

When does overuse of antibiotics become a tragedy of the commons?

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Over-prescribing of antibiotics is considered to result in increased morbidity and mortality from drug-resistant organisms. A resulting common wisdom is that it would be better for society if physicians would restrain their prescription of antibiotics. In this view, self-interest and societal interest are at odds, making antibiotic use a classic "tragedy of the commons". Here we analyzed the decision to prescribe antibiotics as a mathematical game, and showed that this conflict of interest may indeed result, though not in all cases. Increased use of antibiotics by individuals benefits society under certain circumstances, despite the amplification of drug-resistant strains. In situations where increased use of antibiotics is worse for society, antibiotics may be harmful for the individual as well. For other scenarios, where a conflict between self-interest and society exists, restricting antibiotic use would benefit society. Thus, a case-by-case assessment of appropriate use of antibiotics may be warranted.