

SMART ALERTS, SAFER DOSES: REVOLUTIONIZING ANTIMICROBIAL THERAPY WITH RENAL FUNCTION-DRIVEN CLINICAL RULES

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BACKGROUND AND IMPORTANCE

Antimicrobial **dose optimization** is essential in antimicrobial stewardship (AMS), yet incorrect dosing remains frequent. We developed a Clinical Decision Support System (CDSS), HIGEA, which integrates multiple hospital data sources to generate real-time, patient-specific alerts based on predefined **clinical rules (CRs)**.

AIM AND OBJECTIVE

To design and implement a bundle of CRs within our CDSS to **identify patients requiring antimicrobial dose adjustment** according to estimated glomerular filtration rate (eGFR), with the goal of optimizing antimicrobial therapy, supporting AMS teams in individualized dosing, and preventing adverse drug events (ADEs).

MATERIALS AND METHODS

Evidence review

Screening of systemic antimicrobials (ATC J01-J05) that require dose adjustment.

Design of CRs

Establishment of eGFR thresholds for antimicrobial dose adjustment.
+
Dose adjustment recommendations according to indication.

Implementation

Integration of the CRs within the CDSS HIGEA.

Pilot Validation

Daily pharmacist surveillance of the alerts generated in CDSS for 6 months
+
Pharmacist intervention

Performance Assessment

Evaluation of clinical impact:

- Nº alerts generated
- Positive predictive value (PPV)
- Pharmacist intervention and physician acceptance rates

RESULTS

 57 defined CRs  492 generated alerts

 37% of alerts (180/492) led to pharmacist intervention, with 66% (120/180) resulting in modified antimicrobial therapy.

 Physician acceptance rates were highest in medical units (73%), followed by surgical (67%) and critical care units (55%).

 The overall PPV of the rules was 0.24.

CRs with highest PPV

Clinical Rule	PPV
Ceftazidime IV/IM and eGFR <50 mL/min	1.00
Amoxicillin/Clavulanate IV and eGFR <30 mL/min	0.67
Ampicillin IV/IM and eGFR <50 mL/min	0.50
Cefiderocol IV and eGFR <60 mL/min	0.50
Ertapenem IV and eGFR <30 mL/min	0.50

CONCLUSION AND RELEVANCE

Implementation of a consensus-based bundle of clinical rules within the HIGEA CDSS enabled timely, patient-specific pharmacist interventions and supported individualized antimicrobial therapy in patients with renal impairment. These findings highlight the value of integrating rule-based CDSS tools into routine workflows while emphasizing the need for continuous alert optimization.

