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Availability of patient-level real-world data on carbapenem resistance: a systematic analysis

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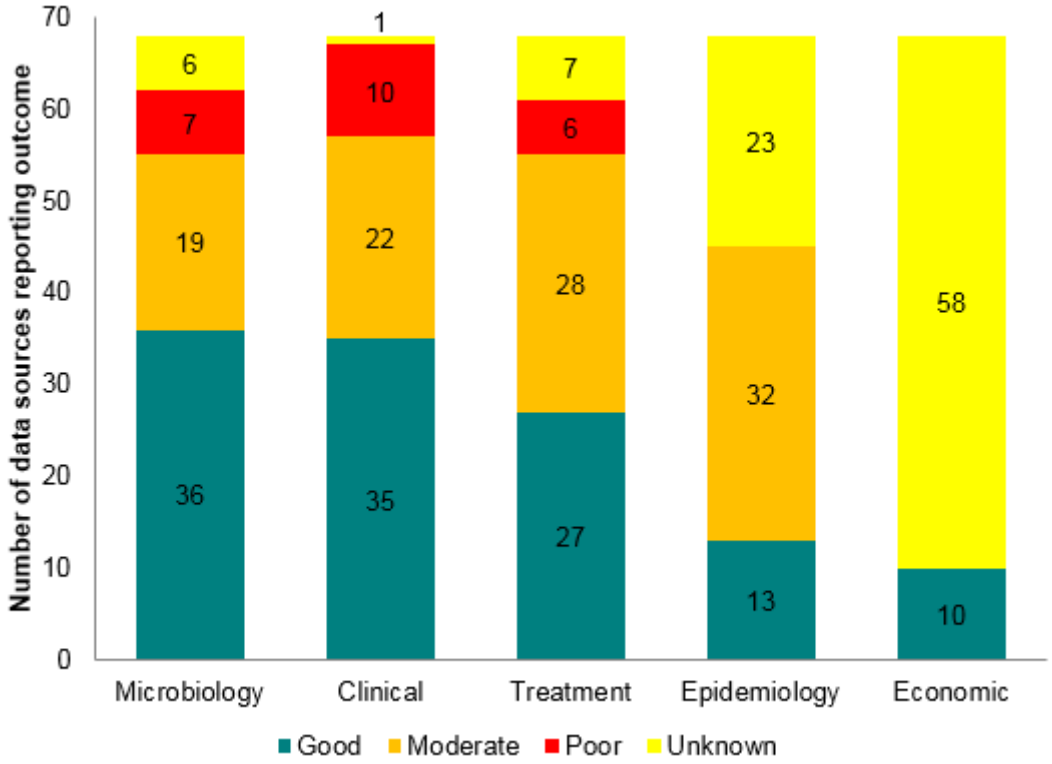
Background: Increasing antibiotic resistance is of major international concern. Particular threats to health are the infections caused by carbapenem-resistant (CR) bacteria, as there are few therapeutic options. Assessing the need for new antibiotic treatments, as well as evaluating the impact of CR infections on patients and healthcare services, can be achieved using 'real-world' data sources including registries and medical records from patients in routine clinical practice. This study aimed to systematically identify, analyse, and summarize real-world data sources that contain patient-level data relating to CR infections.

Material/methods: Electronic databases (Embase®, MEDLINE®, and the Cochrane Library) were searched on 30 March 2016 using terms for CR infection and appropriate data source terms (e.g. registry, database, electronic medical record). Proceedings of relevant congresses were searched in the 2 years up to March 2016. Internet searching for patient-level data sources was performed using Google Advanced Search. To focus on contemporary data sources, only sources with data published from 2011 onwards were reviewed. Data sources reporting patient-level data in Canada, France, Germany, Italy, Spain, UK, and USA were analysed. To assess the availability of relevant data, each source was graded as good, moderate, or poor based on the number of reported data points within each outcome of interest: clinical (i.e. patient characteristics, infection type, effectiveness, safety outcomes); microbiology (i.e. susceptibility testing); treatment (i.e. therapeutic interventions); epidemiology; and economic. Owners of prioritized data sources were sent a questionnaire to gather further information.

Results: A total of 111 publications were identified, referring to 68 data sources: USA (33), Italy (11), Spain (8), France (5), Germany (3), Canada (3), UK (2), or multinational (3). Forty-three per cent of data sources were from single hospitals and 57% were from multicentre healthcare systems or research consortia. Using the grading system, all data sources were rated as moderate for at least one outcome of interest and two were rated as good for all outcomes. Good data availability was highest for microbiology (36/68), clinical (35/68), and treatment (27/68) outcomes, with epidemiology (13/68) and economic data points less well reported (10/68). Forty-five data sources were prioritized for direct contact, three of which provided the requested information (2 single hospitals, 1 disease registry) and

two of which responded positively, prompting follow-up (1 single hospital, 1 administrative database). Seven data sources declined to provide information and 33 did not respond to direct contact.



Conclusions: This systematic analysis of real-world data identified a lack of economic data on carbapenem resistance and a low rate of investigator responses to queries. Closer collaboration between researchers and greater leverage of existing real-world data is encouraged and may assist research on the burden of carbapenem resistance.