

Table 1. Summary of twenty studies describing antimicrobial stewardship strategies in the Middle East (continued)

Study	Country	Design	Setting (No. of patients)	Evaluated component	Comparator	Outcome	Recommendations
Hanssens et al. 2005	Qatar	Prospective observation and evaluation of patients charts	Hospital (71)	Appropriateness of use of antimicrobials and prescribing patterns of physicians	Compliance with local hospital guidelines, international guidelines and clinical judgment and experience	Inappropriate antibiotic management (52% positive cultures in 76% of patients with presumed or proven infection with only 52% change in empiric therapy post sensitivity results) Low potential for microbiological diagnostic procedures and inappropriate microbiological investigations	Urgent need for updated empiric and local hospital treatment guidelines in addition to the need for a review of antibiotic prescribing policies Monitoring of antibiotic usage Role of clinical pharmacist in assuring justified use of continuous antibiotics Implementation of empirical antibiotic treatment without any delay, based on clinical judgment, guided by local antibiograms and antibiotic resistance patterns and on de-escalating antibiotic strategy Rotating empirical antibiotic schedule to limit emergence of resistance patterns Good communication among health care professionals Implementation of infectious control practices to reduce resistance and the spread of nosocomial infections Future drug utilization reviews to assess anti-infectious management
Al-Tawfiq, 2012	Saudi Arabia	Retrospective observation of and evaluation of the pharmacy register of the annual medication utilization	Hospital	Appropriateness of use of antimicrobials	Compliance with WHO guidelines for defined daily dose of antimicrobials	Increased and unexplained usage of intravenous antibiotics; especially fluoroquinolones (from 3.5 to 82.643 defined daily dose/100 patient days) leading to emergence of fluoroquinolone-resistant bacterial strains	Specific unit antimicrobial consumption data to be able to compare with benchmarking data such as the NHSN Education and implementation of antimicrobial stewardship programme to control the use of antibiotics