

Tax on antibiotics could help tackle threat of drug resistance, says study

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Taxing certain antibiotics could help efforts to tackle the escalating threat of antibiotic resistance in humans, according to a new study by the University of East Anglia's Centre for Competition Policy,

Loughborough University and E.CA Economics.

Antimicrobial resistance (AMR) poses a significant global risk, causing an estimated 700,000 deaths annually. A [key AMR report](#) previously warned that if unchecked, it could endanger 10 million lives a year and result in \$100 trillion in lost [economic output](#) by 2050.

Human use of antibiotics is the primary driver of AMR, with the majority in the UK prescribed via GPs. Classified as narrow or broad-spectrum, narrow-spectrum drugs target specific bacteria, helping slow AMR but require knowing the organism causing the infection. Broad-spectrum antibiotics are used more generally when the organism is unknown, exacerbating AMR.

The UK government report, published in 2016, recommended testing for pathogens before prescribing and using narrow-spectrum drugs when appropriate, with costly or time-consuming testing leading to overprescribing of broad-spectrum antibiotics and contributing to AMR levels.

In this new study, economists examined the feasibility of taxing GP surgeries for using particular broad-spectrum drugs—the idea being that when they prescribe them, the amount charged to their drug budget would be higher by the amount of the tax.

Writing in the *International Journal of Industrial Organization*, the researchers argue that because GPs can choose which drug to prescribe, this could encourage greater use of narrow-spectrum drugs as well as aim to reduce testing time and costs. It could also potentially help manage the demand for antibiotics by adjusting the relative pricing of the drugs.

Co-author Prof. Farasat Bokhari, previously of UEA's School of Economics and now at Loughborough University, said, "Antibiotic

resistance is an important issue and a priority for UK health policy. It's possibly the next ticking time bomb in the health care system.

"In our analysis, the financial burden of the tax is not on the patients but rather on the GP practices who may be overprescribing in some cases. Our findings show that switching from broad to narrow-spectrum is possible via changes in relative prices brought about via taxation, but it has implications—in terms of the total cost to society. While the alternative tax regimes we consider differ in how much demand will shift, our estimates suggest that these policies can be highly effective in managing that demand."

The researchers stress that such tax policies should not be implemented without allowing for exemptions based on the severity of the disease, which the physicians could certify. They also acknowledge that if decisions are time-critical and it is not an option to wait for a precise diagnostic test to know which narrow-spectrum antibiotic to prescribe, this may slow the switch from broad to narrow-spectrum.

The study draws on 10 years of monthly sales data for antibiotics dispensed in UK pharmacies and uses [economic models](#) to assess substitution patterns between different antibiotics, together with the impact of prices, seasonality, spectrum, and other characteristics of a drug on its demand.

It looked at the impact of two types of taxes on different groups of drugs: firstly, a percentage tax (5% or 20%) on all antibiotics, all broad-spectrum antibiotics, and specific broad-spectrum antibiotics known to contribute most to antibiotic resistance (co-amoxiclav, quinolones, and cephalosporins). Secondly, the research examined a fixed amount of tax per unit of the drug.

A 20% tax on all antibiotics reduces total antibiotic use by 12.7%.

However, it only reduces the use of the most problematic broad-spectrum antibiotics by 29.4%. This tax results in a consumer welfare loss; that is, the difference between what an individual is willing to pay and what they actually pay, of £322 per 1,000 people, which amounts to about £19.9 million a year in the UK.

However, if the same 20% tax is applied only to the [broad-spectrum antibiotics](#) that contribute most to antibiotic resistance, their use drops by 37.7%, and the overall antibiotic use drops by only 2.38% because most patients switch to narrow-spectrum drugs. This more targeted tax results in a smaller consumer welfare loss of £78.2 per 1000 people, or £4.8 million a year.

Lead author Dr. Weijie Yan, at E.CA Economics, said, "The consumer welfare loss and overall welfare loss from taxing these antibiotics are significant, however they are relatively small compared to the predicted societal costs of [antibiotic resistance](#) in terms of deaths and economic losses.

"While our simulations show how much demand is shifted from broad to narrow-spectrum, and at what cost, it does not calculate the long-term benefits of switching to drugs with a lower AMR footprint. It is also clear that the estimated loss in welfare is much smaller than previous estimates of worldwide costs, and so it may be well worth considering such remedies to shift demand to narrow-spectrum drugs."

More information: Antibacterial resistance and the cost of affecting demand: the case of UK antibiotics, *International Journal of Industrial Organization* (2024).

Provided by University of East Anglia

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