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Reducing antibiotic use in primary care may be insufficient alone to curtail antimicrobial resistance

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Summary: Strategies to reduce antibiotic prescribing in primary care are insufficient alone to halt the rise in drug resistant *E. coli* infections in England, a new report concludes.

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FULL STORY

Strategies to reduce antibiotic prescribing in primary care are insufficient alone to halt the rise in drug resistant *E. coli* infections in England, a new report concludes.

The first evaluation of NHS England's Quality Premium intervention on antimicrobial resistance (AMR) is published in *The Lancet Infectious Diseases*. The Quality Premium scheme was introduced in 2015 and rewarded groups of general practitioners (GPs) for improvements in quality of care, including reducing inappropriate antibiotic prescribing in primary care.

Led by researchers at Imperial College London, the new report finds that while the intervention achieved a downward step change in antibiotic prescribing, it only led to a modest reduction in antibiotic resistant infections from *Escherichia coli* (*E. coli*). The study's authors conclude that a single intervention in one sector is not enough; a more radical, multi-sectoral approach is needed to tackle the growing threat of AMR.

AMR is a substantial and growing health issue, which globally causes around 700,000 deaths a year. *E. coli* is of particular concern because of its widespread resistance to antibiotics. It is the most common drug resistant infection, and in the UK more than half of drug-resistant bacterial blood stream infections, which can lead to sepsis, are caused by *E. coli*.

Antibiotic use in primary care is associated with increased risk of antimicrobial resistant infection and reducing antibiotic prescribing in this setting has been a cornerstone of antibiotic stewardship activity globally. In England over 70 per cent of antibiotics are prescribed in primary care, and many are considered inappropriate. This increases the chances of bacteria evolving and becoming resistant, so initiatives have tried to educate and persuade prescribers of antibiotics to follow evidence-based prescribing.

The Global Digital Health unit team at Imperial College London, led by Dr Céire Costelloe, and colleagues linked data from 6,882 English general practices with Public Health England's (PHE) national surveillance of bacterial infections over the six-year period from January 2013 to December 2018 when the NHS Quality Premium was in operation. They looked at prescribing of the five most common antibiotics and examined resistance trends in *E. coli* infections, before and after the implementation of the intervention.

Dr Céire Costelloe, Reader and Director of the Global Digital Health Unit at Imperial College London says: "We found that although the NHS England Quality Premium on AMR succeeded in reducing broad spectrum antibiotic prescribing, resistance among *E coli* causing bacteraemia remains on an upward trajectory, despite an initial attenuation. This highlights the fact that a single intervention alone is not enough to tackle the growing threat of AMR.

"A multifactor, multisectoral, collaborative and global approach is needed, taking into consideration antibiotic use across the entire healthcare economy, in combination with a wider, 'One Health' approach, which involves efforts that work nationally and globally to improve health for people, animals and the environment."

GP practices in England prescribed an average of 207 broad-spectrum antibiotic items per 100,000 patients per month before implementation of the Quality premium. A 13 per cent reduction in prescribing rate was observed immediately following implementation of the Quality Premium, which corresponds to a reduction of 26 items per 100,000 patients in the English population. This effect was sustained such that by the end of the study period there was a 57 per cent reduction in rate of antibiotic prescribing observed, compared to predicted rates if the intervention had not occurred.

In the lead up to the implementation of the Quality Premium, a monthly average of 275 resistant *E.Coli* isolates, per 1000 isolates tested against broad-spectrum antibiotics, were reported to Public Health England. A 5 per cent reduction in resistance rate was observed immediately following the implementation of the Quality Premium, which corresponds to a reduction of 14 resistant *E.Coli* isolates per 1000 isolates tested. Although this reduction was sustained until the end of the study period, *E.Coli* resistance remains on an upward, albeit slower, trajectory.

Co-author Shirin Aliabadi, a research postgraduate in the Global Digital Health unit at Imperial College London, and NHS Pharmacist says: "Antimicrobial resistance is predicted to kill 10 million people per year by 2050. Naturally, the nation's efforts and resources have shifted to responding to the ongoing COVID-19 crisis but our findings suggest that we must nevertheless consider the growing threat of antimicrobial resistance, which can be viewed as a silent pandemic."

Co-author Professor Azeem Majeed, GP, and Head of the Department of Primary Care and Public Health, Imperial College London, says: "My colleagues in primary health settings have done the right thing and responded to the focus on their prescribing of antibiotics, but to combat the devastating impacts of antimicrobial resistance, we need global, coordinated efforts and new drugs to treat resistant infections. If the COVID-19 pandemic has taught us anything, it is that we can move fast in the face of large-scale epidemics. If we apply some of the recent lessons learned and work together, we can achieve a great deal in a short time. I hope this is possible."

Story Source:

Materials provided by **Imperial College London**. Original written by Maxine Myers. *Note: Content may be edited for style and length.*

Journal Reference:

1. Shirin Aliabadi, Philip Anyanwu, Elizabeth Beech, Elita Jauneikaite, Peter Wilson, Russell Hope, Azeem Majeed, Berit Muller-Pebody, Céire Costelloe. **Effect of antibiotic stewardship interventions in primary care on antimicrobial resistance of Escherichia coli bacteraemia in England (2013–18): a quasi-experimental, ecological, data linkage study.** *The Lancet Infectious Diseases*, 2021; DOI: 10.1016/S1473-3099(21)00069-4

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