

Session: P052 Computerized decision support systems as a stewardship tool

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Clinical decision support systems for antimicrobial management: a systematic review of interventions in primary and secondary care

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Background: Clinical decision support systems (CDSS) for antimicrobial management can support healthcare professionals to optimise antimicrobial therapy. A systematic review of qualitative and quantitative studies describing CDSS in primary and secondary care was undertaken to create a pragmatic picture of the field and produce recommendations for future research.

Material/methods: PRISMA guidelines were followed. *Medline*, *EMBASE*, *HMIC Health and Management*, and *Global Health* databases were searched from 1st January 1980 to 31st October 2015. All primary research studies describing CDSS for antimicrobial management in adults in primary or secondary care were included. Critical care orientated CDSS were excluded. Two researchers independently screened abstracts and extracted data against a framework adapted from the Stage Model of Behaviour Intervention Development and the Medical Research Council's developing and evaluating complex interventions guidance. For qualitative studies, thematic synthesis was performed. Quality was assessed using Integrated quality Criteria for the Review Of Multiple Study designs (ICROMS) criteria. Grading of Recommendations Assessment, Development and Evaluation (GRADE) criteria was used to rate the overall level of evidence for individual outcome measures at either patient, prescriber, or hospital unit level.

Results: Fifty-eight articles were included describing 38 CDSS. CDSS included were defined as conventional systems (incorporating guidelines, algorithms, and prompts) integrated with electronic medical records (24/38; 63%), intelligent (machine learning) systems (3/38; 8%), web based guidelines (3/38; 8%), pharmacokinetic tools (2/38; 5%), and other systems (6/38;16%). 11/38 (19%) CDSS were deployed in primary care and 27/38 (71%) in secondary care. Primary care CDSS tended to focus on single conditions, such as acute respiratory tract infections, whereas secondary care CDSS focused on empirical antimicrobial selection and prophylaxis in surgery.

CDSS studies failed to report consideration of the non-infection expert, end-user workflow, or routine decision making pathways. They focused on narrow aspects, such as antimicrobial selection, using proxy outcome measures that demonstrate significant outcomes at a hospital or prescriber level, whilst failing to demonstrate direct benefit to the patient. Engagement with CDSS by clinicians was poor.

Conclusions: The design of CDSS interventions must consider the factors influencing non-expert decision-making to ensure integration into routine workflow and promote engagement with these interventions. Future work must expand CDSS beyond simply selecting appropriate antimicrobials, instead integrating this aspect with dose optimisation, patient engagement, and surveillance mechanisms to provide personalised decision support. Developing clear and systematic reporting frameworks for CDSS interventions would address the identified gaps in the reporting of evidence for current CDSS.