

How to develop and implement a computerised decision support system integrated with a computerised prescriber order entry for antimicrobial stewardship: experience from two Swiss hospitals

Catho G^a, Suter B Waldispühl^b, Valotti R^c, Portela J^d, DaSilva S^d, Vernaz N^e, Centemero N S^b, Coray V^b, Pagnamenta F^f, Bernasconi E^c, Meyer R^d, Huttner B^a

^a Division of infectious diseases, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland

^b Division of clinical informatics, Ente Ospedaliero Cantonale, Bellinzona, Switzerland

^c Division of infectious diseases, Ente Ospedaliero Cantonale, Ospedale Regionale, Lugano, Switzerland

^d Division of informatics, Geneva University Hospitals, Geneva, Switzerland

^e Medical direction, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland

^f Information and communication technologies, Ente Ospedaliero Cantonale, Bellinzona, Switzerland

Background

Many antimicrobial stewardship (AMS) interventions require intensive human resources and are difficult to sustain in the long term. Computerised decision support systems (CDSSs) provide new opportunities for automating AMS interventions and integrating them into routine healthcare. CDSSs are recommended as part of AMS programmes by international guidelines [1]. However, the development and implementation of such systems is challenging.

Methods

We developed and implemented two CDSSs paired with two home-built computerised prescriber order entry (CPOE) systems in three public hospitals in Switzerland (Hôpitaux Universitaires de Genève [HUG], Ente Ospedaliero Cantonale in Bellinzona and Lugano [EOC]). With different interfaces, both CDSSs (a) support physicians' decisions about antimicrobial treatment (substance, route of administration and duration) for 153 selected indications based on local guidelines, (b) require physicians to document justifications for deviation from local guidelines without further support, and (c) alert physicians to re-evaluate substance, route of administration and duration of the antimicrobial treatment on day 4.

CDSSs have been implemented in 10 internal medicine wards (HUG and EOC) and 2 surgery wards (EOC). The impact of CDSSs on the quantity and quality of antimicrobial use is currently being tested in the COMPASS cluster-randomised trial (with 10 internal medicine and 2 surgery wards serving as controls) [2].

Results

Despite a relatively simple algorithm without incorporation of patient-specific data, the development of the two CDSSs and their integration into the different home-built CPOE systems was complex and took between 9 (EOC) and 12 months (HUG). The main challenge was to achieve structured data (essential for analysis and long-term sustainability) while ensuring a safe and user-friendly interface.

The two CDSSs have now been used for 10 (EOC) and 7 months (HUG). Feedback on CDSS utilisation is delivered to end-users every two to three months. In spite of an overall good acceptance, the main hurdles we are experiencing are physicians' resistance to re-evaluating antimicrobial prescriptions and to attending training courses covering COMPASS features. Furthermore, two limitations of the software are the need of manual CDSS activation for transferred patients (HUG) and the usability of the search tool causing a frequent use of free-text diagnoses (EOC).

Conclusions

Close collaborations between informaticians and clinicians are crucial to developing user-friendly CDSSs. Physicians' resistance to CDSS adoption was related to a perception of extra time needed for prescribing and difficulty in changing routine practice. Both can be avoided by supporting end-users during the CDSS implementation. Based on the results of the COMPASS trial [2], we are considering extending the use of AMS CDSSs to other specialties.

References

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