More children getting the right dose of antibiotics since prescribing changes

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Credit: Imperial College London

Changes to national prescribing guidelines have led to fewer children receiving too small a dose of antibiotics.

The findings come from a collaborative study, published today in the journal *BMJ Open*, which found that since a review of guidance around the antibiotic amoxicillin in 2014, fewer children with infections have been under-dosed the oral preparation of the drug.

According to the team, which includes researchers from St George's University of London, University College London, Imperial College London and King's College London, the findings could prompt a review of other drug doses for children.

Amoxicillin is a common antibiotic prescribed for a range of bacterial infections, from tonsillitis to bronchitis. Changes to prescribing guidelines for the oral preparation of the drug were prompted by concerns of misdosing, particularly given the rising prevalence of childhood obesity in the UK.

Dr Olivia Rann, from Imperial College London and one of the authors of the study, said: "Accurate doses are important because too low a dose is much more likely to lead to the development of drug resistant bacteria – children's infections get worse if they have a resistant rather than a sensitive infection. On the other hand, excessively high doses increase the chances of side effects such as diarrhoea or rashes."

"Our weight influences how our bodies process antibiotics and what dose of antibiotic is needed. But rather than weighing children as they do in Europe, doctors and other prescribers in the UK prescribe antibiotics according to a child's age range," she adds.

Increasing bodyweight

The UK guidelines for children are based on age bands, and advise that infants get the lowest doses, preschool children aged 1-4 years get a higher dose and so on for school age children and teenagers up to

adulthood. However, annual increase in average weights for children have meant that these doses have become out of date.

In 2014, a review led to dosing in these age bands being updated to bring them more in line with European recommendations, with dosing up to 30mg per Kg of bodyweight, three times per day.

In a review of national patient data, the team looked at figures for age and weights for 1,556 British children aged two to 18 years. They calculated the doses each child would receive using the BNFC (British National Formulary for Children) guidance, before and after the 2014 changes, against the 'gold standard' weight-based dose of amoxicillin, as per its summary of product characteristics.

They found that before 2014, 54.6 percent of children receiving oral amoxicillin would have been under dosed, though no child would have received more than the recommended dose. After the guidance changed in 2014, the number of children estimated as under dosed dropped to 5.8 percent, but 0.5 percent of the children would have received too high a dose.

Commenting on the findings, Dr Rann said: "Before the changes in 2014 over half of all children would have received too low a dose of amoxicillin with the old guidance. Fortunately the new doses mean that only children who are very overweight will risk getting too low a dose."

According to the authors, more research is needed to understand whether prescribers are following the change in guidance and if they are not prescribing recommended doses what the reasons are.

Professor Sonia Saxena added: "There is currently an urgent need for more research into how children's bodies deal with drugs and the effects drugs have in children particularly those who are overweight and

underweight. Given the continued rise in childhood obesity it may well be prudent to review other paediatric drug doses."

More information: Rann O, Sharland M, Long P, et al Did the accuracy of oral amoxicillin dosing of children improve after British National Formulary dose revisions in 2014? National cross-sectional survey in England. *BMJ Open* 2017;7:e016363. DOI: 10.1136/bmjopen-2017-016363

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