

Experts opinion and technical assessment allows the selection of drug related problems to be targeted by a CDSS in pediatrics

Selection of clinical rules for the screening of high-risk situations in paediatric medicine

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Objectives

- Develop a selecting method for clinical rules (CR) dedicated to prevent critical drug related problems (DRP) *via* our clinical decision support system (CDSS)
- Draw up a list of CR adapted to the pediatric department

Conclusion

- Selection criteria for CR took into account
 - Experts opinion regarding DRP potentiel clinical impact and relevance
 - The feasibility to implement CR in PharmaCheck
- 24 Clinical rules were selected, 8 concerned all pediatric specialties and should be implemented in priority for better efficiency

PharmaCheck

is a CDSS for the screening of high-risk situations with CR involving drug prescriptions, lab values, vital signs and medical problems

Identification of clinical rules potentially relevant for pediatrics

with a literature review: 56 CR potentially relevant for children were selected and presented to 14 senior physicians (experts) in 8 pediatric specialties

CR were scored by the pharmacist in charge of PharmaCheck for technical feasibility, by the expert panel for relevance and criticality

Technical feasibility scale		Clinical relevance scale	
Score	Definition	Score	Definition
0	No feasible	0	No relevant
33.3	Hardly feasible	33.3	CR is relevant if modified
66.6	Easily feasible	66.6	Relevant
100	Very easily feasible	100	Very relevant

Criticality	Score
Extreme	15 to 25
High	8 to 14
Moderate	4 to 7
Low	1 to 3

Criticality = PxS

Probability of occurrence scale (Score = P)		Severity of DRP scale (score = S)	
Score	Definition	Score	Definition
1	Rare	1	Negligible
2	Unlikely	2	Minor
3	Possible	3	Moderate
4	Likely	4	Major
5	Almost certain	5	Catastrophic



Inclusion of pediatric medical specialties according to the 2 computerized physician order entries used in Geneva University Hospital
Group A : general pediatrics, oncology, pneumology, gastroenterology/hepatology, surgery, cardiology;
Group B : intensive care, neonatology

CR concerning more than 1 pediatric specialty (assessed by > 1 experts)	CR concerning only 1 pediatric specialty (assessed by 1 expert)
Criticality score ≥ 8	Criticality score ≥ 15
Relevance score = 100	Relevance score = 100
Feasibility score ≥ 66.6	Feasibility score ≥ 66.6

Drug-drug interaction

- Prescription of CYP3A4 substrate with a strong inducer or inhibitor
- Co-prescription of ≥ 3 analgesic or sedative drugs
- Co-prescription of ≥ 2 NSAIDs
- Co-prescription of a macrolide with ciclosporin or tacrolimus
- Co-prescription of methotrexate and trimethoprim
- Co-prescription of immunosuppressive therapy over/under-dosed (blood level) with a strong CYP3A4 inducer or inhibitor
- Co-prescription of parenteral calcium with digoxine
- Co-prescription of aminoglycoside with another ototoxic medication
- Co-prescription of ≥ 2 nephrotoxic medications
- Co-prescription of ≥ 2 drugs inducing QT-prolongation

Medication with abnormal lab value

- Parenteral potassium chloride with hyperkalemia
- Vancomycin dose not adjusted to renal function
- Aminoglycosides prescription with supra-therapeutic blood levels
- Furosemide prescription with hypokalemia, hyponatremia or hypovolemia
- Heparin prescription with thrombopenia
- Insulin prescription with hypoglycemia
- Low molecular weight heparin prescription with severe or terminal renal impairment

Inappropriate administration mode

- Methotrexate inappropriate frequency of administration
- Vancomycine inappropriate length of administration
- Peripheral venous infusion of potassium chloride at a concentration greater than 40 mmol/l

Medication contraindicated or to use with caution

- Dose confusion between non-liposomal and liposomal amphotericine-B
- Prescription of a nephrotoxic medication for ≥ 3 days
- Paracetamol dose greater than maximum authorized daily-dose/unique dose

Medication omission

- Opioid prescription for more > 48h without laxative medication

CR common to all specialties in group A and group B
 CR specific for group A
 CR specific for group B

24 clinical rules were selected after assessment of their criticality, their relevance and their technical feasibility