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 Prescriptible drugs database specific to pediatrics, structured, validated by experts, and easy to update

Prescoped creation

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

Difficulties 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

Preparations
- Nursing: Drug preparation
- Pharmacy: Dosage recommendations

validation of 346 drug records

Two regularly prescribing experts per drug

March 2006

20 meetings

October 2006

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 dosagel/kg/dose
- Maximum dosagel/m²/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

Orderset with condition-specific orders subset
- Electronic orderset, condition-specific orders subset

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/m² 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