

## CHI Learning & Development (CHILD) System

## **Project Title**

Ensuring a Safe and Effective Psychotropic Medication Titration

## **Project Lead and Members**

Project lead: Dr Evelyn Law Chung Ning

Project members: Chan Sherlyn SJ; Teh Jean; Dr Chong Shang Chee

## Organisation(s) Involved

**National University Hospital** 

## Healthcare Family Group(s) Involved in this Project

Medical, Healthcare Administration

## **Applicable Specialty or Discipline**

Pediatrics, Specialist Associate, Research Assistant

## **Project Period**

Start date: Jan 2022

Completed date: Feb 2023

## **Aims**

- Ensure >90% of families use medication titration materials and >50% are comfortable communicating dosage titration outside of in-person visits within 12 months of implementation
- Decrease number of days needed to reach the most effective dose of psychotropic medication

## **Background**

See poster attached/below



## CHI Learning & Development (CHILD) System

### **Methods**

See poster attached/below

### **Results**

See poster attached/below

### **Lessons Learnt**

This was a 1.5-year project that began early in 2021 when our team identified and define the problem of psychotropic medication titration within the Child Development Unit, Department of Paediatrics, National University Hospital. We then set SMART goals and completed a gap analysis by mid-2021. We collected information about our patients and families from May to October 2021, which was captured in Table 1. On 1 October 2021, we embarked on our interventions and obtained data after 1 year. Here is the A3 poster which was generated when the project was completed on 27 February 2023

### Conclusion

See poster appended/below

## **Additional Information**

Accorded the NUH QIX Award\* (Merit) Winner for period Jan-Apr 2023

\*Quality Improvement Award for Process eXcellence & Service eXperience

## **Project Category**

Care & Process Redesign

Quality Improvement, Clinical Practice Improvement, Lean Thinking

## **Keywords**

Psychotropic Medication, Titration, Mental Health, Child Development Unit



## CHI Learning & Development (CHILD) System

## Name and Email of Project Contact Person(s)

Name: Dr Evelyn Law

Email: evelyn\_law@nuhs.edu.sg

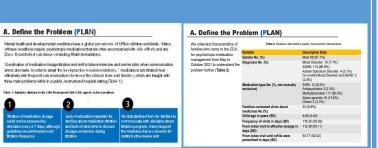
## **Incredible Care QIX Award (Process Excellence)**

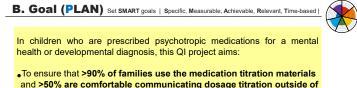




Project Title no. 2 : Ensuring safe and effective psychotropic medication titration				
Department: Department of Pediatrics	Period: January 2021 to February 2023	Author: Dr LAW Evelyn Chung Ning		
Sponsors (HOD): Prof LEE Yung Seng	Team Leader: <b>Dr LAW Evelyn Chung Ning</b>			

Team Members: CHAN Sherlyn SJ, TEH Jean, Dr CHONG Shang Chee





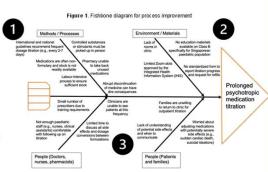
•To decrease the number of days needed to reach the most effective dose of psychotropic medication from the baseline interval to 30 percent of the interval within a 6-month time frame AND for the decreased interval to be maintained for another 6 months

in-person visits within 12 months of implementation

### C. Problem Analysis (PLAN) Gap Analysis

We used the fishbone diagram to understand potential causes of our defined problems. The main "bones" of the fish address 4 contributing factors, including the Methods/Processes, Environment/Materials, and 2 groups of People, those who provide and those who receive healthcare (Figure 1).

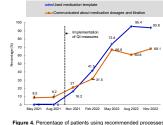
The problems that our CDU team initially defined were all gaps identified in this diagram.

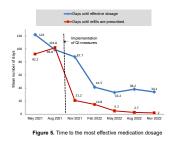




### E. Benefits / Results (CHECK)

At 1-year post intervention, 93.8% of families were using the medication refill template and over two-thirds of families communicated about their titration process before their review visit in the hospital (**Figure 4**). The number of days until effective dosage was reduced from 122.0 (SD 2.9.8) to 34.1 (22.0) days, while the days needed for families to obtain refills decreased to a mean of 2.0 (SD 1.8) days (**Figure 5**).





The 6 box QIX template is brought to you by Quality Improvement Department wef 1 April 2023

### F. Strategy for Spreading/ Sustaining (ACT)

What actions are required for continuous improvement? How will the results be sustained for the long run? Will the project be spread to other areas?

#### Communication with colleagues

- Team leader, Dr Evelyn Law, has used CDU team meetings as a platform to discuss findings of this QI Project early 2023
- The team will ensure that CDU doctors use these interventions across the 3 NUH sites, which include CDU at KTP-NUCMI and 2 community sites (CDU@Keat Hong in Choa Chu Kang and CDU@Jurong Madical Central)
- To discuss this with Department of Psychological Medicine and to see whether QI strategies may be useful in their inter-disciplinary clinics

#### laterials \_

- To ensure that doctors and clinical assistants seeing CDU patients have access to both the education materials and the medication refill template
- A3 posters of the education materials are printed and laminated in respective clinic rooms

### Assess for sustainability

The team will systematically collect data around February every year to understand the pattern of
medication refill template use and to retrospectively examine the number of days needed until effective
dosage and for families to obtain refills.

# A. Define the Problem (PLAN)

Mental health and developmental conditions have **a global prevalence of 16%** in children worldwide.<sup>1</sup> Many of these conditions require psychotropic medications that are often accompanied with **side effects** and are **Class B controlled substances** including Ritalin formulations.

Coordination of medication dosage titration and refill is labour-intensive and carries risks when communication errors are made. In order to adopt **the best-practice recommendations**,<sup>2,3</sup> medications are titrated most effectively with **frequent communications between the clinical team and families**, which are fraught with three main problems within in a public, restructured hospital setting (**Table 1**).

Table 1. Paediatric clinicians in the Child Development Unit (CDU) agreed on these problems

1

Titration of medication dosage could not be assessed by clinicians every 2-7 days, although guidelines recommended such titration frequency

2

Lack of education materials for families about medication titration and lack of clinic time to discuss dosage conversion during titration 3

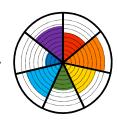
No standardised form for families to communicate with clinicians about titration progress, many stopped the medicine due to concerns for safety by the review visit

# A. Define the Problem (PLAN)

We collected characteristics of families who came to the CDU for psychotropic medication management from May to October 2021 to understand the problem further (**Table 2**).

**Table 2**. Baseline data before quality improvement interventions

Variable	Descriptive Data
Gender No. (%)	Male 88 (67.7%)
Diagnosis No. (%)	Mood Disorder: 10 (7.7%) ADHD: 113 (86.9%) Autism Spectrum Disorder: 4 (3.1%) Co-morbid Mood Disorder and ADHD: 3 (2.3%)
Medication type No. (%, not mutually exclusive)	SSRI: 12 (9.2%) Antipsychotics 3 (2.3%) Methylphenidate 117 (90.0%) Alpha agonists 18 (13.8%) Others 3 (2.3%)
Families contacted clinic about medicines No (%)	23 (8.9%)
Child age in years (SD)	8.89 (4.40)
Frequency of visits in days (SD)	118.25 (29.92)
From index visit to effective dosage in days (SD)	112.38 (50.11)
From index visit until refills were prescribed in days (SD)	94.77 (82.02)



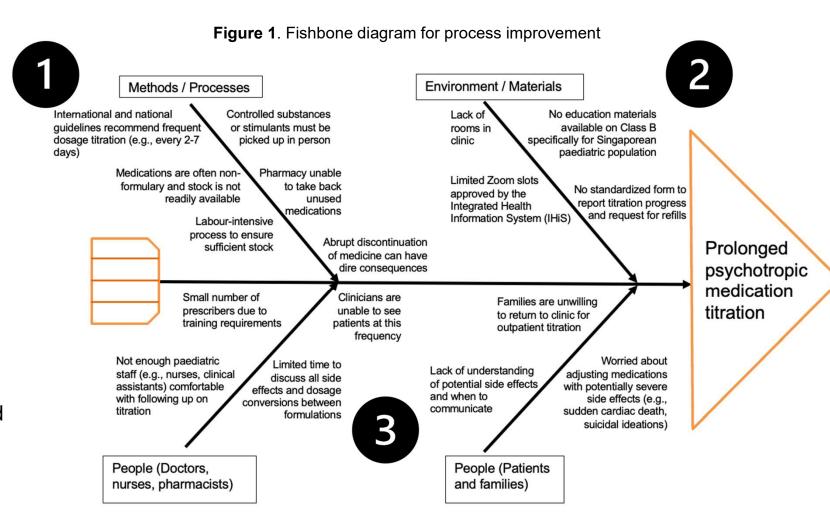
In children who are prescribed psychotropic medications for a mental health or developmental diagnosis, this QI project aims:

- To ensure that >90% of families use the medication titration materials and >50% are comfortable communicating dosage titration outside of in-person visits within 12 months of implementation
- •To decrease the number of days needed to reach the most effective dose of psychotropic medication from the baseline interval to 30 percent of the interval within a 6-month time frame AND for the decreased interval to be maintained for another 6 months

# C. Problem Analysis (PLAN) Gap Analysis

We used the fishbone diagram to understand potential causes of our defined problems. The main "bones" of the fish address 4 contributing factors, including the Methods/Processes, Environment/Materials, and 2 groups of People, those who provide and those who receive healthcare (Figure 1).

The problems that our CDU team initially defined were all gaps identified in this diagram.



# **D.** Interventions & Action Plan (DO)

	Problem	People responsible	Date of implementation	Interventions & Action plan
1	Methods/Processes: Frequent need for dosage adjustments based on guidelines	CDU team and patients	1 Oct 2021	<ul> <li>Discussed the Singapore guidelines and created standardised instructions for families to titrate medications at home</li> <li>Added new communication channels between providers and patients</li> </ul>
2	Methods/Processes: Unavailable medication stock	Doctors and the KTP-NUCMI pharmacy team	21 Jan 2022	<ul> <li>Discussed with head pharmacist Lai Ping Yeong on stocking psychotropic medications on MOH Standard Drug List 2 in the KTP-NUCMI formulary</li> <li>On 7 Sep 2022, we received news that the most commonly used stimulant medications were stocked in NUH</li> </ul>
3	Materials: No education materials	CDU team	1 Oct 2021	See Figure 2 on our new education materials
4	Materials: No standardised refill form	CDU team	24 Sep 2021	See <b>Figure 3</b> on our new medication refill form used by all families to ensure no errors with prescriptions
5	People: Small numbers of prescribers due to training requirements	CDU team	3 Jan 2022	While doctors below Associate Consultant (AC) could not order many of these medications, a triage process was instituted for AC and above to see children requiring pharmacotherapy
6	People: Discomfort with communicating medication titration	Clinical Assistants and Specialist Associates	27 Oct 2021	We standardised our emails to families on how to report medication titration progress with the team and the clinic staff were trained to use them for communication with patients

## **D.** Interventions & Action Plan (DO)

Every 3 months, the clinical team reviewed the communications from families and extracted details on 4 variables, which included **% families using the medication template**, **% who communicated about their titration process**, **# days from index visit to effective dosage**, and **# days for refills to be prescribed**.

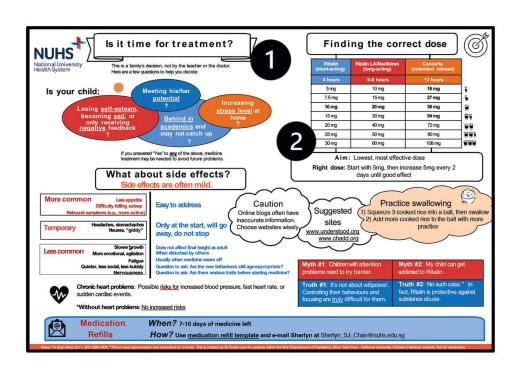


Figure 2. Education materials to teach families about medication titration

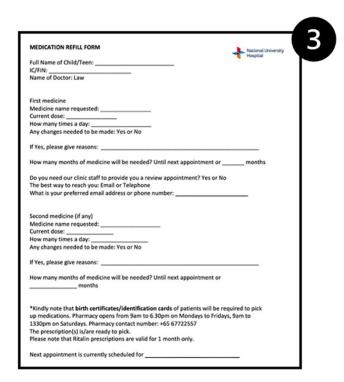


Figure 3. Medication refill template

# E. Benefits / Results (CHECK)

At 1-year post intervention, 93.8% of families were using the medication refill template and over two-thirds of families communicated about their titration process before their review visit in the hospital (**Figure 4**). The number of days until effective dosage was reduced from 122.0 (SD 29.8) to 34.1 (22.0) days, while the days needed for families to obtain refills decreased to a mean of 2.0 (SD 1.8) days (**Figure 5**).

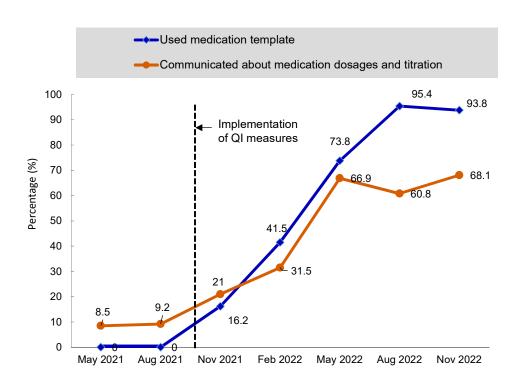


Figure 4. Percentage of patients using recommended processes

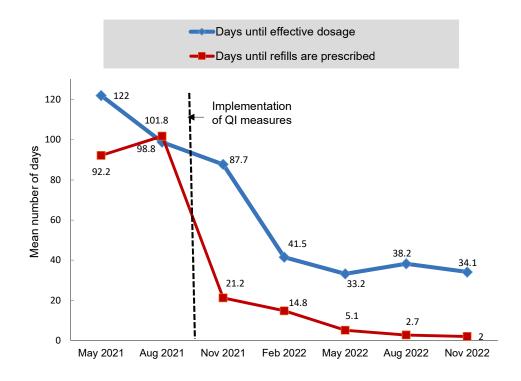


Figure 5. Time to the most effective medication dosage

# F. Strategy for Spreading/ Sustaining (ACT)

What actions are required for continuous improvement? How will the results be sustained for the long run? Will the project be spread to other areas?

## Communication with colleagues

- Team leader, Dr Evelyn Law, has used CDU team meetings as a platform to discuss findings of this QI Project early 2023
- The team will ensure that CDU doctors use these interventions across the 3 NUH sites, which include CDU at KTP-NUCMI and 2 community sites (CDU@Keat Hong in Choa Chu Kang and CDU@Jurong Medical Centre)
- To discuss this with Department of Psychological Medicine and to see whether QI strategies may be useful in their inter-disciplinary clinics

## **Materials**

- To ensure that doctors and clinical assistants seeing CDU patients have access to both the education materials and the medication refill template
- A3 posters of the education materials are printed and laminated in respective clinic rooms

## Assess for sustainability

- The team will systematically collect data around February every year to understand the pattern of medication refill template use and to retrospectively examine the number of days needed until effective dosage and for families to obtain refills.

## **Appendix**

Show evidence and team effort to illustrate project implementation journey

This was a 1.5-year project that began early in 2021 when our team identified and define the problem of psychotropic medication titration within the Child Development Unit, Department of Paediatrics, National University Hospital. We then set SMART goals and completed a gap analysis by mid-2021. We collected information about our patients and families from May to October 2021, which was captured in Table 1. On 1 October 2021, we embarked on our interventions and obtained data after 1 year. Here is the A3 poster which was generated when the project was completed on 27 February 2023.



## Ensuring safe and effective psychotropic medication titration <sup>1,2</sup>Evelyn C Law, Sherlyn SJ Chan, Aveline Ajalan Vasu, Aishworiya Ramkumar, Shang Chee Chong



Child Development Unit, Department of Paediatrics, Khoo Teck Puat – National University Children's Medical Institute, National University
Hospital Singapore \* Department of Paediatrics, Young Log Lin School of Medicine, National University of Singapore, Singapore.

#### INTRODUCTION

Mental health and developmental conditions have a global prevalence of 16% in children worldwide (GRDDC, 2019). Many of these conditions require psychotropic medications that are often accompanied with side effects and are

Coordination of medication dosage titration and refill is labour-intensive and carries risks when communication errors are made.

In order to adopt the best-practice recommendations (MOH 2014; AAP 2019) medications are titrated most effectively with frequent communications between the clinical team and families, which may not be possible in a restructured hospital setting.

#### **PROBLEM**

Paediatric clinicians who routinely prescribe psychotropic medications in the Child Development Unit (CDU) agreed on the following problems:

Titration of medication dosage could not be assessed by clinicians every 2-7 days, although guidelines recommended such titration frequency

2 Lack of education materials for families about medication titration at lack of clinic time to discuss dosage conversion during titration

No standardised form for families to communicate with clinicians about titration progress, many discontinued the medicine due to concerns for safety by the review visit

#### AIMS

In children who are prescribed psychotropic medications for a mental health or developmental diagnosis, this Ol project aims: • To ensure that >90% of families use the medication titration materials and >50% are comfortable communicating dosage titration <u>outside of in-person visits</u> within 12 months of

To decrease the number of days needed to reach the most effective dose of psychotropic medication from the baseline interval to 30 percent of the interval within a 8-month time frame AND for the decreased interval to be maintained for another 6

### METHODS

We first collected characteristics of families who came to the CDU psychotropic medication management from May to October 2021 (Table 1).

#### Table 1. Patient baseline characteristics

 Child age in years (SD)
 8.89 (4.40)

 Frequency of visits in days (SD)
 118.25 (29.92)

 From index visit to effective dosage in days (SD)
 112.38 (50.11)

 From index visit until refills were prescribed in days (SD)
 94.77 (82.02)

Note: ADHD = Attention-Deficit/Hyperactivity Disorder

We started implementation of QI measures (see Targeted Interventions). Every 3 months, the clinical team reviewed the communications from families and extracted details on 4 variables, which included % families using the medication template, % who communicated about their thration process, # days from index visit to effective desage, and # days for refills to be prescribed.

### TARGETED INTERVENTIONS

On 1 October 2021, we initiated the use of education materials (Fig 1) for families to address Problems 1 & 2.
 We also implemented a standardised psychotropic medication reporting and refill form (Fig 2) to address Problems.

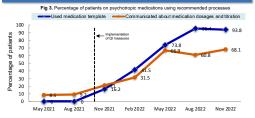


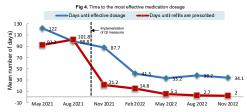


Fig 1. Education materials to teach families about medication titrati

Fig 2. Medication refill templat

### RESULTS





At 1-year post intervention, the majority of families (93.8%) were using the medication reporting and refill forms and over two-inflors of families communicated about their titration process before their review visit in the hospital. The number of days until effective dosage was reduced from 122.0 (SD 29.8) to 34.1 (22.0) days, while the days needed for families to obtain refills decreased to a men of 20.(SD 1.3) days.

### CONCLUSIONS

While the frequency of clinic visits remain the same, the provision of (a) easy-to-understand education materials in infographic format and (b) standardised medication reporting forms have empowered families to conduct medication titration at home, as recommended by evidence-based guidelines, and have reduced the days needed to reach the most effective dosage. To obtain a refill takes a mean of 2 days for families, which may increase medication continuity.

#### REFERENCES

Obsanya BO, Kancherla V, Shaheen A, Ogbo FA, and David AC, on behalf of the Global Research on Developmental Disabilises Collaborators (GRDDC); (2022) Froot Public Feath. DOI: 103389/jubh. 2022 977453. 2 Anademy of Medicine of Singapore - Ministry of Health Cinical Practice Guidelines on Attention-Deficil Viperactivity Disorder (FoldPDI). May 2014. Singapore: Ministry of Health Cinical Practice Guideline of Attention-Deficil Viperactivity Disorder (FoldPDI). May 2014. Singapore: Ministry of Health ISBN 978-881-09-0767-9.3. Workaich MI, Hagan JF., Allan C, Chan E, on behalf of the American Academy of Pediatrics (APP). (2019) Pediatrics. Clinical Practice Guideline for the Diagnosis. Evaluation, and Treatment of Attention-Deficil-Viperactivity Biosorder in Children and Adolescents. Dol 101.151/29/pedia/2019-2282.

## References

- Olusanya BO, Kancherla V, Shaheen A, Ogbo FA, and David AC, on behalf of the Global Research on Developmental Disabilities Collaborators (GRDDC). (2022) Front Public Health. DOI: 10.3389/fpubh.2022.977453.
- 2. Academy of Medicine of Singapore Ministry of Health Clinical Practice Guidelines on Attention-Deficit/ Hyperactivity Disorder (ADHD). May 2014. Singapore: Ministry of Health. ISBN 978-981-09-0767-9.
- 3. Wolraich ML, Hagan JF., Allan C., Chan E, on behalf of the **American Academy of Pediatrics** (AAP). (2019) Pediatrics. Clinical Practice Guideline for the Diagnosis, Evaluation, and Treatment of Attention-Deficit/Hyperactivity Disorder in Children and Adolescents. DOI:10.1542/peds/2019-2528.