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EFFECTIVENESS OF COMPUTERISED DECISION SUPPORT SYSTEM-BASED INTERVENTION IN ANTIMICROBIAL USE: THE HIGEA PROJECT

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OBJECTIVES

Clinical decision support systems (CDSS) can play an important role in facilitating antimicrobial stewardship programs (ASP). However, the effects of CDSS on improving antimicrobial therapy have been insufficiently studied.

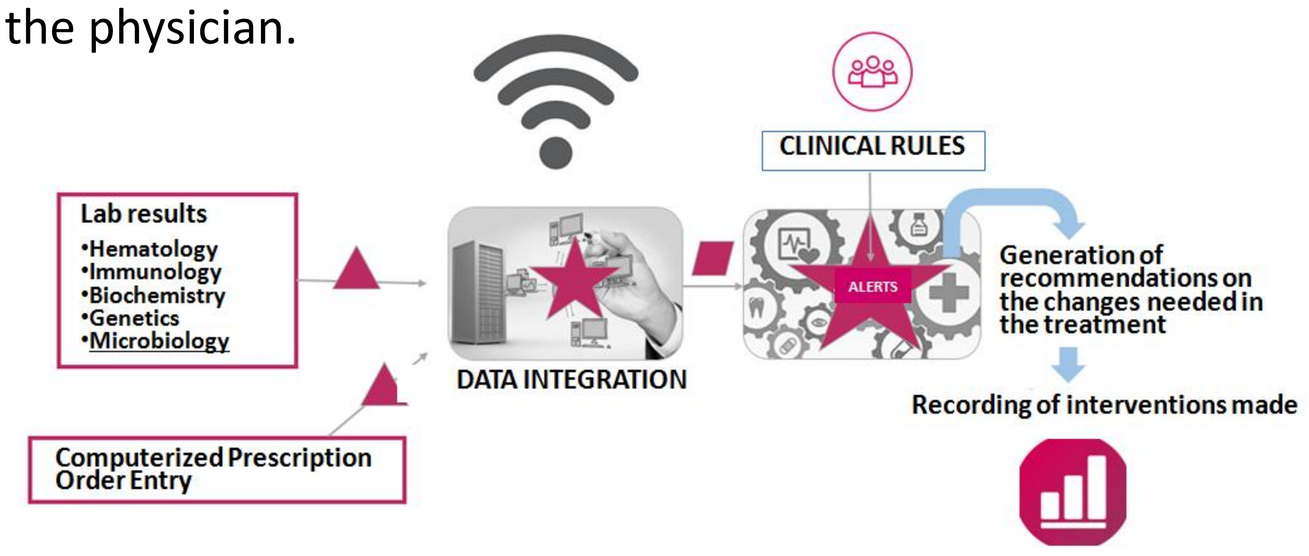
Objective: To evaluate the impact of an automated/integrated real-time CDSS called HIGEA for antimicrobial stewardship-related interventions.

METHODS

Study design: Quasi-experimental study performed in a 1300-bed tertiary teaching hospital in Madrid (Spain).

System development: a CDSS was developed integrating microbiology data, laboratory data and the computerized prescription order system. The integration was performed using a standard language (HL7). The system generates alerts based on predefined clinical rules (CR) to select patients in whom antimicrobial therapy can be improved. Alerts are reviewed daily by an infectious disease pharmacist, who makes recommendations of the necessary changes on the treatment to the physician.

System evaluation: Eight custom-built CR that promote stop/de-escalation of therapy were evaluated in the initial ASP review during 01/04/2017–31/08/2017.



Total number of **actionable alerts, recommendations provided** and **acceptance rates** were collected.
For each CR, the **Positive Predictive Value (PPV)** was calculated as the ratio of modifications in treatment to alerts reviewed. The **severity of medication errors prevented** and **antimicrobial consumption** were also analyzed.

RESULTS

- **701** alerts were reviewed during the study period (6.4 alerts per day). Overall, **419 (60%)** alerts were actionable.
- The acceptance rate was **77%** (321/419), and the **PPV 0.46**.

Clinical Rule	Reviewed	Intervened	Accepted	Rejected	Not assessable	PPV
Treatment with penicillins/cephalosporin/quinolones >7 days	268	199	155	32	12	**0.58**
Switch to oral therapy with quinolones/ linezolid/ azole	355	157	110	27	20	**0.31**
Streptococcus/Enterococcus + carbapenem	30	23	21	1	1	**0.70**
Candin + fluconazole sensitive *Candida*	24	21	20	1	0	**0.83**
Methicillin-sensitive Staphylococcus + vancomycin/linezolid/daptomycin	11	11	8	3	0	**0.73**
Meticillin-resistant Staphylococcus + only in beta-lactam therapy	9	5	4	1	0	**0.44**
Candidemia without antifungal	3	2	2	0	0	**0.70**
Tuberculosis without TB medication	1	1	1	0	0	**1.0**
TOTAL	**701**	**419**	**321**	**65**	**33**	**0.46**

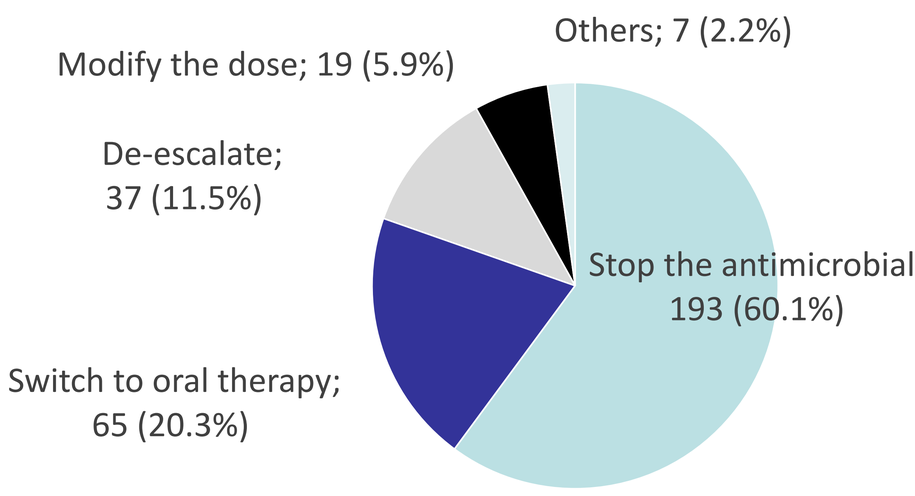


Figure 1. Type of interventions.

- Overall, **14%** of errors intercepted were classified as being of moderate severity, and **9.4%** as serious.
- A significant reduction in the consumption of quinolones was achieved (**from 15.0 to 12.6 Defined Daily Doses-100 patient-days)**, with no significant change in the consumption of other antibiotics.

CONCLUSIONS

- HIGEA has identified opportunities to optimize antimicrobial use.
- Future work must aim to incorporate new custom-built clinical rules, including those to alert to the need to prompt initiation of antimicrobial therapy.

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