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Abstract (oral session)

Variation in strain-specific incidence of Clostridium difficile in Oxfordshire inpatients

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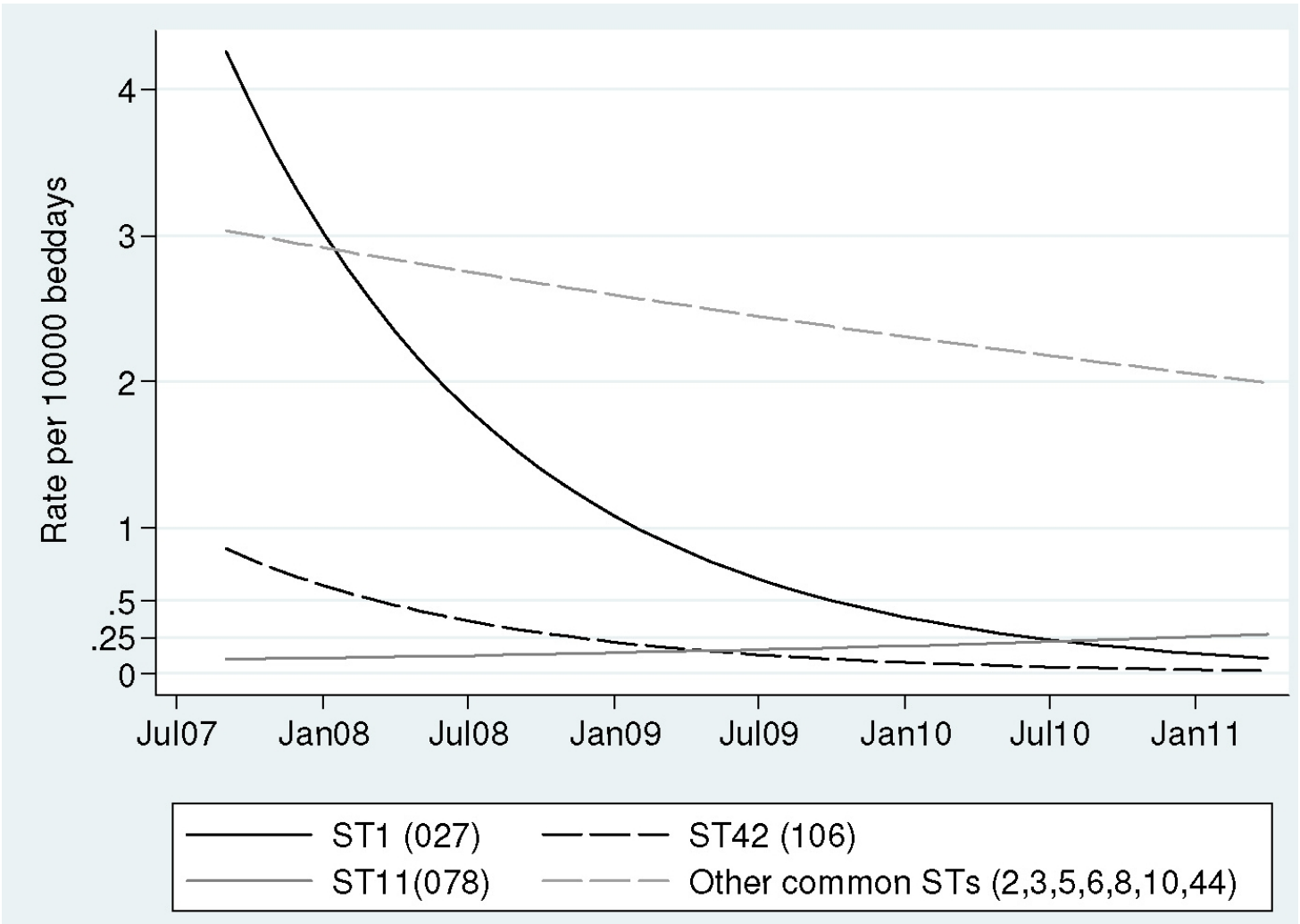
Objective: To compare incidence of C. difficile infection (CDI) in inpatients in the Oxford University Hospitals (OUH) Trust according to strain determined by multi-locus sequencing typing (MLST). Methods: From September 2007 to April 2011 inclusive, toxin enzyme immunoassay (EIA) positive samples from routine clinical testing of Oxfordshire patients with CDI underwent culture and MLST (97% of all EIA-positives retrieved for culture). Incidence per 10000 bed-days (excluding repeat positives within 14 days) was calculated over calendar time for EIA-positive culture-positive CDI and for the 10 most common strains, and compared across strains using stacked negative binomial regression with natural cubic splines to reflect non-linear calendar trends. Results: Over the study period, incidence of EIA-positive culture-positive CDI declined from 9.4 per 10000 bed-days in Q4 2007 to 2.9 in Q1 2011 (per-annum decline (incidence rate ratio) 22%, 95% CI 18-27%). Of 943 EIA-positive culture-positive CDI in OUH inpatients, the 10 most common sequence types (STs) were 179 (19%) ST1 (PCR-ribotype 027), 81 (9%) ST2 (ribotypes 014/020), 81 (9%) ST8 (ribotype 002), 60 (6%) ST6 (ribotype 005), 50 (5%) ST3 (ribotypes 001/072), 44 (5%) ST44 (ribotype 015), 40 (4%) ST5 (ribotype 023), 36 (4%) ST42 (ribotype 106), 34 (4%) ST10 (also ribotype 015) and 27 (3%) ST11 (ribotype 078) (311 (33%) other less common STs). In Q4 2007, ST1 and ST42 accounted for 36 (36%) and 8 (8%) of the 98 CDI - but neither ST was observed in 16 CDI in Q1 2011, and they accounted for only 11 (8%) and 2 (2%) of the 133 CDI during 2010, per-annum declines of 65% (95% CI 58-71%) and 64% (95% CI 48-75%) respectively over the study period. Other STs apart from ST11 also declined over the study period, but at a significantly slower rate than ST1 and ST42 (12% pa (95% CI 3-18%): $p<0.0001$ vs ST1/ST42). In contrast, there was marginal evidence that ST11 was not declining in the same way as other common STs, but instead increasing, with an estimated annual increase in incidence of 32% (95% CI 10% decrease to 95% increase; $p=0.045$ vs other STs, $p<0.0001$ vs ST1/ST42), although to an absolute level which still remained relatively low. Conclusion: Declines in CDI in Oxfordshire inpatients were driven by declines in ST1 and ST42 suggesting that these may have been particularly susceptible to hospital-based interventions. ST11 (PCR-ribotype 078) may be increasing in Oxfordshire.


Rate per 10000 beddays
4
3
2
1
.5
.25
0
Jul07
Jan08
Jul08
Jan09
Jul09
Jan10
Jul10
Jan11
ST1 (027)
ST42 (106)
ST11(078)
Other common STs (2,3,5,6,8,10,44)