

Antibiotic use in the community predicts the number of severe bacterial infections

Martha MC Elwenspoek^{1,2}, Tim Jones^{1,2}, Penny Whiting^{1,2}

1. The National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care West (NIHR CLAHRC West), University Hospitals Bristol NHS Foundation Trust, Bristol, UK. 2. Population Health Sciences, Bristol Medical School, University of Bristol, Bristol, UK

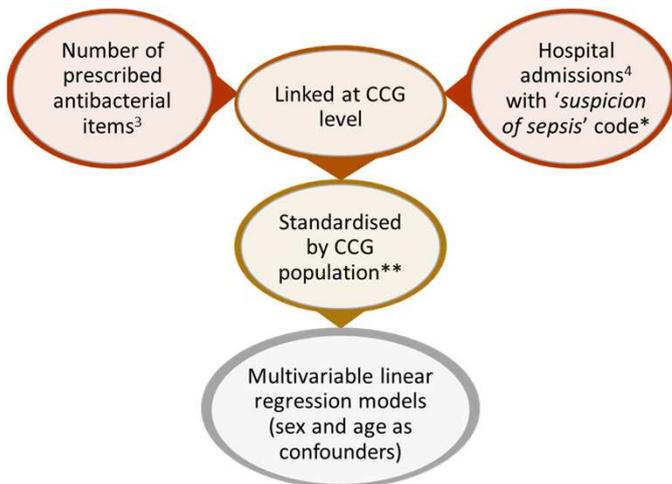
Background

Antibiotic use is one of the main drivers of antibiotic resistance and the large majority (75%) of antibiotics used in healthcare are prescribed in the community. Because multidrug resistant infections are harder to treat, they lead to longer hospital stays, higher medical costs, and increased mortality. A sustained decrease in community antibiotics prescribing rates for respiratory tract infections has been associated with a smaller corresponding increase in hospital admission rates for respiratory tract infections.¹ There is a 2-fold variation in total antibiotic prescribing between the highest and lowest prescribing clinical commissioning group (CCG).²

Research Question

Does previous antibiotic use in the community predict the number of bacterial infections requiring hospital admission?

Design and Methodology

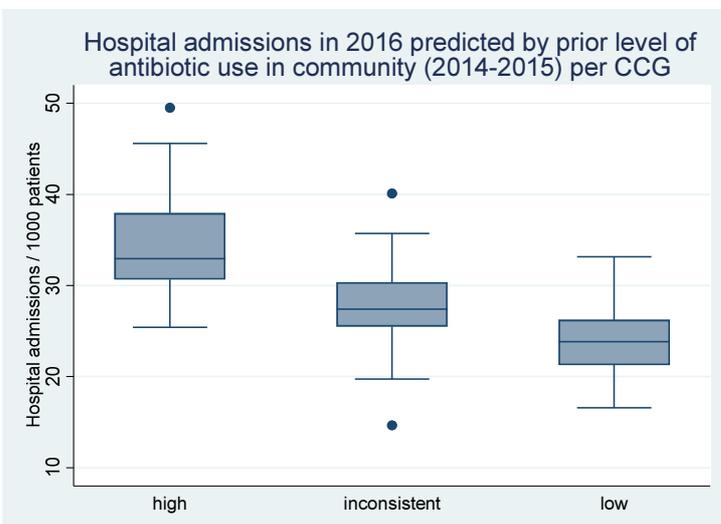


* SOS code list containing 'all codes known to be infective bacterial pathogens, requiring treatment with antibiotics, and specific codes for sepsis'.⁵

**Using the Office of National Statistics mid-2015 population estimated for England

Results (1)

Initial analysis showed clear differences in hospital admissions when dividing CCGs by prescribing level (see Figure below).

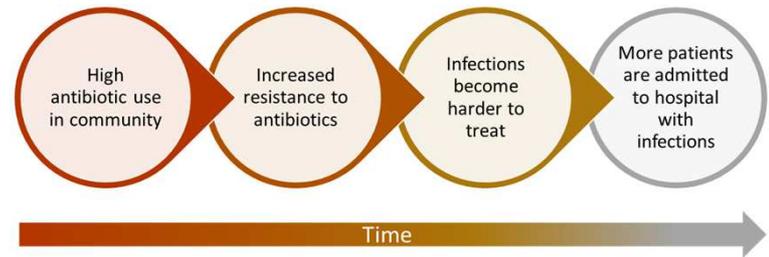


High: consistently above national median between 2014-2015

Inconsistent: both below and above national median between 2014-2015

Low: consistently below national median between 2014-2015

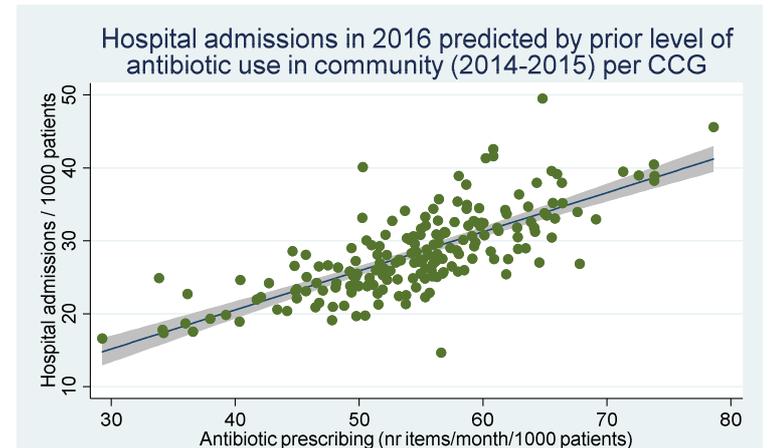
Hypothesis



Results (2)

Lower respiratory infection including pneumonia (30%), urinary tract infection (13%), and lower respiratory infection (8.4%) were the most common reasons for hospital admission.

Linear regression analysis showed an increase of 0.54 hospital admissions per 1000 patients with every antibacterial item prescribed on average per month per 1000 patients in the two years prior (0.54, 95% confidence interval 0.47, 0.61, $p < 0.001$, see Figure below). Adjusting for proportion of males and people above 75 years old per CCG did not affect this association.



Limitations

These results should be interpreted with caution as data were aggregated to CCG level and the ability to adjust for confounding was therefore limited. Some of the variation between CCGs may also be due to differences in hospital admission policies, socioeconomic status, and inclination of GPs to refer patients to hospital.

Implications

Higher level of antibiotic use in the community predicts higher incidence of bacterial infections that are serious enough to require hospital admission, possibly due to increased antibiotic resistance in these regions. Thus, reducing unnecessary antibiotic prescriptions at CCG level may reduce serious infections in patients and save hospital costs in the immediate future.

References

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3. OpenPrescribing.net, EBM DataLab, University of Oxford, 2019
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Contact information

- martha.elwenspoek@bristol.ac.uk
- Twitter: @CLAHRC_West
- Website: clahrc-west.nihr.ac.uk