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Support for health professionals reduces unnecessary use of antibiotics in hospitals

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An updated *Cochrane Review* published today has identified effective and safe ways to reduce unnecessary use of antibiotics in hospitals. Guidelines and policies that promote better targeting of antibiotics in patients who need them have the greatest impact when they are supported by the most effective ways to change doctors' behaviour.

Antibiotics are used to treat bacterial infections, such as pneumonia. Antibiotic resistance has become a major public health problem with some infections no longer treatable using currently available drugs. Infections caused by antibiotic-resistant bacteria lead to longer hospital stays and carry a higher risk of death. Inappropriate use of antibiotics is associated with increased resistance, and studies have shown that about half of the time physicians in hospital are not prescribing antibiotics appropriately.

A team of Cochrane researchers from the UK assessed the effectiveness and safety of interventions to improve how physicians prescribe antibiotics to hospital inpatients. They also wanted to know how much variation there was among the different types of interventions they studied.

The researchers found 221 studies from the US, Europe, Asia, South America, and Australia. The interventions were aimed at healthcare professionals who prescribe antibiotics to hospital in-patients receiving acute care, and those undergoing planned surgery. The interventions broadly fell into two categories. 'Restrictive' techniques applied rules to

make physicians prescribe properly, whilst 'enabling' techniques provide advice or feedback to help physicians make more informed prescribing decisions. In both cases, the aim was to increase the number of appropriate prescribing decisions so that patients who were unlikely to benefit from antibiotics did not get them, whilst they were still used for patients who stood to benefit from them.

The researchers found high-quality evidence from 29 randomized studies in 23,394 inpatients that following either type of intervention 58% of hospital in-patients received treatment in line with prescribing guidelines, compared with 43% of the patients in the standard practice groups. The interventions shorten the duration of antibiotic use from 11 days to 9 per patient, and probably reduce hospital stay from an average of 13 days to 12 per patient. Data from 28 randomized studies of 15,827 patients showed that the risk of death was 11% in both treatment groups, suggesting that reducing antibiotic use did not lead to an increase in harm. Data from 26 non-randomized studies provide only limited evidence of an association between adopting the interventions and a reduction in hospital infections.

Interventions that included enabling or restrictive techniques were consistently more effective than interventions that relied on simple education alone (e.g. meetings or distribution of guidelines). Moreover, adding enabling techniques increased the effectiveness of restrictive techniques. However, only 10% of interventions used the most effective enabling techniques, (goal-setting, feedback, and action planning.)

Cochrane lead author Peter Davey, from the Population Health Sciences Division at the University of Dundee in Dundee, UK said, "This *Cochrane Review* shows that a wide variety of different interventions have been successful in safely reducing unnecessary antibiotic use in hospitals."

He added, "We do not need more studies to answer the question of whether these interventions reduce unnecessary antibiotic use, but we do need more research to understand why the most effective behaviour change techniques are not more widely adopted within hospital settings. Future research should instead focus on targeting treatment and assessing other measures of patient safety, and different interventions that explore the barriers and facilitators to implementation. Appropriate antibiotic use in hospitals should ensure effective treatment of patients with infection and reduce unnecessary prescriptions. Successful adoption of the interventions we have studied could have considerable impact on health service, policy, and future decision-making for patients."

More information: Davey P, Marwick CA, Scott CL, Charani E, McNeil K, Brown E, Gould IM, Ramsay CR, Michie S. Interventions to improve antibiotic prescribing practices for hospital inpatients. *Cochrane Database of Systematic Reviews* 2017;(2):CD003543. DOI: 10.1002/14651858.CD003543.pub4

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