

Mortality burden of antimicrobial resistance in respiratory tract infections in Hong Kong, 2012-2021

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Background: Respiratory tract infections (RTIs) are major drivers of antibiotic use and antimicrobial resistance (AMR), yet the local burden of AMR in RTIs in Hong Kong remains poorly quantified.

Methods: We conducted a territory-wide retrospective cohort study using Hospital Authority electronic health records with linked microbiology to apply an explicit counterfactual approach to estimate AMR burden in RTIs in Hong Kong, 2012-2021. Using matched survival analyses, we compared in-hospital mortality for lab-confirmed bacterial RTI patients with non-susceptible (resistant; R) versus susceptible (S) infections, and for R infections versus hospitalizations without respiratory bacterial infection (NI). We estimated population attributable fractions for resistance and derived deaths and mortality rates attributable to (R vs S) and associated with (R vs NI) resistance for prespecified key drug-pathogen combinations, stratified by community-onset (CO) versus hospital-onset (HO) infection.

Findings: We identified 336,098 hospitalisations with bacterial RTIs (457.7 per 100 000 person-year, comprising 441,022 RTI episodes (204,708 CO [46.4%], 236,314 HO [53.6%])). *Pseudomonas aeruginosa* was the most frequent pathogen in both CO and HO RTIs. Across key drug-bug combinations, mortality attributable to resistance was generally small and sometimes compatible with no clear additional risk. In contrast, mortality associated with RTI episodes was considerable, particularly for ESC-resistant *Pseudomonas aeruginosa*, which accounted for 501 AMR-associated deaths in CO and 552 in HO RTIs (0.68 and 0.75 deaths per 100,000 person-year, respectively).

Interpretation: AMR in RTI patients imposes a substantial mortality burden especially in terms of excess mortality when compared to no infection. These estimates can inform prioritization of infection prevention, antimicrobial stewardship, and vaccination and other preventive strategies particularly targeting high-burden pathogens and high-risk settings.