

A CLUSTER RANDOMIZED TRIAL OF TWO STRATEGIES TO IMPROVE ANTIBIOTIC USE IN PATIENTS WITH COMPLICATED URINARY TRACT INFECTIONS

Veroniek Spoorenberg¹, Marlies E.J.L. Hulscher², Ronald B. Geskus³, Theo M. de Reijke⁴, Brent C. Opmeer⁵, Jan M. Prins¹ and Suzanne E. Geerlings¹

1. Dep. of Internal Medicine, Div. of Infectious Diseases, Centre for Infection and Immunity Amsterdam, Academic Medical Centre (AMC), the Netherlands. 2. Scientific Institute for Quality of Healthcare, Radboud University Nijmegen Medical Center, the Netherlands. 3. Department of Clinical Epidemiology, Biostatistics and Bioinformatics, AMC, Amsterdam, The Netherlands. 4. Department of Urology, AMC, Amsterdam, The Netherlands. 5. Clinical Research Unit, AMC, Amsterdam, The Netherlands

E-mail: v.spoorenberg@amc.nl

Aim

Up to 50% of hospital antibiotic use is inappropriate and therefore improvement strategies are urgently needed. We compared the effectiveness of two strategies to improve antibiotic use in patients with complicated urinary tract infections (UTIs):

1. A Multi-faceted strategy, including feedback, educational sessions, reminders and additional/optional improvement actions (figure 1b).
2. A Competitive feedback strategy, i.e. providing professionals with non-anonymous feedback on the departments' appropriate antibiotic use (figure 1b). Additionally, we explored whether the degree of compliance to the different strategies was associated with successful improvement.

Patients and Methods

We conducted a multicentre, cluster-randomized trial among 19 university and non-university hospitals (departments Internal Medicine and Urology) located throughout the Netherlands. Hospitals were allocated to one of the strategies. A baseline- and a post-intervention measurement were performed in 50 patients per department (figure 1a).

Principal outcome measures were nine validated guideline-based quality indicators (QIs) to define appropriate antibiotic use in patients with complicated UTIs. Data were extracted from medical charts. Effects were quantified via regression models. Clustering at department and hospital level was taken into account through inclusion of random effects.

Total Set of Quality Indicators*

1. Perform a urine culture before starting treatment
2. Prescribe empirical therapy according to national guideline
3. Switch from intravenous to oral treatment < 72 hours
4. Tailor antibiotic treatment on the basis of culture results
6. Duration of antibiotic therapy should be at least 10 days
7. Treat UTI in men according to national guideline

* Three QIs (no 5, 8 and 9) were excluded from analyses, because of too small sample size

Results

Figure 1a: Study design and participants

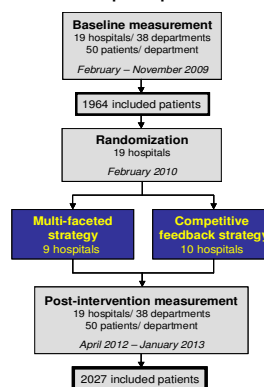
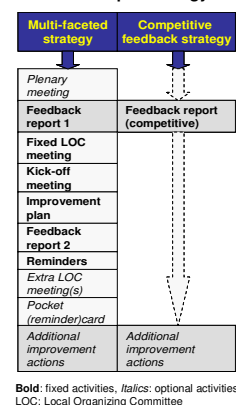


Figure 1b: Improvement activities per strategy



For the total study population, performance scores on the QIs (including the total QI set performance) showed an improving trend from baseline- to post-intervention measurement, but no significant differences were found between both strategies (table 1).

A better compliance to the competitive feedback strategy was associated with successful improvement (figure 2).

Figure 2: Degree of compliance and improvement

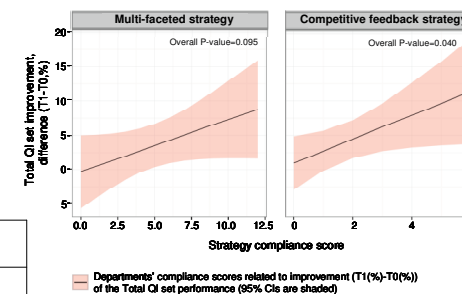


Table 1: Performance of QIs before (T0) and after intervention (T1)

nr	Quality indicator	Multi-faceted strategy			Competitive feedback strategy			Odds ratio (95% CI)	P
		T0 n=923	T1 n=963	change % P	T0 n=1041	T1 n=1064	change % P		
1	Perform a urine culture, n (%)	669/922 72.6	769/961 80.0	+ 7.4 0.01	800/1040 76.9	888/1064 83.5	+ 6.6 0.008	0.99 (0.64-1.55)	0.98
2	Prescribe according to national guideline, n (%)	447/679 65.8	450/670 67.2	+ 1.4 0.83	531/786 67.6	498/703 70.8	+ 3.2 0.32	0.89 (0.59-1.35)	0.59
3	Switch from i.v. to oral therapy within 72 h, n (%)	127/243 52.3	124/251 49.4	- 2.9 0.47	177/317 55.8	170/282 60.3	+ 4.5 0.48	0.68 (0.32-1.44)	0.31
4	Tailor antibiotic treatment based on culture result, n (%)	390/513 76.0	438/549 79.8	+ 3.8 0.46	480/648 74.1	535/661 80.9	+ 6.8 0.03	0.81 (0.51-1.28)	0.36
6	Treatment duration should be at least 10 days, n (%)	396/720 55.0	418/761 54.9	- 0.1 0.78	444/833 53.3	469/882 53.2	- 0.1 0.97	1.04 (0.71-1.51)	0.86
7	Treat UTI in men according to national guideline, n (%)	156/434 35.9	172/441 39.0	+ 3.1 0.23	160/482 33.2	202/527 38.3	+ 5.1 0.047	0.90 (0.61-1.34)	0.62
	Total QI set performance (0-100%), mean	59.1	63.7	+4.6 0.043	61.6	65.4	+ 3.8 0.010		0.77

Conclusion

- Effectiveness of both improvement strategies seems comparable, with a non-significant trend favouring the competitive feedback strategy.
- A better compliance was associated with successful improvement.