Development and implementation of a computerised decision support system integrated with a computerised prescriber order entry for antimicrobial stewardship - An experience from two Swiss hospital systems.

G Catho¹; B Waldispühl Suter²*; R Valotti³; J Portela⁴; S DaSilva⁴; N Vernaz⁵; N S Centemero²; V Coray²; F Pagnamenta⁶; E Bernasconi³; R Meyer⁴, B Huttner¹.

1. Division of infectious diseases, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland, 2. Division of clinical informatics, Ente Ospedaliero Cantonale, Bellinzona, Switzerland, 3. Division of infectious diseases, Ente Ospedaliero Cantonale, Ospedale Regionale, Lugano, Switzerland, 4. Division of informatics, Geneva University Hospitals, Geneva, Switzerland, 5. Medical direction, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland, 4. Division of informatics, Geneva University Hospitals, Geneva, Switzerland, 5. Medical direction, Geneva University Hospitals and Faculty of Medicine, Geneva, Switzerland, 6. Information and communication technologies, Ente Ospedaliero Cantonale, Bellinzona, Switzerland

Introduction

Clinical decision support systems (CDSS) are recommended as a part of antimicrobial stewardship programs by international guidelines (1). However, the development and implementation

Methods

Development and implementation of two CDSS integrated into the in-house computerised prescriber order entry (CPOE) systems of Hôpitaux Universitaires de Genève (HUG) and Ente Ospedaliero Cantonale (EOC). Both CDSS encourage physicians to follow local guidelines for antimicrobial therapy and re-evaluate antimicrobial prescriptions after 4 days. The CDSS has been implemented in 10 internal medicine wards (HUG, EOC) and 2 surgery wards (EOC) and are currently

of such systems entail several challenges.

Results

Despite a relatively simple algorithm without incorporation of patient-specific data, the development of the two CDSS and their integration into the distinct home-built CPOE systems was complex and required 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 CDSS have now been deployed for 14 months in Bellinzona and Lugano (EOC) and 10 months in Geneva (HUG). Feedback regarding the adoption of the local guidelines is sent to end-users every 2-3 months. In spite of an overall good acceptance, the principal hurdles are physicians' resistance to re-evaluate antimicrobial prescriptions and to attend training courses regarding COMPASS functions. Furthermore, as far as software concerns, constraints where identified related to the need of manual CDSS activation for transferred patients causing limited use of the CDSS system (HUG) and to the search functionality of diagnoses causing a frequent use of free-text (EOC).

Hôpitaux Universitaires de Genève





Ente Ospedaliero Cantonale

	television of a series indicates and the leadersheet		Raccomandazioni			
	Guide Therapies (PDE) Origonitem en cas de contremocation aux deta-actamines	100 mg Intolérance/allergie/autre contre-indication	Durata Parenterale	Enterale		
1. "Type of treatment" selection	PROPOSITION 5 PROPOSITION 6 PROPOSITION 7 Nevofloxacine Tavanic inject moxifloxacine Availox cp Nevofloxacine Tavanic cp	12h Immunosuppression Traitement anti-infectieux récent	5(-10) giorni 5(-10) giorni 5(-10) giorni	amoxicillina/clav per os 1000mg 1x/12h o cefuroxime per os 500mg 1x/12h o clindamicina per os 300mg 1x/6h	CCLMED 9 F COMPASS Ato4 - 23.07.1990 (28 anni)	^
	500 mg 500 mg 500 mg	ison avec chiru Voie orale impossible	Misure particolari Effettuare striscio ferita (ev. emocolture). Se impianto di corpo estra vascolare) consulto infettivologico sempre. Somministrare cefuroxi	aneo (ad es. osteosintesi o protesi ime dopo i pasti.	Terapia Anticoagulante Antidiabetica Antinfettiva Giornaliera Mensile PSUN	
At the we avaluation store, there are	Durác 5 (à 7) jours (alus leon s) astrast shoriques)	Autre (texte libre)	Schema di somministrazione (unità della dose, dose per somminis	trazione, frequenza, via)	Antinfettiva Mensile	
. At the re-evaluation stage, there are	nnex: c (a.) Jone (hen politi a Rauna albidden)		Calcola dose per Peso Superficie	cpr Altra dose 1	← Lun 05.11.18 - Gio 22.11.18 → Novembre 2018 5 6 7 8 9 10 11 12 13 14 15 16 17 1	18 19 20 21
hree options:	2 "Indication" coloction (recommanded	3. If the physician does not follow the	Q Altra frequenza	schema ogni 12 h ogni 8 h	EPISODIO	
Re-validate	2. Indication selection (recommended				Ferita infetta post-operatoria	
Ston	treatments for the selected indication are	recommendation, s/ne has to justify	Aitra via di somministrazione	per os	Tavanic 500 mg cpr cpr	
	displayed)	her/his choice through a list of standard			EPISODIO	
Re-evaluate through the COMPASS	uispiayeu)	iustifications or using from toxt			Polmonite extraospedaliera	
system (switch PO or change the		Justifications of using free text			Farmaci	
indication					Co-Amoxi Mepha 2200 mg flac mg	
indication)					Co-Amoxi Mepha 2200 mg flac mg Clarithromycin Sandoz 500 mg cpr cpr •	
indication)					Co-Amoxi Mepha 2200 mg flac mg Clarithromycin Sandoz 500 mg cpr cpr	
Prescriptions Chronologie A la sortie Documenter Poids: 117.5 kg Taille: 173 cm Clearance: 55.71 ml/min eGFR: 32 ml/min/1.73m2	Hospitalisation de 60 jours N°EdS : 15360516				Co-Amoxi Mepha 2200 mg flac mg Clarithromycin Sandoz 500 mg cpr cpr	_
indication) Prescriptions Chronologie A la sortie Documenter Poids: 117.5 kg Taille: 173 cm Clearance: 55.71 ml/min eGFR: 32 ml/min/1.73m2 Arc Signature (0) Stopper	Hospitalisation de 60 jours N°EdS : 15360516 • TI • Impres				Clarithromycin Sandoz 500 mg cpr cpr	
indication) Prescriptions Chronologie A la sortie Documenter Poids: 117.5 kg Taille: 173 cm Clearance: 55.71 ml/min eGFR: 32 ml/min/1.73m2 Signature (0) Stopper Traitements à réévaluer	Hospitalisation de 60 jours N°EdS : 15360516 • TI • Impres	esions	eoc		Clarithromycin Sandoz 500 mg cpr opr	lc
indication) Prescriptions Chronologie A la sortie Documenter Poids: 117.5 kg Taille: 173 cm Clearance: 55.71 ml/min eGFR: 32 ml/min/1.73m2 Signature (0) Stopper Taitements à réévaluer abcès hépatique	Hospitalisation de 60 jours N°EdS : 15360516 TI O Impres Modifier Valider 0 1	essions v	eoc		Clarithromycin Sandoz 500 mg cpr cpr	ls
indication) Prescriptions Chronologie A la sortie Documenter Poids: 117.5 kg Taille: 173 cm Clearance: 55.71 ml/min eGFR: 32 ml/min/1.73m2 Signature (0) Stopper Traitements à réévaluer Cordres à boutons Compass Ceftriaxone Ceftriaxone Inject 2 g 1x/24h IV sur 30 min dans	Hospitalisation de 60 jours N°EdS : 15360516 T I © Impres Modifier Valider 0 1 ns 50 ml de NaCl 0.9% soit 1.67 ml/min ou 100.2 ml/h	essions stopper ré	eoc		Clarithromycin Sandoz 500 mg cpr opr	Is
indication) Prescriptions Chronologie A la sortie Documenter Poids: 117.5 kg Taille: 173 cm Clearance: 55.71 m/min eGFR: 32 m/min/1.73m2 Cordres à boutons Cordres à boutons Compass Cettriaxone (o) Stopper Compass Cettriaxone inject 2 g 1x/24h IV sur 30 min dan WigiGeme® Métronidazole Flagyl cp 500 mg 1x/8h PO Cettriaxone flagyl cp 500 mg 1x/8h	Hospitalisation de 60 jours №Ed S : 15360516 ● TI ② Impres ns 50 ml de NaCl 0.9% soit 1.67 ml/min ou 100.2 ml/h 1 mar 13.27 (gauc) Non reievé 1 mar 13.27 Non reievé	essons ké ké	eoc		Clarithromycin Sandoz 500 mg cpr opr	Is
indication) Prescriptions Chronologie A la sortie Documenter Poids: 117.5 kg Taille: 173 cm Clearance: 55.71 m/min eGFR: 32 m/min/1.73m2 Sortires à boutons Cordres à bouton	Hospitalisation de 60 jours N°EdS : 15360516 ● TI ● Impres Ins 50 ml de NaCl 0.9% solt 1.67 ml/min ou 100.2 ml/h 1 mar 13.27 (gauc) Non relevé	essions ré ré ré	eoc		Clarithromycin Sandoz 500 mg cpr or Dashboard of the infectious episodes with indication, start/end date, and antimicrobia received by the patient	IIS

Conclusions

Close collaboration between clinicians and IT specialists are crucial to develop user-friendly CDSS. Physicians' resistance to adopt the CDSS during start-up periods is related to the perception of extra-time required for prescribing and difficulties to change routine practice. Both these issues can be avoided by involving end-users during development and providing adequate support during implementation. Based on the preliminary results and practical experience, discussions to extend the use of the COMPASS tool in other wards have started.

1. Barlam TF, Cosgrove SE, Abbo LM, et al. Implementing an Antibiotic Stewardship Program: Guidelines by the Infectious Diseases Society of America and the Society for Healthcare Epidemiology of America. Clin Infect Dis 2016;62:1197–202.doi:10.1093/cid/ciw217

2. Catho G, De Kraker M, Waldispühl Suter B, Valotti R, Harbarth S, Kaiser L, et al. Study protocol for a multicentre, cluster-randomised, superiority trial evaluating the impact of computerised decision support, audit and feedback on antibiotic use: the COMPuterised Antibiotic Stewardship Study (COMPASS). BMJ Open. 2018 Jun 27;8(6):e022666.

Contacts

*Brigitte.WaldispuehlSuter@eoc.ch



Ente Ospedaliero Cantonale