

# Study quantifies threat of rising antibiotic resistance on surgery and chemotherapy

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Researchers report the strongest evidence yet that rising antibiotic resistance could have disastrous consequences for patients undergoing surgery or cancer chemotherapy. New estimates published in *The Lancet Infectious Diseases* journal suggest that up to half of infections after surgery and over a quarter of infections after chemotherapy are caused by organisms already resistant to standard prophylactic antibiotics in the USA.

Worryingly, the findings also predict that just a 30% reduction in the efficacy of preventive antibiotics given routinely before, during, or after these procedures could result in 120000 more infections and 6300 [infection](#)-related deaths every year in the USA.

Prophylactic antibiotics are given as standard practice to patients undergoing [surgery](#) and cancer treatment to prevent infection and death. Bacterial resistance to commonly prescribed antibiotics is increasing at an alarming pace. But until now, the potential effect of rising [antibiotic resistance](#) on antibiotic prophylaxis efficacy in patients undergoing surgery and chemotherapy was not known.

Dr Ramanan Laxminarayan, Director of the Center for Disease Dynamics, Economics & Policy, Washington, USA and colleagues conducted a review of all meta-analyses of randomised controlled trials conducted between 1968 and 2011, examining the efficacy of antibiotic prophylaxis in preventing infections and infection-related deaths after 10 of the most common surgical procedures and blood cancer

chemotherapy in the USA. They calculated the additional number of infections and infection-related deaths under different scenarios of reduction in the efficacy of antibiotic prophylaxis. Additionally, using the National Health Safety Network data and existing studies, they estimated the proportion of infections caused by bacteria that are resistant to currently used standard [prophylactic antibiotics](#).

The authors found that between 39% (after caesarean section) and 50-90% (after transrectal prostate biopsy) of surgical site infections are caused by organisms that are resistant to recommended antibiotic prophylactic regimens. Additionally, just over a quarter (27%) of infections after blood cancer chemotherapy are resistant to standard antibiotics.

Further modelling estimated that a 10% drop in the efficacy of antibiotic prophylaxis could, at best, result in 40000 additional infections every year in the USA, or 280000 in a pessimistic scenario—a 70% drop in efficacy. Infection-related deaths could increase by 2100 in an optimistic scenario, or even 15000 in a pessimistic scenario.

According to Dr Laxminarayan, "This is the first study to estimate the impact of antibiotic resistance on broader medical care in the United States. A lot of common surgical procedures and [cancer chemotherapy](#) will be virtually impossible if antibiotic resistance is not tackled urgently. Not only is there an immediate need for up-to-date information to establish how antibiotic prophylaxis recommendations should be modified in the face of increasing resistance, but we also need new strategies for the prevention and control of antibiotic resistance at national and international levels."

Writing in a linked Comment, Dr Joshua Wolf from St. Jude Children's Research Hospital, Memphis, USA says, "[These authors] Teillant and colleagues describe a future in which patients who need surgery or

chemotherapy can no longer be protected from life-threatening infections by [antibiotic prophylaxis](#). All clinicians have a responsibility to prevent this situation from becoming our patients' reality by supporting efforts to combat antimicrobial resistance worldwide and by supporting antimicrobial stewardship at home [using systemic interventions such as clinician education, guideline development, and formulary restriction to optimise antibiotic use]."

**More information:** *The Lancet Infectious Diseases* ,  
[www.thelancet.com/journals/lan ... \(15\)00270-4/abstract](http://www.thelancet.com/journals/lan... (15)00270-4/abstract)

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