

Pharmaceutical care in an inpatient pediatric intensive care unit: an international multicenter study

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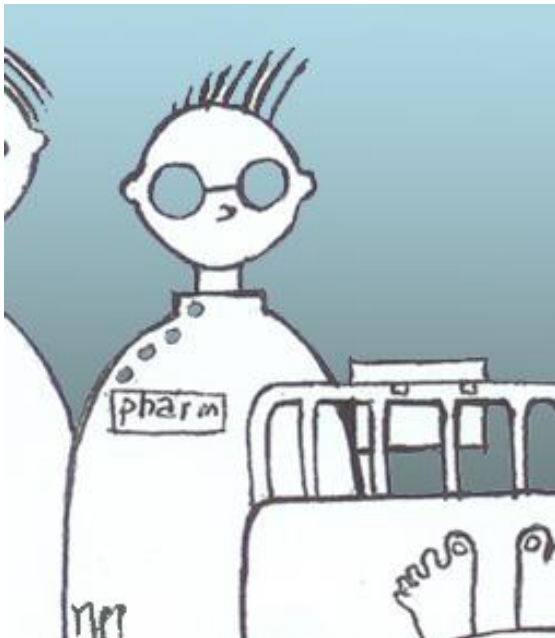
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Participants and support

Participants:



F



Q



S



B

Support:



Réseau Mère Enfant de la Francophonie



Introduction

- Pediatric intensive care patient = **high risk** for drug-related problems
- **Variable development** of pharmaceutical care among francophone countries
- Objective = **to describe drug-related problems and interventions** of four decentralized pharmacists in pediatric intensive care/cardiac units

Materials & Methods

- Multicenter, descriptive and prospective study
- 6-month period (August 1st 2009 – January 31st 2010).
- 4 different pharmacists
- 4 pediatric units : France (F), Quebec Canada (Q), Switzerland (S), and Belgium (B)
- Data concerning patients, drugs, intervention, documentation, approval (if needed), and estimated impact compiled
- Tool developed by the French Society of Clinical Pharmacy

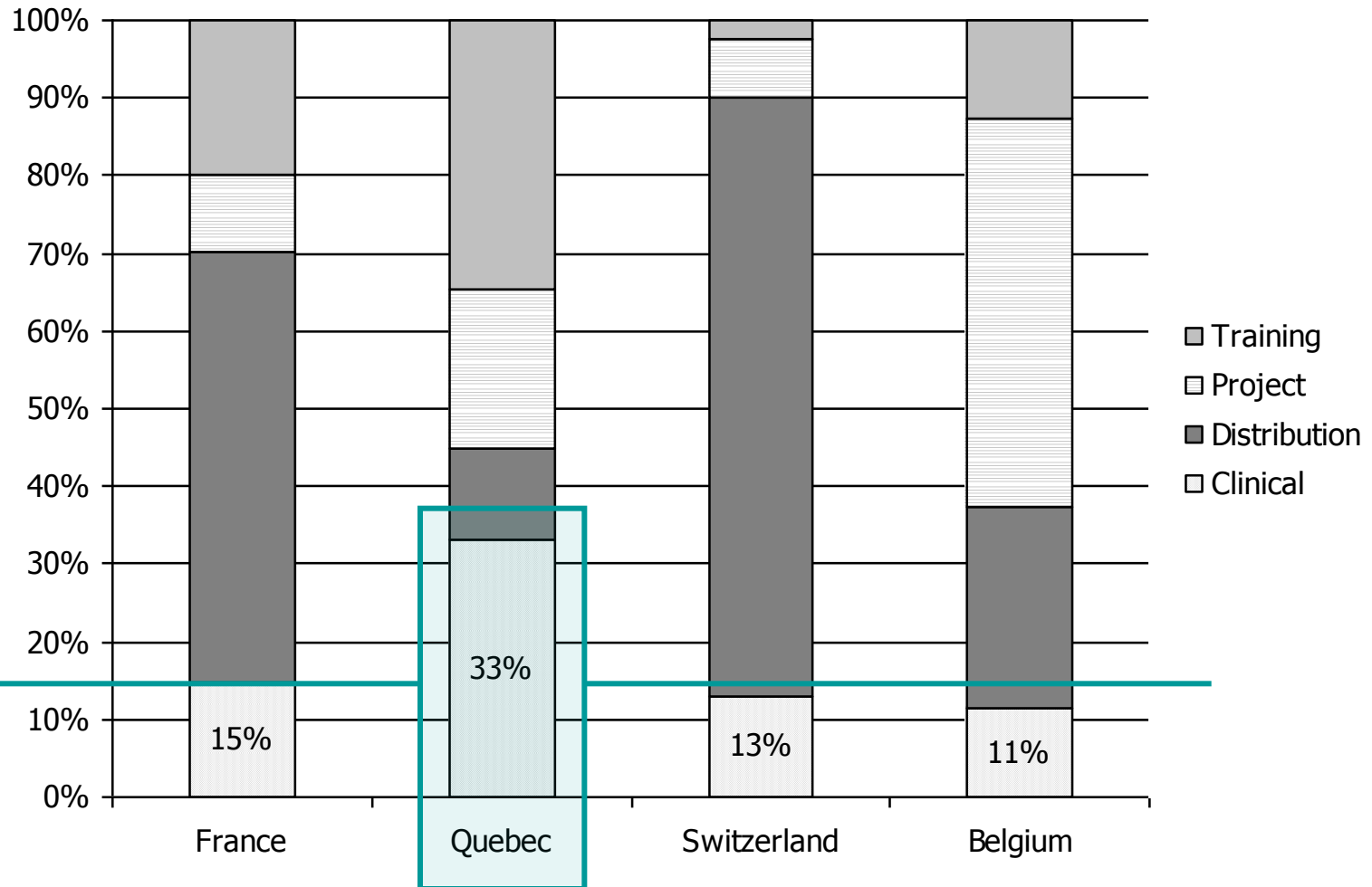
Context

	<i>F</i>	<i>Q</i>	<i>S</i>	<i>B</i>
Hospital Center	Robert Debré	Ste Justine	CHUV	St Luc
Teaching hospital	Yes	Yes	Yes	Yes
Total number of beds	440	350	1325	900
Pediatric beds %	86%	86%	8%	11%
Number of pharmacists	12	30	12	11
Number of technicians	18	40	30	15
Pharmacist				
Diploma	2004	1998	1987	2002
Unit speciality	I	I (and C)	I	C
Computerized prescription	Yes	No	No	Yes
Number of beds of clinical unit	13	23	9	15
Pharmaceutical care training	Yes	Yes	Yes	Yes

I : Intensive Care Unit

C : Cardiology

Results: Pharmacists daily activities

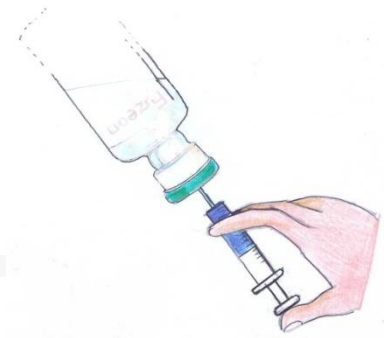


Results: 269 Patients

	<i>F</i>	<i>Q</i>	<i>S</i>	<i>B</i>	<i>Total</i>
Nb of patients	88	56	56	69	269
Nb of boys (%)	53 (60%)	31 (55%)	21 (37%)	36 (52%)	141 (52%)
Age ¹	1.1y [0d-22.1y]	7mo [2d-16.8y]	1.1y [6d-17.5y]	4.7 [3d-17.0y]	1.8y [0d-22.1y]
Weight ¹	8.6 [1.7-60.0]	6.0 [2.7-70.0]	8.7 [1.6-55.0]	17.3 [2.5-56.0]	10.8 [1.6-70.0]
Clinical unit N (%)					
ICU	88 (100%)	48 (86%)	56 (100%)		192 (71%)
Cardiology		8 (14%)		69 (100%)	77 (29%)
Interventions N	238	278	351	129	996
Interventions/pts ¹	2 [1-17]	2 [1-43]	2 [1-83]	1 [1-7]	2 [1-83]
Interventions/day ¹	3 [1-17]	6.5 [1-17]	3.5 [1-19]	3.5 [1-12]	4 [1-19]
Days	59	42	63	28	192

¹Med [Min-Max]

Results: 996 drug-related problems and interventions



5 major drug-related problems ...

Improper administration	293	(29.4%)
Untreated indication	254	(25.5%)
Dose too high	106	(10.6%)
Subtherapeutic dose	92	(9.2%)
Adverse drug reaction	92	(9.2%)

...and 4 major interventions

Administration modalities optimization	310	(31.1%)
Dose adjustment	200	(20.1%)
Addition of new drug	186	(18.7%)
Drug monitoring	164	(16.5%)

Examples of drug-related problems

- Drug interaction between cyclosporine and mycophenolate => TDM
- Cholecalciferol prescribed and not administered
- Esomeprazole 50 mg q 12h IV => 40 mg
- Drug compatibility levosimendan – heparin => laboratory test

Other results

- 2 major drug classes:
 - anti-infectives for systemic use (233, 23%)
 - alimentary tract and metabolism drugs (218, 22%)
- Interventions towards mainly physicians: residents, senior doctors or all clinical staff (726, 73%).
- 731 (83%) interventions accepted among the 879 (88%) requiring a physician's approval
- Clinical impact: moderate (51%) or major (17%)
- Economic impact positive 10% (27% in Belgium)

Discussion: Strength and limits

Strength:

- First multicenter and international study in pediatric intensive care and cardiac units

Limits:

- Impact **auto-evaluation**
- Cardiac **versus** Intensive Care Unit
- Only **senior** pharmacists' interventions

Conclusion

- Decentralized pharmacist at patient bedside is a pre-requisite for pharmaceutical care
- There are limited studies comparing the activity of clinical pharmacists between countries
- Clinical pharmacists are able to identify and solve drug-related problems in pediatric intensive care and cardiac units!