Analysis of re-prescribing of antibiotics used for urinary tract infection in the community using national information

Authors

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Background

Lower urinary tract infection (UTI) is common, particularly in women, and is the second most common reason for antibiotic use in the community[1].Initial antibiotic treatment is usually empirical and in Scotland *E. Coli* is the most frequent cause of UTI. National guidance recommends a 3-day course of trimethoprim or nitrofurantoin for non-pregnant women of any age with acute lower UTI[2,3].

Antibiotic susceptibility has been stable over the last 5 years although non-susceptibility to trimethoprim remained high at 36.7%. The majority (97.3%) of isolates remain susceptible to nitrofurantoin[4]. However samples submitted to microbiology departments will be biased towards resistance as samples may only be submitted in complicated cases or where patients have failed on empirical treatment.

A meta-analysis published in 2015 reported 3-day courses of nitrofurantoin had lower clinical efficacy than longer courses[5] and this observation had been reported anecdotally by some prescribers in Scotland.

Objectives

To identify the proportion of adult women who received a prescription for nitrofurantoin or trimethoprim returning for a further course of antibiotics within 7 days of completion of the initial course.

To determine if adult women who receive 3-day courses had more repeat courses than those who receive 5 or 7-day courses of nitrofurantoin or trimethoprim.

Methods

Records from the Prescribing Information System (PIS) E-messaging were linked to SMR-01 data to:

- identify females aged ≥16years with a community prescription for nitrofurantoin 50mg tablets/capsules or 100mg modified release capsules or trimethoprim 200mg tablets from 1 January to 31 December 2016
- split the cohort into three groups: 3; 5; and 7-day courses on the basis of the quantity of tablets supplied
- exclude patients who had antibiotics prescribed or a hospital admission in the previous 90 days.

The outcome of interest was the proportion of individuals who received a further prescription for one of the following antibiotics within 7 days of the date of completion of the initial antibiotic course: cefaclor, cefalexin, ciprofloxacin, co-amoxiclav, fosfomycin, methenamine hippurate, nitrofurantoin, norfloxacin, ofloxacin, pivmecillinam, trimethoprim.

Logistic regression was used to test the effect of course length on treatment success. Age group; Charlson score (prior 5 years); number of medicines by BNF paragraphs prescribed in prior 12 months; care home status and exposure to antibiotics (DDDs) in the prior 12 months were used as additional predictors.

Results

Within the study period 144,004 (61.8%) of 233,248 patients met the inclusion criteria: 35,387 (24.6%) were prescribed nitrofurantoin and 108,617 (75.4%) were prescribed trimethoprim. The number of patients included was similar across all age groups. Only 1% of patients were care home residents. Around half of patients had an unknown Charlson score and 40% had a score of zero.

In females who received trimethoprim 92.8% did not have a further prescription for UTI antibiotics within 7 days of the end of the initial course. In those receiving nitrofurantoin 94.2% had no further UTI antibiotics prescribed within 7 days (Table 1).

Table 1 Number (%) of patient prescribed trimethoprim and nitrofurantoin that returned within 7 days for a further prescription.

Antibiotic	Total Number (%)	No repeat antibiotic within 7 days Number (%)	Repeated antibiotic within 7 days Number (%)
Trimethoprim	108617	100820 (92.8%)	7797 (7.2%)
Nitrofurantoin	35387	33276 (94.2%)	2111 (5.8%)

After adjusting for other factors 3-day courses of trimethoprim were not associated with an increased rate of re-prescribing compared to 5 or 7-days. Seven day courses were associated with a statistically significant increase in repeat antibiotics compared to 3-day course (Figure 1).

In those who received nitrofurantoin after adjusting for other factors the re-prescribing rate in those who received 3-day courses (6.5%) was higher than those who received 5-day courses (5.3%) and 7-day courses (5.2%; Figure 2).

Fig. 1 Trimethoprim: re-prescribing rate for 3, 5 and 7-day courses

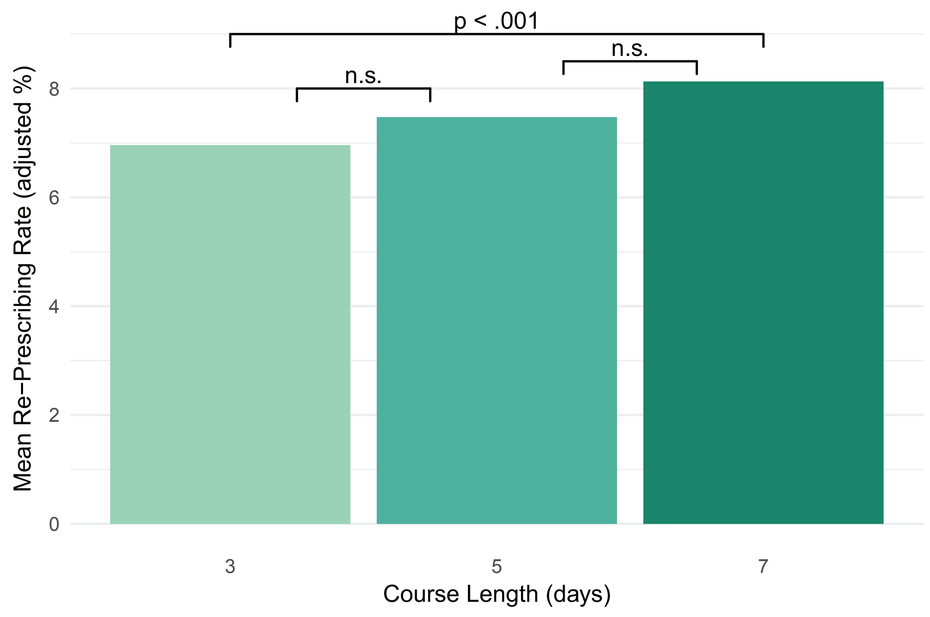
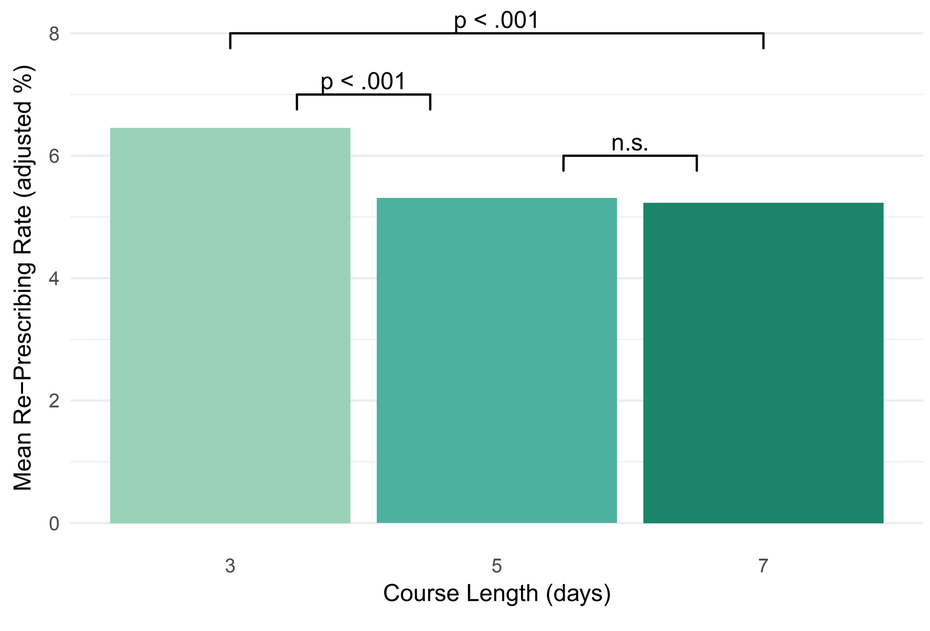


Fig. 2 Nitrofurantoin: re-prescribing rate for 3, 5 and 7-day courses



Discussion

This study using routine national data indicates that despite the reported high levels of trimethoprim non-susceptibility in *E. Coli* in urine isolates only 7.2% of adult females returned within 7 days of the date of completion of the course for a further prescription for a UTI antibiotic. Moreover only 5.8% of females who received nitrofurantoin had a further UTI antibiotic within 7 days.

Three day courses of nitrofurantoin but not trimethoprim were associated with higher rates of repeat antibiotic prescribing compared to 5 or 7-day courses. However the absolute difference was low.

Conclusion

These data should provide reassurance to clinicians that trimethoprim and nitrofurantoin remain appropriate first choice empirical antibiotics in females aged ≥16years with symptoms of simple uncomplicated lower urinary tract infection.

References

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