

**Economic impact of antimicrobial resistance: How to evaluate?**

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The emergence of antimicrobial-resistant organisms is accelerating. Antimicrobial-resistant infection (ARI) causes ineffective treatment, delayed recovery, recurrent infection, or even death, which have economic impact to patients, hospitals, and society. From a societal perspective, the economic burden incurred by ARI includes not only medical cost but also productivity cost due to morbidity or loss of life.

In evaluating economic burden attributable to ARI, it is important to measure an unbiased cost attributable to ARI. A simple comparison of costs between patients with ARI and without ARI may cause a bias. One of the causes of the bias is the existence of confounding factors which may be associated with ARI and with increased cost. To control for the effect of the confounding factors, multiple regression is often employed. Another cause of the bias is sampling error. To address the sampling bias, propensity scores, estimated by logistic regression, are used to select matched control patients for each patient with ARI. The number of drug-resistant cases is multiplied by the attributable costs for ARI to estimate the total medical cost for the entire patients.

To estimate the societal costs for excess mortality, the number of deaths attributable to ARI is multiplied by the lost productivity cost. Excess mortality attributable to ARI is estimated by logistic regression. Productivity cost is estimated based on mean wage of the age group which patients belong to. The societal costs for excess mortality need to be discounted at various rates. To estimate the societal costs for excess length of stay, additional length of stay attributable to ARI is multiplied by the daily cost for lost productivity. The attributable length of stay is also estimated by multiple regression.