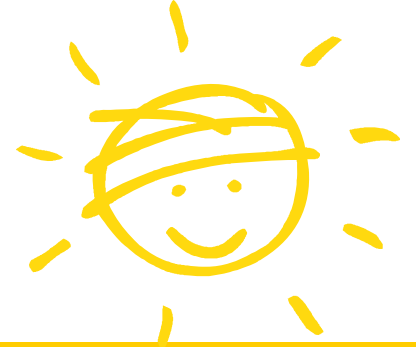


INTRODUCTION



*This presentation is in 2 parts and was given by
Dr Madlen Gazarian, Paediatric Clinical Pharmacologist and
Head, Paediatric Therapeutics Program, University of NSW
and Sydney Children's Hospital (SCH), Randwick:*

- (1) Presentation of findings of 4 year research project based at SCH, including implementation of Paed-NIMC in final year*
- (2) Introduction to Paed-NIMC Implementation & Evaluation resources for national use, based on tools and resources developed in (1) and endorsed for national use by Children's Hospitals Australasia and ACSQHC*



LONG TERM IMPROVEMENTS IN PAEDIATRIC MEDICATION SAFETY

The Science to Support the Policy and Practice

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Paediatric Therapeutics Program

School of Women's and Children's Health, UNSW

Sydney Children's Hospital, Randwick





The problem

- ◆ Medication errors in hospitalised children occur at similar rates to adults but have greater potential to cause harm
- ◆ Estimated **5-27%** of paediatric medication orders have **errors** ("true" figure closer to **~ 5%**)
 - approx 80% of medication errors associated with potential **harm** are **prescribing** errors

Fortescue EB et al, Paediatrics 2003;111:722-729
Miller M R et al. Qual Saf Health Care 2007

Potential solutions?



- ◆ Wide-ranging recommendations for preventing paediatric medication errors are available

eg...

- Institute for Safe Medication Practices (US & Canada)
- American Academy of Pediatrics
- Others...

Levine SR et al, J Paediatr Pharmacol Ther 2001;6:426-42

- ◆ All largely ***unproven*** in paediatric inpatient setting
 - *especially re impact on patient outcomes (eg harm)*

Miller M R et al. Qual Saf Health Care 2007

Potential solutions?



- ◆ 3 interventions prioritised as having the greatest “potential” to reduce medication errors in children:

Fortescue EB et al, Paediatrics 2003;111:722-729

- 1) improved **communication** among doctors, nurses & pharmacists
- 2) ward based **clinical pharmacists**
- 3) computerised physician order entry (**CPOE**) & **clinical decision support**

CPOE



- ◆ Firm consensus re great potential
- ◆ Actual effect on improving safety more controversial
 - ◆ Reduce some errors
 - ◆ Unique errors associated with CPOE
 - ◆ No clear impact on clinically important outcomes (eg harm)
- ◆ Important success variables
 - ◆ Presence of decision support systems (CPOE + DSS)
 - ◆ Quality of implementation process
- ◆ Very costly and not widely available
 - ◆ Special challenges for paediatric population

Mollon B et al. BMC Medical Informatics and Decision making 2009;9:11

Van Rosse F et al. Pediatrics 2009;123:1184-1190

Aims



*To evaluate the effectiveness of **safe prescribing guideline implementation** in reducing medication related **error and harm** in hospitalised children*

- **Gazarian M, Graudins LV. Long term improvements in paediatric medication safety: the science to support the policy and practice. National Medicines Symposium 2008, Canberra**
- **Gazarian M. Graudins LV. Improving Medication Safety in Hospitalised Children: An effective model for sustained change. 9th World Conference on Clinical Pharmacology & Therapeutics, CPT 2008, Quebec city, Canada**



- ◆ *The slides relating to **Methods** and **Results** of this study which were presented at the Seminar on 7 May 2009 have been removed as the material is being prepared for peer-reviewed publication.*

- ◆ *Please see **Conclusions** for key points of general relevance to effective implementation of paed-NIMC and accompanying safe prescribing guidelines nationally*

- ◆ *If you wish to use recommendations, please cite:*
 - 1. Gazarian M, Graudins LV. Long term improvements in paediatric medication safety: the science to support the policy and practice. National Medicines Symposium 2008, Canberra*

 - 2. Gazarian M. Graudins LV. Improving Medication Safety in Hospitalized Children: An effective model for sustained change. 9th World Conference on Clinical Pharmacology & Therapeutics, CPT 2008, Quebec city, Canada*

Conclusion



Safe prescribing guideline implementation model was **effective in reducing medication errors and harm**

➤ improvements **sustained** over **4 years**

Important factors:

- Multidisciplinary collaboration and improved communication
- Multi-faceted and evidence-based strategies tailored to local needs
- Timely and meaningful data feedback (*valued by clinicians*)
- Iterative PDSA cycles (*maintained in longer term*)
- Effective clinician leadership and facilitation of program
- Integration with routine systems
- Appropriate resources

THANKS TEAM !



MEDICAL

- Junior
- Senior

Dr Madlen Gazarian, Project leader (Clinical Pharmacologist)
Dr Liz Argent (Staff specialist, General Paediatrics)
Dr Michael Brydon (Co-ordinator, SCH Clinical Services)
Dr Anna Gill, Dr Hala Katf (Chief RMO)
Dr David Sandeman (Paediatric Anaesthetist)

CONSUMERS
via “patient
friend”

Coralie Lane
SCH Executive unit



NURSING

- clinical
- education
- quality
- managers

Helen Bullot (NUM)
Nikki Brown (Nurse educator)
Margo Casaceli (NUM)
Jackie Ludher
(Nursing Quality Coordinator)
Lynn MacRitchie (NUM)
Study ward RNs and CNEs

PHARMACY

- clinical
- management

Linda Graudins, Project officer (Senior Pharmacist)
Carolyn Dubury (Senior Paediatric Pharmacist)
Julie Arena & SCH Pharmacy staff
Sue Goh (Deputy Director of Pharmacy)
Dr Kylie Easton
(consulting pharmacist, National Prescribing Service)

λ **Tara Stevermuer** for statistical analysis

λ **Australian Council for Safety and Quality in Health Care (Medication Safety Innovation Awards Program)** for funding

SANTA
CLAUS

ON
Prednisone



Ashlee Mankin '96

Paed-NIMC RESOURCES FOR NATIONAL USE



1. Implementation resources
 - educational resources
 - overall effective implementation model
2. Evaluation resources

Resources to support National Implementation & Evaluation

Address  http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/NIMC_002-Paed-Imp&Eval

 Go

Links 

Paediatric NIMC implementation and evaluation resources

Enter keywords

 Search

 A+ A+

The Paediatric National Inpatient Medication Chart

Implementation and evaluation resources

- Optimal implementation of the paediatric National Inpatient Medication Chart (NIMC) will involve use of **multi-faceted strategies** as part of a **co-ordinated implementation program**, suited to the needs of local settings.
- Appropriate education will form part of an effective implementation program. A range of [educational resources](#) is available to support education about safe prescribing and administration of medicines to paediatric patients and optimal use of the paediatric NIMC.
- **Evaluation** using clinically meaningful outcomes is strongly recommended. Selected indicators from the Quality Use of Medicines Indicators in Australian Hospitals (developed by the NSW Therapeutic Advisory Group and Clinical Excellence Commission) are well suited to this purpose. Children's Hospitals Australasia Medication Safety Expert Reference Group recommends using the following indicators as a minimum set to form part of a more comprehensive evaluation of the paediatric NIMC nationally.
 - 3.2 [Percentage of patients whose known adverse drug reactions are documented on the current medication chart \(PDF 64 KB\)](#)
 - 3.3 [Percentage of medications that include error-prone abbreviations \(PDF 64 KB\)](#)
 - 3.4 [Percentage of paediatric medication orders that include correct dose per kg \(or body surface area\) and a safe total dose \(PDF 64KB\)](#)

The whole indicator set is available at the [NSW TAG Indicators for QUM in Australian Hospitals web page](#).

Core evaluation parameters for paed-NIMC



- ◆ Accurate patient identification
- ◆ Accurate weight +/- height documentation
- ◆ Complete & accurate information re Adverse Drug Reactions (ADRs)
- ◆ Documentation of indication (regular and prn medicines)
- ◆ Correct dose (including documentation of the relevant mg/kg or mg/m² **basis for dose calculation** and **correct actual dose**; as well as maximum daily dose for prn medicines being specified and correct)
- ◆ Use of approved abbreviations and avoidance of dangerous ones
- ◆ Scheduled medicines administration times correlating with frequency ordered by prescriber and actual administration times medicines given

Educational resources

Address  http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/NIMC_002-Paed-Educational

 Go

Links 

Paediatric NIMC educational resources

 A- A+

Paediatric National Inpatient Medication Chart

Educational resources

Background

To improve the safety and quality of medicines use nationally, Australian Health Ministers required all public hospitals in Australia to use a common medication chart. The National Inpatient Medication Chart (NIMC) was developed by a multi-disciplinary national working party.

Similarly, a nationally agreed paediatric version has been developed, sharing many features with the original NIMC, but incorporating additional features important for safely using medicines in the paediatric population. Short stay (5 days) and long stay (21 days) versions are available.



Below are a range of education resources for safe prescribing in hospitalised paediatric patients and which will support implementation of the paediatric NIMC. These resources have been developed by multi-disciplinary teams of clinicians (see acknowledgements below) and are designed for use by doctors, nurses and pharmacists.

All facilities caring for paediatric inpatients are invited to use these resources to support the optimal use of the paediatric NIMC for improving paediatric medication safety. We request that you:

- i. Acknowledge the source;
- ii. Adapt the content to your facility, as some material is specific to Sydney Children's Hospital and may need modification for other settings;
- iii. Evaluate outcomes ([see recommended minimum core parameters](#))

Paed-NIMC & Safe Paediatric Prescribing

Address  http://www.safetyandquality.gov.au/internet/safety/publishing.nsf/Content/NIMC_002-Paed-Educational

 Go  Links >>

Paediatric educational resources

- [Paediatric NIMC fact sheet \(PDF 85 KB\)](#)
- [Paediatric NIMC PowerPoint presentation \(PDF 2400 KB\)](#)
[Paediatric NIMC PowerPoint presentation with speakers notes\(PDF 2325 KB\)](#)
- [Sydney Children's Hospital safe prescribing guidelines \(PDF 48 KB\)](#)
- [Sydney Children's Hospital allergy and adverse drug reaction definitions \(PDF 52 KB\)](#)
- [Recording and reporting adverse drug reactions: MEDIScene Feb 2005 \(PDF 96 KB\)](#)

Frequently asked questions

- [Paediatric NIMC FAQs \(PDF 78 KB\)](#)

Links to general resources

- [National Prescribing Service \(NPS\) Medication Chart on-line training module](#)
- [National terminology, abbreviations and symbols to be used in the prescribing and administering of medicines in Australian hospitals](#)
- [NSW Health Medication Safety Strategy](#)

Feedback

Let us know whether you found the material useful (and why). Suggestions for improvements are very welcome. Please send your feedback to mail@safetyandquality.gov.au.

Acknowledgements

This educational package was developed by

FAQs

Address http://www.sch.edu.au/health/professionals/nimc/nimc_faqs.pdf

Go Links >>



present, so disregard this instruction.

- **Is a red pen allowed to be used in the allergies section?**

Use a black or blue pen.

3. Do I need to enter the INDICATION for each order?

Yes. The indication is important for the double-checking process for:

Dose: e.g. Erythromycin dose is different depending on indication; pro-kinetic or antimicrobial?

Duration of treatment: e.g. Cefazolin is used for short-term post-operative prophylaxis or may be prescribed for on-going treatment of infection;

Maximum daily dose: Paracetamol maximum daily dose is lower when used for fever (60 mg/kg/day) than for pain relief (90 mg/kg/day).

Off-label indication: dose which is not found in standard references, e.g. medication dosed according to a clinical trial protocol or used as an approved individual patient use (IPU) medicine

To decrease drug name confusion: e.g. azathioprine (immunosuppression) should not be confused with azithromycin (antimicrobial/anti-inflammatory) if the indication is clearly stated.

4. Do I need to enter the BASIS FOR DOSE CALCULATION for each order?

Yes. The basis for the dose calculation should be entered for all paediatric medicines where dose is based on mg/kg or mg/m². Dosing errors are the most common type of medication error in paediatrics. Showing the basis for dose calculation on the chart allows a double-check (by nurses, pharmacists +/- other prescribers) to verify that the correct dose has been chosen and correctly calculated. The recommended "standard" dosing reference at SCH is the RCH Pharmacopoeia ('red book') so check dose here when ordering. However, there are some local exceptions which should be checked first (see insert in red book issued annually; and SCH DURC guidelines).

- *This is one of the most important NEW features of the NIMC-paed to help reduce important dosing errors and related harm in paediatric patients*

Paed-NIMC & Safe Paediatric Prescribing

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Effective implementation model



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Thanks to an even bigger Team!



◆ **Paed-NIMC Educational resources:**

- ◆ Developed by Paediatric Therapeutics Program, University of NSW & Sydney Children's Hospital, Randwick
- ◆ Multidisciplinary clinician input, SCH, Randwick
- ◆ Pharmacy Department, CYWHS, Adelaide
- ◆ Input from general NIMC educational resources
- ◆ Review and endorsement by CHA Medication Safety Expert Reference Group

◆ **Paed-NIMC Evaluation resources:**

- ◆ Madlen Gazarian, Linda Graudins, Sonya Stacey, Joanna Holt, on behalf of CHA Medication Safety Expert Reference Group