

Drug Prescriptions Requiring Compounding at a Canadian University Affiliated Pediatric Hospital: A Cross-Sectional Study

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Introduction

Many drugs administered to Canadian children remain unavailable in commercial formulations that suit their needs. This leads to compounding and though it is common in pediatrics, the importance of this practice in recent years is not well described.

Objectives

To determine the proportion of:

- Active prescriptions (aRx) of compounded drugs for enteral administration (CDEA) in hospitalized children, among all aRx;
- Hospitalized children prescribed ≥ 1 CDEA, among all children with aRx.

Methods

- This cross-sectional retrospective study was conducted at a Canadian university affiliated pediatric hospital
- Between March 20th, 2019 and March 19th, 2020 on 2 randomly selected days:
 - 07/23/2019 (summer);
 - 02/26/2020 (winter).
- All aRx for hospitalized patients under 18 years of age were identified using the hospital pharmacy database
- Demographic data were collected from patient medical records
- Patients excluded: in one-day surgery unit, delivery room, emergency room (N=131).
- Descriptive statistical method comprised means and medians.

CDEA Definition

Drug requiring manipulation (compounding) to be adequately administered to children:

- Solids: tablet splitting (TS), capsule opening or other solid CDEA (OS)
- Liquids: tablet-based (TB), injectable-based (IB) or powder-based (PB) solution, suspension or syrup.

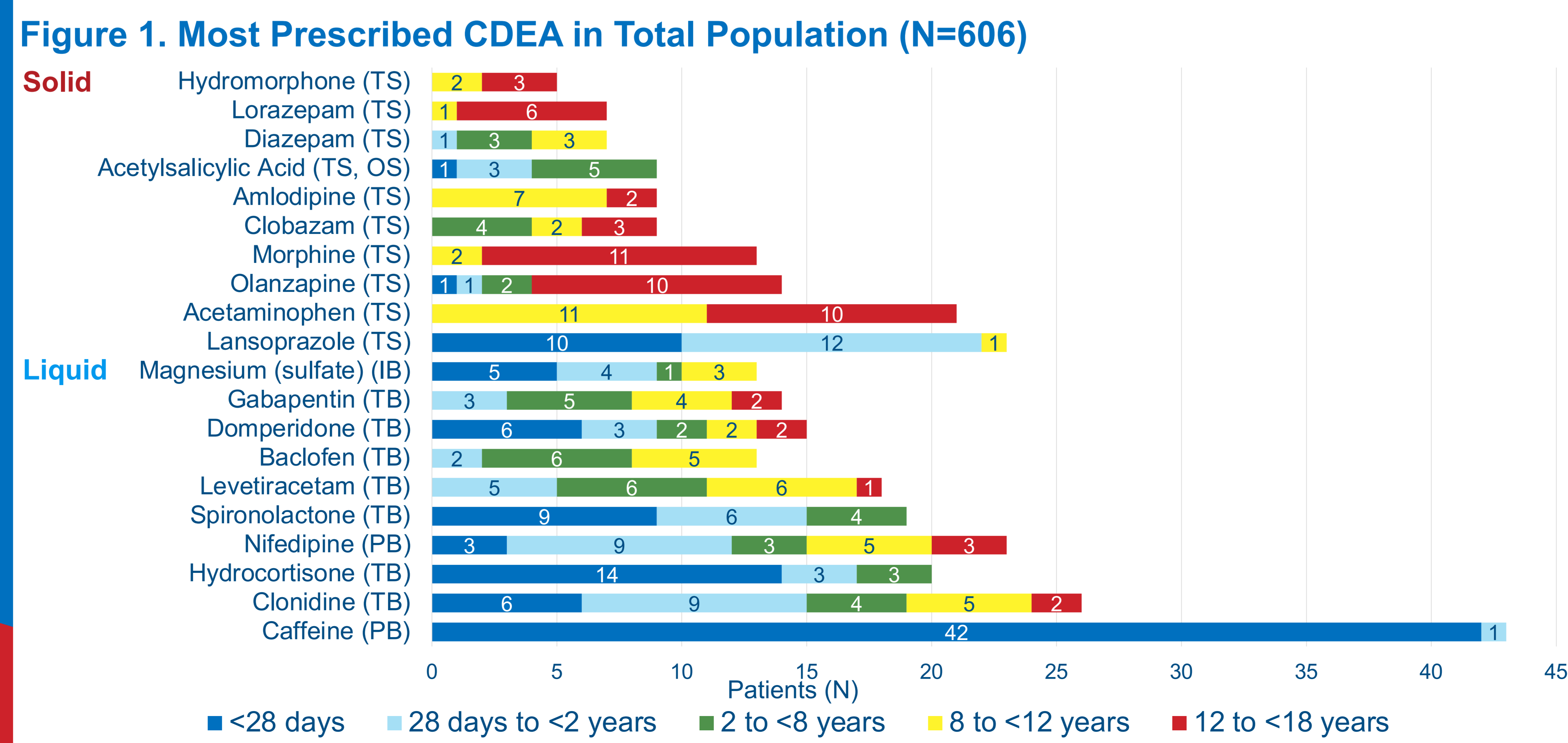
Results

- 606 hospitalized children with 5465 aRx (Tables 1 & 2), comprising 390 drugs, were included
- CDEA represented 13.1% (n=714) of all aRx (Table 1), but 23.2 % of aRx for enteral administration (n=3075)
- 31.9% (n=228) of all CDEA were prescribed for twice a day administration

Table 1. Characteristics of Active Prescriptions and CDEA in Total Population (N=606)

Parameter	Total (N = 606)	Age group				
		<28 days (N = 213)	28 days to <2 years (N = 108)	2 years to <8 years (N = 85)	8 years to <12 years (N = 71)	12 years to <18 years (N = 129)
Active Prescriptions, n (%)	5465 (100.0)	1225 (100.0)	893 (100.0)	1000 (100.0)	1054 (100.0)	1293 (100.0)
Enteral route	3075 (56.3)	712 (58.1)	454 (50.8)	550 (55.0)	584 (55.4)	775 (59.9)
Commercial Form	2361 (43.2)	530 (43.3)	327 (36.6)	409 (40.9)	428 (40.6)	667 (51.6)
CDEA	714 (13.1)	182 (14.9)	127 (14.2)	141 (14.1)	156 (14.8)	108 (8.4)
Liquid	478 (8.7)	168 (13.7)	96 (10.8)	106 (10.6)	85 (8.1)	23 (1.8)
Tablet-based	299 (5.5)	74 (6.1)	68 (7.6)	91 (9.1)	53 (5.1)	13 (1.0)
Injectable-based	92 (1.7)	38 (3.1)	13 (1.5)	9 (0.9)	25 (2.4)	7 (0.5)
Powder-based	87 (1.6)	56 (4.6)	15 (1.7)	6 (0.6)	7 (0.1)	3 (0.2)
Solid	236 (4.3)	14 (1.1)	31 (3.5)	35 (3.5)	71 (6.7)	85 (6.6)
Tablet splitting	231 (4.2)	13 (1.1)	28 (3.2)	35 (3.5)	70 (6.6)	85 (6.6)
Other solid CDEA	5 (0.1)	1 (0.1)	3 (0.3)	1 (0.1)	1 (0.1)	0
Parenteral route	2390 (43.7)	513 (41.9)	439 (49.2)	450 (45.0)	470 (44.6)	518 (40.1)

- 122 drugs were compounded and included mainly drugs of following therapeutic areas:
 - Central nervous system (35.3%)
 - Cardiovascular system (20.9%)
 - Gastro-intestinal system (12.0%)
- Top 10 of liquid and of solid CDEA are shown in Figure 1



- Children with ≥ 1 CDEA (N=298 [49.2%]) (Table 2) received a median (min, max) of 2 (1, 10) CDEA per child

Table 2. Characteristics of Total Population (N=606) and Patients with at Least One aRx of CDEA (N=298)

Parameter	Total N=606	Receiving ≥ 1 CDEA (N=298)
Proportion, %	100.0	49.2
Age Group, N (%)		
<28 days	213 (35.2)	75 (35.2)
28 days to <2 years	108 (17.8)	55 (50.9)
2 to < 8 years	85 (14.0)	51 (60.0)
8 to < 12 years	71 (11.7)	51 (71.8)
12 to < 18 years	129 (21.3)	66 (51.2)
Sex, N (%)		
Male	318 (52.5)	160 (50.3)
Female	288 (47.5)	138 (47.9)
Hospital Unit, N (%)		
Pediatric ICU	47 (7.8)	37 (78.7)
NICU	121 (20.0)	58 (47.9)
Nursery	56 (9.2)	0
Hematology-Oncology	50 (8.3)	43 (86.0)
Pediatrics	124 (20.5)	40 (32.3)
Surgery	74 (12.2)	25 (33.8)
Multispecialty	78 (12.9)	50 (64.1)
Rehabilitation Centre	56 (9.2)	45 (80.4)
Active Prescriptions, n (%)	5465 (100.0)	4018 (73.5)
Enteral administration	3075 (56.3)	2268 (73.8)

Conclusion

Many of these CDEA exist in child-friendly formulations in other countries, but availability in Canada remains challenging, as shown by our study demonstrating that almost half of all hospitalized children had an active prescription for an oral compounded drug on two randomly selected days. International collaboration is mandatory to facilitate access to child-friendly formulations as they become available in trusted foreign jurisdictions.

Disclosure Summary

No conflicts of interest to declare pertaining this project.

É. K. Landry, D. Lebel, M.-É. Métras: Nothing to disclose

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