

# Creation of computer-assisted drug prescription in a pediatric hospital: the 8 years experience of the Children's Hospital of Geneva

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## Introduction

The University Hospitals of Geneva had an institutional project to implement a computerized physician order entry (CPOE) system to replace verbal and handwritten prescriptions as well as transcription, to decrease errors and related adverse drug events.

A working group specific to pediatrics (PRESCO-PED) was created with physicians representing most pediatric specialties, such as intensive care, neonatology, emergency medicine, oncology, general pediatrics, surgery, orthopedic surgery, anesthesiology, infectious diseases and psychiatry, in cooperation with nurse representatives, pharmacists, and computer specialists.

## Objective

Creation of a Prescribable drugs database specific to pediatrics, structured, validated by experts, and easy to update

PRESCO-PED creation

Experts meetings and database specifications

Pharmacy: dosage recommendations  
Nursing: Drug preparation

Two regularly prescribing experts per drug

Group validation of 346 drug records

Ready for deployment, with standard orders sets facilitating CPOE

Difficulty to have evidence-based recommendations

Used references: Shann's DrugDoses, Nelson's Pediatric Antimicrobial Therapy, HUG Formulary, Swiss Drug Compendium, UpToDate, Toronto Hospital for Sick Children's Formulary, Pittsburgh Children's Formulary, Published papers

Drug database specifications

Brand name, international nonproprietary name (INN), unit dose, interval, maximal unit dose, maximal daily dose, route of administration, perfusion rate, formulation, specific dosage according to: patient's age, gestational age, body weight, body surface index

March 2006

20 meetings

October 2006

## Orderset with condition-specific orders subset

Hyospade en Pédiatrie  
ATTENTION: Les doses proposées ont été calculées avec un poids de 12.7 kg. Si cela ne correspond pas, veuillez immédiatement accéder au formulaire de documentation clinique du patient: "Documenter".

Informations cliniques  
Diagnostic: Hyospades

Mesures spécifiques VigCerma®  
Liste de pathologies et pathogènes

Pas de mesure spécifique prescrite.

Signes vitaux et surveillances post-op  
Poids, Fréquence respiratoire, Douleur au méat, Transit, Perméabilité de la sonde, Repos à plat dans le lit les 24 premières heures, TA, T°, Pansement aux changes, Durée, Pampers

Médicaments  
Co-trimoxazole (Bactrim inject.), Paracétamol (Dafigan sr.), Oxybutyrine (Otropan cp), Tramadol (Tramal cp), Lidocaïne + Hyaluronidase (Lid-Hyal A inject.)

Perfusions  
ATTENTION: Les doses proposées ont été calculées avec un poids de 12.7 kg. Si cela ne correspond pas, veuillez immédiatement accéder au formulaire de documentation clinique du patient: "Documenter".  
Recommandations  
ATTENTION  
> 10 kg: Glucose 10% + électrolytes (Glycémie à garder < 4 mmol/L)  
> 10 kg: Glucose 5% + électrolytes ou autres solutions  
VOLUME PAR POIDS:  
0 à 10 kg: 100 mL/kg/24h  
10 à 20 kg: 1000 mL + 50 mL/kg en plus des 10 kg/24h  
20 kg et plus (Max 50 kg): 1500 mL + 20 mL/kg en plus des 20 kg/24h  
VOLUME PAR SURFACE CORPORELLE (Par exemple des 40 kg): 1000 mL/m2

Solutions de perfusion  
Choix de la solution: IsoG5 (Glucose 4.6% + NaCl 0.9%)

Dose	Fréquence	Vole	Perfusion
1135 ml (89ml/kg)	1x/12h	IV	sur 24 heures
autre	autre	autre	pendant 2 heures
	O.U.		IV lent

Début: débuter selon horaire habituel, en urgence, autre  
Fin: jusqu'à nouvel ordre, ce jour seulement, autre  
Condition: office, en réserve, autre

Choix des électrolytes à ajouter  
NaCl amp. à 14.7%, 1 mL = 2mmol  
KCl amp. à 7.5%, 1 mL = 1 mmol  
MgSO4 10%, 1 mL = 0.41 mmol  
Uniquement pour patients cardiaques pendant les premières 48 heures post-op  
Ca Glucose 10%, 1 mL = 0.225 mmol  
Uniquement pour patients cardiaques pendant les premières 48 heures post-op

## Current drug record data

- Drug (international nonproprietary name and proprietary name)
- Formulation
- Route of administration
- Default dosage
- Other Dosages
- Default dose interval
- Other dose intervals
- Maximal absolute dosage per dose
- Maximum dosage/kg/dose
- Maximum dosage/m<sup>2</sup>/dose
- Maximum absolute dosage per day
- Maximum dosage/kg/day
- Maximum dosage/m<sup>2</sup>/day
- Indications (with age-specific administration recommendations)
- Pharmacologic information (including administration-specific info such as perfusion rate, dilution guidelines, etc)
- Responsible physicians for the record

## Improvements • Current status

- Current database: 447 drugs
- Compounding (ointments, patient-specific dosages, topical preparations) prescription
- Patient-specific Parenteral Nutrition prescription
- Overdose alert if prescribed dose > 110% of accepted maximum dosage
- Validation screen requesting dose confirmation, indicating prescribed dose/kg or dose/m<sup>2</sup> with colored alert in case of possible overdosing
- Alert when prescribing a drug to a patient already receiving the same drug or another drug with the same INN
- Immediate generation of a weight/age based emergency drugs reference PDF to be used in case of medical emergency
- Suggestion to use PO formulation instead of IV route when same biodisponibility (i.e. Metronidazole, Ciprofloxacin, ...)
- Suggestion to use equivalent but less expensive alternative or generic drug
- Pediatric drugs identified by a specific logo, and appearing at the top of the list when using search functions

## Solved Problems

- No recorded weight for the patient = default to 70 kg  
— user alerted that no patient weight was entered
- Dose prescription box accepting non-standard units  
— imposed unit, user can only enter numerical doses values in text box

## Future

- Rational rounding of prescribed drug doses
- Oncology prescriptions (Chemotherapy protocols)
- Semi-automatic therapeutic drug monitoring prescription
- Alerts for interactions/incompatible drugs
- Outpatient clinic deployment
- Swiss Pediatric Drug Database