

## Time efficiency assessment of antimicrobial stewardship strategies

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To the Editor – We read with interest the recent manuscript in *Clinical Infectious Diseases* by Tamma et al that focused on the efficacy of different antimicrobial stewardship methods, demonstrating that post-prescription review with feedback (PPRF) was more effective at reducing antimicrobial consumption over time than pre-prescription authorisation [1]. The study was performed on medical inpatients, but hospitals contain many other cohorts, such as surgical inpatients, where antimicrobial use is also high and often inappropriate [2]. PPRF can take many forms but is invariably both human resource- and time-intensive. Many hospitals may lack the resources to initiate this level of stewardship universally [3,4], and therefore, there is a need to identify the form of PPRF that most efficiently impacts inappropriate antimicrobial prescribing [5,6].

We performed a prospective, observational study that compared different forms of PPRF: ward round reviews on acute medical wards, ward round reviews on surgical recovery wards and telephone reviews to clinical teams caring for patients receiving carbapenems, cephalosporines or quinolones. Each stewardship review episode was performed by 2 microbiologists and a pharmacist, who collected no more data than needed for routine practice and were not aware that the data would be used comparatively in the study. Each form of stewardship occurred daily for 45, 90 and 60 minutes respectively, and there was no overlap in the patients reviewed. All antimicrobial prescriptions reviewed were quantified and any intervention recorded, defined as a change to antimicrobial prescription, including starting or stopping a medicine, as well as modifying their duration or administration. For the purpose of comparison, we considered telephone stewardship to be the control group. We calculated both the proportion of reviews resulting in an intervention and the rate of intervention per hour of stewardship across each of the three stewardship modalities.

A total of 1,928 antimicrobial prescriptions were reviewed. Both surgical (37.24%) and medical (9.35%) stewardship ward rounds resulted in a significantly higher proportion of interventions

compared to telephone reviews (4.34%) (Table 1). However, after controlling for time, the rate of interventions per hour was higher for medical stewardship rounds (2.26 interventions/hour) compared to both surgical rounds (1.70 interventions/hour) and telephone rounds (0.48 interventions/hour) (Table 1).

In conclusion, our study supports the observations made by Tamma et al that hospital ward based PPRF, though resource intensive, is an effective form of antimicrobial stewardship. We extend their findings by raising the importance of time efficiency, demonstrating that whilst surgical patient stewardship rounds result in a high absolute number and proportion of interventions, they are labour intensive and that medical ward rounds resulted in a similar number of interventions per hour of stewardship time. Both approaches were significantly better than telephone stewardship in terms of both the proportion and rate of stewardship interventions. We propose that other hospitals looking to assess and prioritise the impact of their stewardship programs should also incorporate a standardised time-based measure of stewardship efficiency.

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**Table 1:** Number and proportion of stewardship interventions.

Stewardship Approach	Number of Prescriptions Reviewed	Stewardship Interventions		Rate of Intervention per hour of Stewardship (95% CI)	Hazard Ratio* (95% CI)
		n (%)	Odds Ratio* (95% CI)		
Telephone	691	30 (4.34%)	–	0.48 (0.34 – 0.69)	–
Medical Round	802	75 (9.35%)	2.27 (1.46-3.52)	2.26 (1.8 – 2.83)	4.69 (3.07 – 7.17)
Surgical Round	435	162 (37.24%)	13.07 (8.64 – 19.79)	1.70 (1.36 – 1.98)	3.53 (2.39 – 5.21)