INTRODUCTION

Post-marketing in vitro surveillance programs are performed to comply with the requirements of regulatory agencies responsible for approving new antimicrobial agents, such as the United States Food and Drug Administration (US FDA) and the European Medicines Agency (EMA). However, post-marketing in vitro surveillance programs are essential for detecting the emergence of resistance and changes in resistance patterns that may occur after the clinical introduction of new antimicrobial agents. Furthermore, data generated by these programs can assist clinicians beyond the scope of local antibiograms, which may not be available for all new drugs. By providing useful information on the potency and spectrum of new antimicrobial agents in clinical practice, these surveillance programs can detect the emergence of resistance before its occurrence in clinical practice.

METHODS

Screen for β-lactamase genes by WGS and bioinformatic tools

- Selection criteria:
  - ≥10,000 E. coli and ≥10,000 isolated from 85 distinct locations
  - ≥10,000 K. pneumoniae and ≥10,000 isolated from 85 distinct locations

- Antimicrobial susceptibility testing

- The power of genome sequencing, bioinformatic tools, and curated databases for in silico predictions has enabled the rapid and accurate detection of resistance determinants in clinical isolates. Furthermore, data generated by these programs can assist clinicians beyond the scope of local antibiograms, which may not be available for all new drugs. By providing useful information on the potency and spectrum of new antimicrobial agents in clinical practice, these surveillance programs can detect the emergence of resistance before its occurrence in clinical practice.

RESULTS

- A total of 19,535 Enterobacterales isolates were consecutively collected (1 per patient) from 85 distinct locations in the United States during the years 2016 and 2017. These isolates were identified by the laboratory, and their identity was confirmed by the clinical microbiology laboratory of JMI Laboratories.

- The prevalence of ESBL-producing K. pneumoniae isolates decreased from 3.4% in 2016 to 2.2% in 2017 (Table 2).

- The prevalence of KPC-producing K. pneumoniae isolates decreased from 3.4% in 2016 to 2.2% in 2017 (Table 2).

- A total of 2,658 isolates were positive for ESBL-producing isolates and were detected in 3.2% of screened isolates.

- A total of 2,658 isolates were positive for KPC-producing isolates and were detected in 3.3% of screened isolates.

- A total of 2,658 isolates were positive for OXA-type enzymes (mainly OXA-1/30-like) and were detected in 3.2% of screened isolates.

- A total of 2,658 isolates were positive for TEM-type enzymes and were detected in 3.3% of screened isolates.

- A total of 2,658 isolates were positive for CMY-type enzymes and were detected in 3.2% of screened isolates.

- A total of 2,658 isolates were positive for SHV-type enzymes and were detected in 3.3% of screened isolates.

- A total of 2,658 isolates were positive for CTX-M-type enzymes and were detected in 3.2% of screened isolates.

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