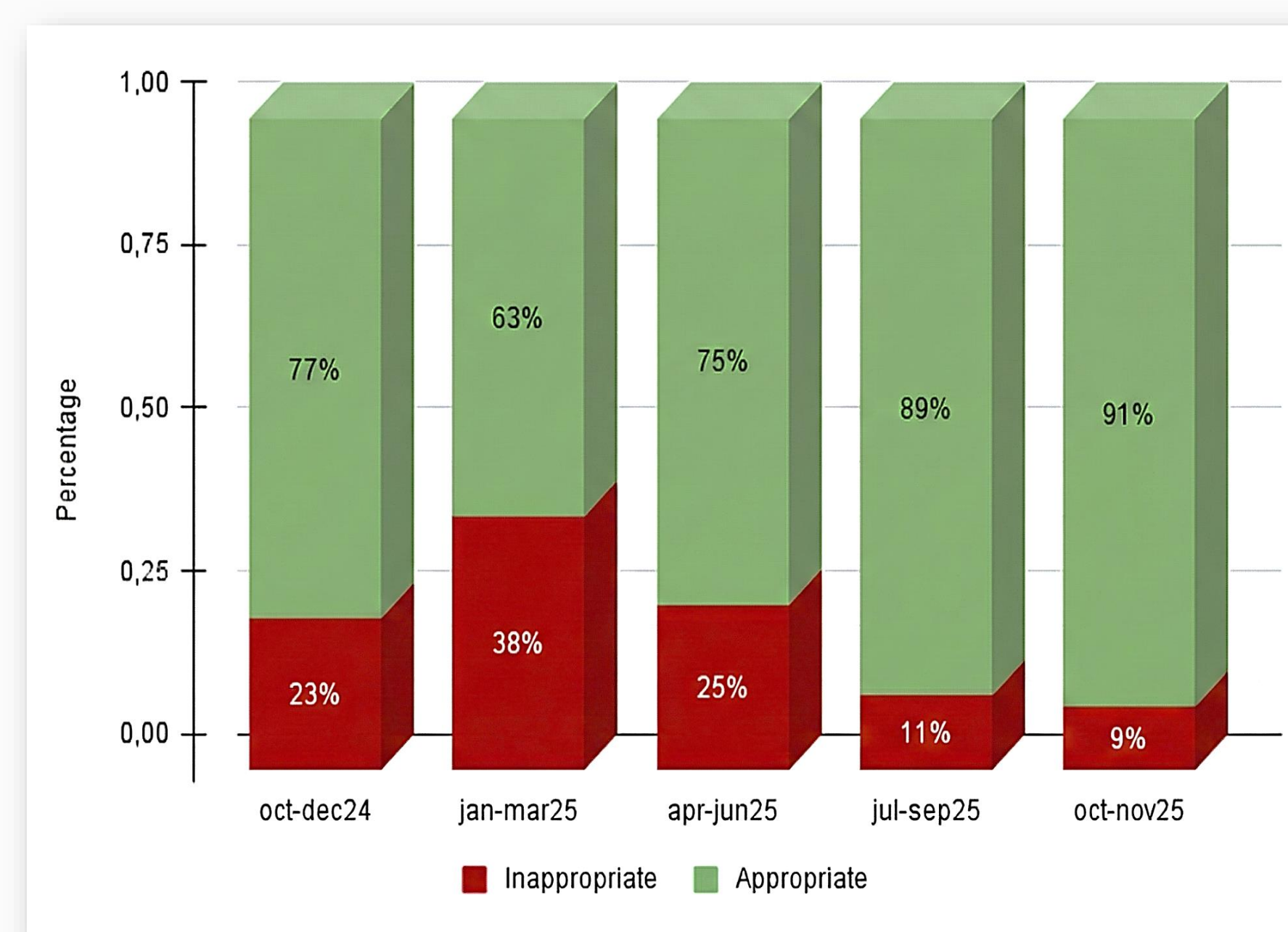


Figure 4. Surgical antibiotic prophylaxis appropriateness by three-month period (October 2024–November 2025)

As shown in Figure 5, prescriptions issued without infectious disease consultation increased from 29% during the restrictive phase to 50% in the post-authorization phase, without compromising appropriateness. Inappropriate prescriptions were mainly due to incorrect duration or indication.

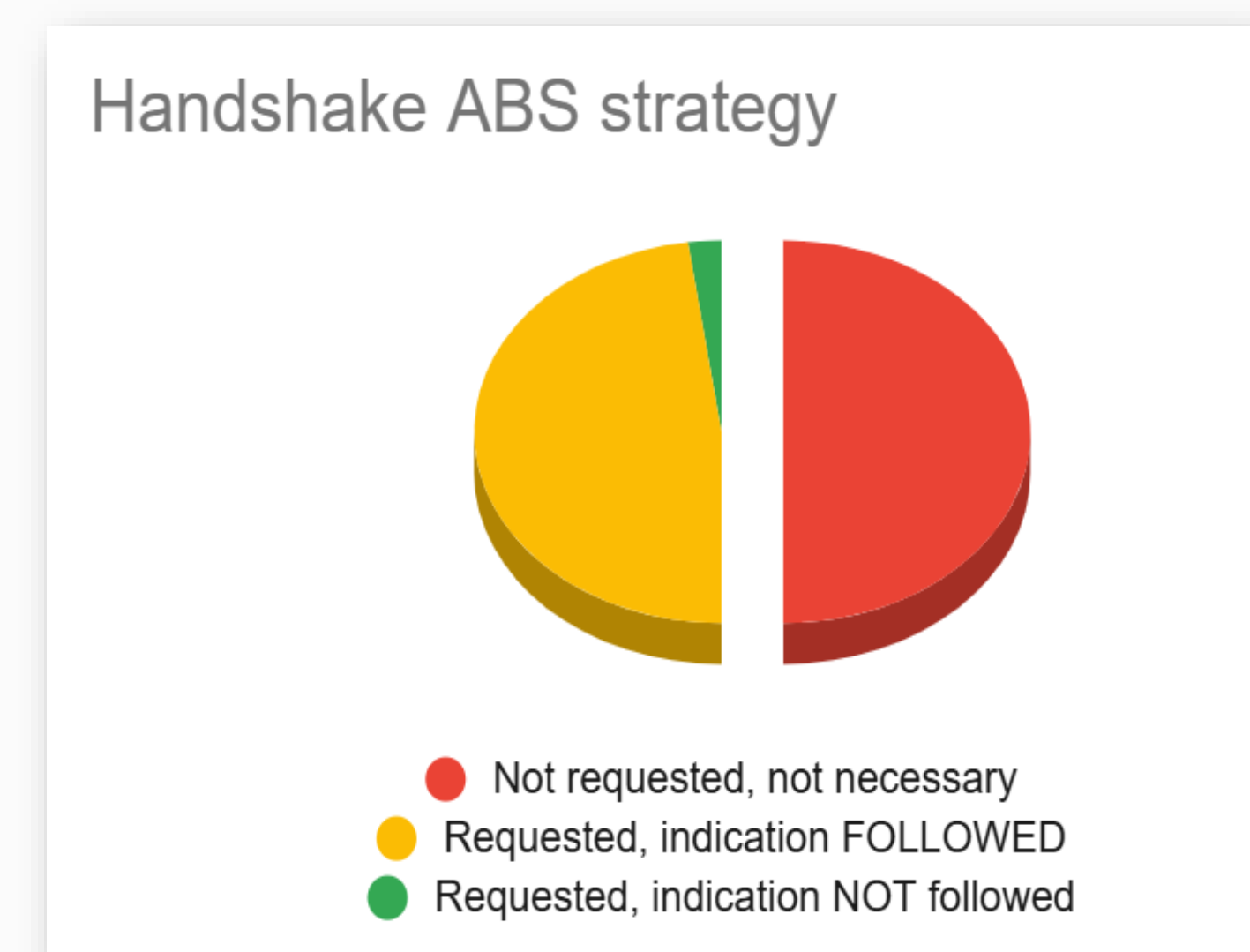
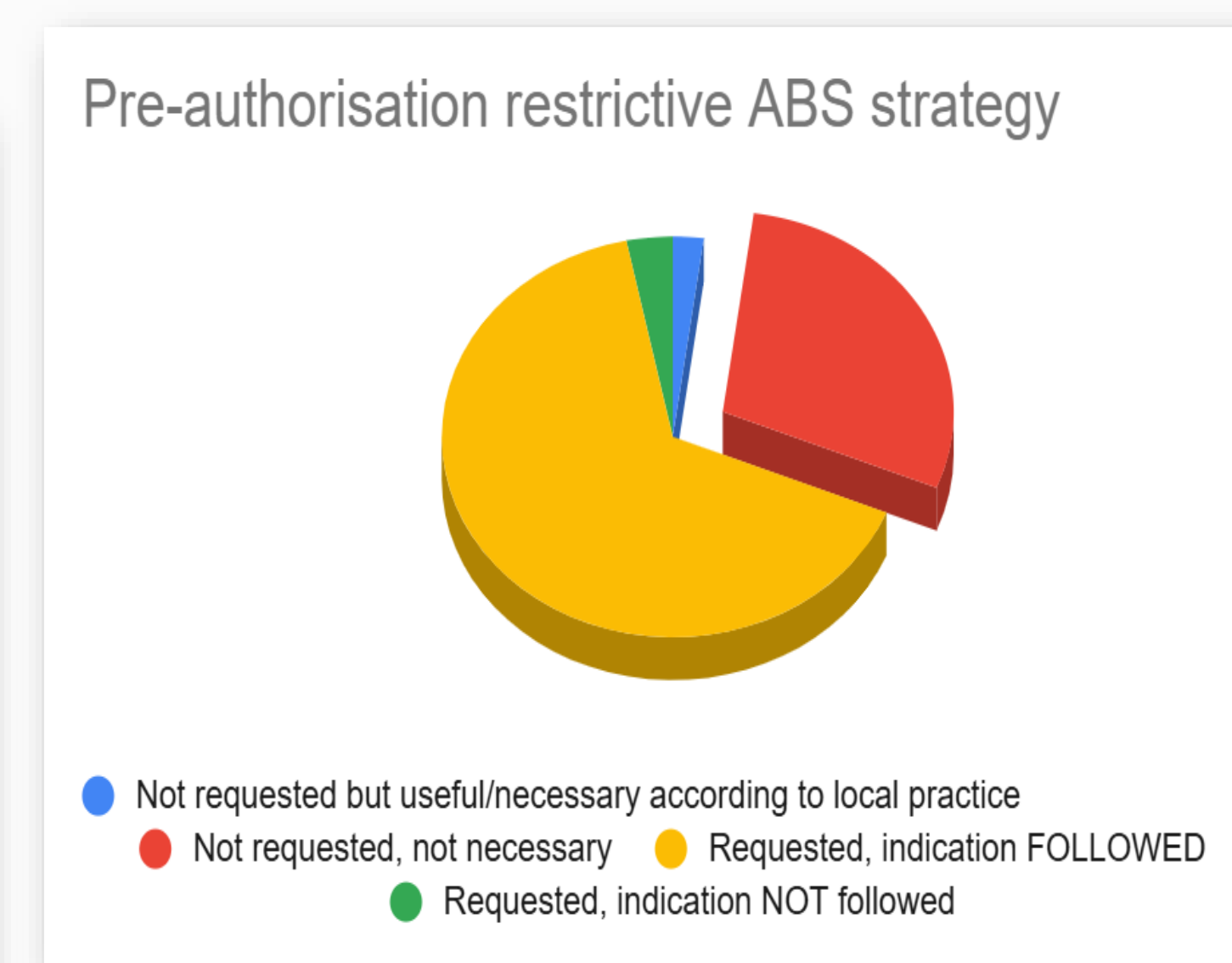


Figure 5. Comparison of adherence to indications and consultation dynamics between Restrictive and Handshake ABS strategies

Conclusions

Transitioning from a restrictive to a post-authorization ABS model, supported by education, local champions, guideline dissemination, and regular audit and feedback, maintained appropriate prescribing in medical departments and improved surgical prophylaxis practices. These findings support the effectiveness of a non-restrictive, education-based stewardship strategy in sustaining high prescribing quality while reducing reliance on restrictive measures.

References:

- World Health Organization. "WHO policy guidance on integrated antimicrobial stewardship activities." (2021).
- Zay Ya, Kyaw et al. "Association Between Antimicrobial Stewardship Programs and Antibiotic Use Globally: A Systematic Review and Meta-Analysis." *JAMA network open* vol. 6,2 e2253806. 1 Feb. 2023, doi:10.1001/jamanetworkopen.2022.53806