



# Medication Errors in Children

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“A cheerful heart is good medicine, but a crushed spirit dries up the bones.  
(Proverbs 17:22)”.



# Learning outcomes

- At the end of the session, you will be able to:
  - Explain why children are at greater risk of medication errors.
  - Describe epidemiology and nature of medication error in children.
  - Five risks

# Literature review

## RESEARCH REPORT

Pediatrics

THE ANNALS OF  
PHARMACOTHERAPY

## Systematic Review of Medication Errors in Pediatric Patients

Maisoon Abdullah Ghaleb, Nick Barber, Bryony D Franklin, Vincent WS Yeung,  
Zahra F Khaki, and Ian CK Wong

**OBJECTIVE:** To systematically locate and review studies that have investigated the incidence of medication errors (MEs) in pediatric inpatients and identify common errors.

**METHODS:** A systematic search of studies related to MEs in children was performed using the following databases: MEDLINE (1951–April 2006), EMBASE (1966–April 2006), Pharm-line (1978–April 2006), International Pharmaceutical Abstracts (1970–April 2006), Cumulative Index to Nursing and Allied Health Literature (1982–April 2006), and British Nursing Index (1994–April 2006). Studies of the incidence and nature of MEs in pediatrics were included. The title, abstract, or full article was reviewed for relevance; any study not related to MEs in children was excluded.

**RESULTS:** Three methods were used to detect MEs in the studies reviewed: spontaneous reporting ( $n = 10$ ), medication order or chart review ( $n = 14$ ), or observation ( $n = 8$ ). There was great variation in the definitions of ME used and the error rates reported. The most common type of ME was dosing error, often involving 10 times the actual dose required. Antibiotics and sedatives were the most common classes of drugs associated with MEs; these are probably among the most common drugs prescribed.

**CONCLUSIONS:** Interpretation of the literature was hindered by variation in definitions employed by different researchers, varying research methods and setting, and a lack of theory-based research. Overall, it would appear that our initial concern about MEs in

# Literature review

- Great variation in the paediatric medication error rates reported due to differences in study design.
  - prescribing error rate 0.45 to 30.1 errors per 100 orders in the USA
  - drug administration error rates varied from 0.6% to 27%
- Dosing errors are the most common type of errors in paediatrics (particularly 10-fold or greater overdose caused by calculation errors).

# How big is the problem in our hospital?

Original article



## The incidence and nature of prescribing and medication administration errors in paediatric inpatients

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### ABSTRACT

**Objectives:** To determine the incidence and nature of prescribing and medication administration errors in paediatric inpatients.

**Design:** Prospective review of drug charts to identify prescribing errors and prospective observation of nurses preparing and administering drugs to identify medication administration errors. In addition, incident reports were collected for each ward studied.

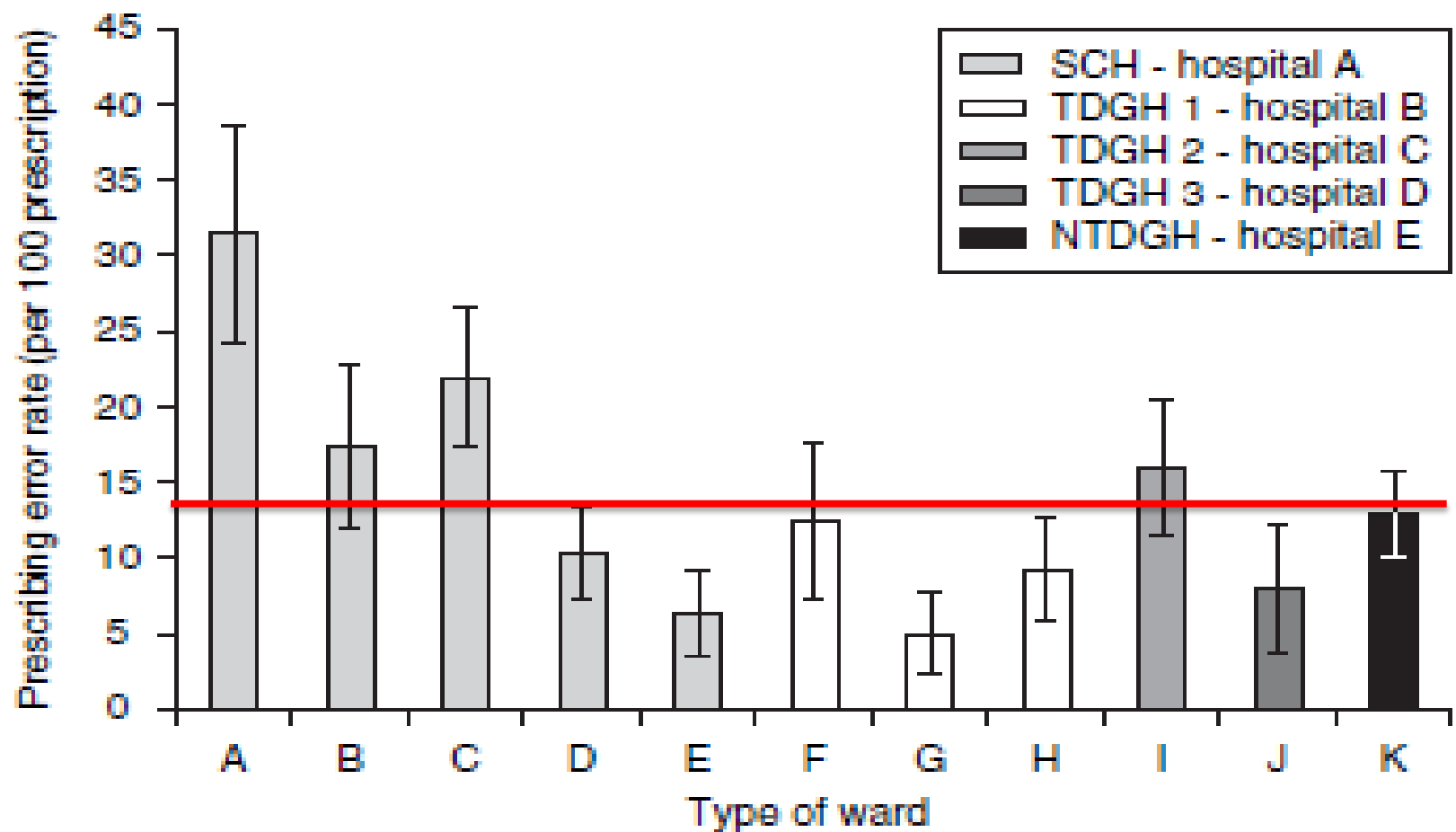
**Participants:** Paediatric patients admitted to hospitals and nurses administering medications to these patients.

**Setting:** 11 wards (prescribing errors) and 10 wards (medication administration errors) across five hospitals (one specialist children's teaching hospital, one non-teaching hospital and three teaching hospitals) in the London area (UK).

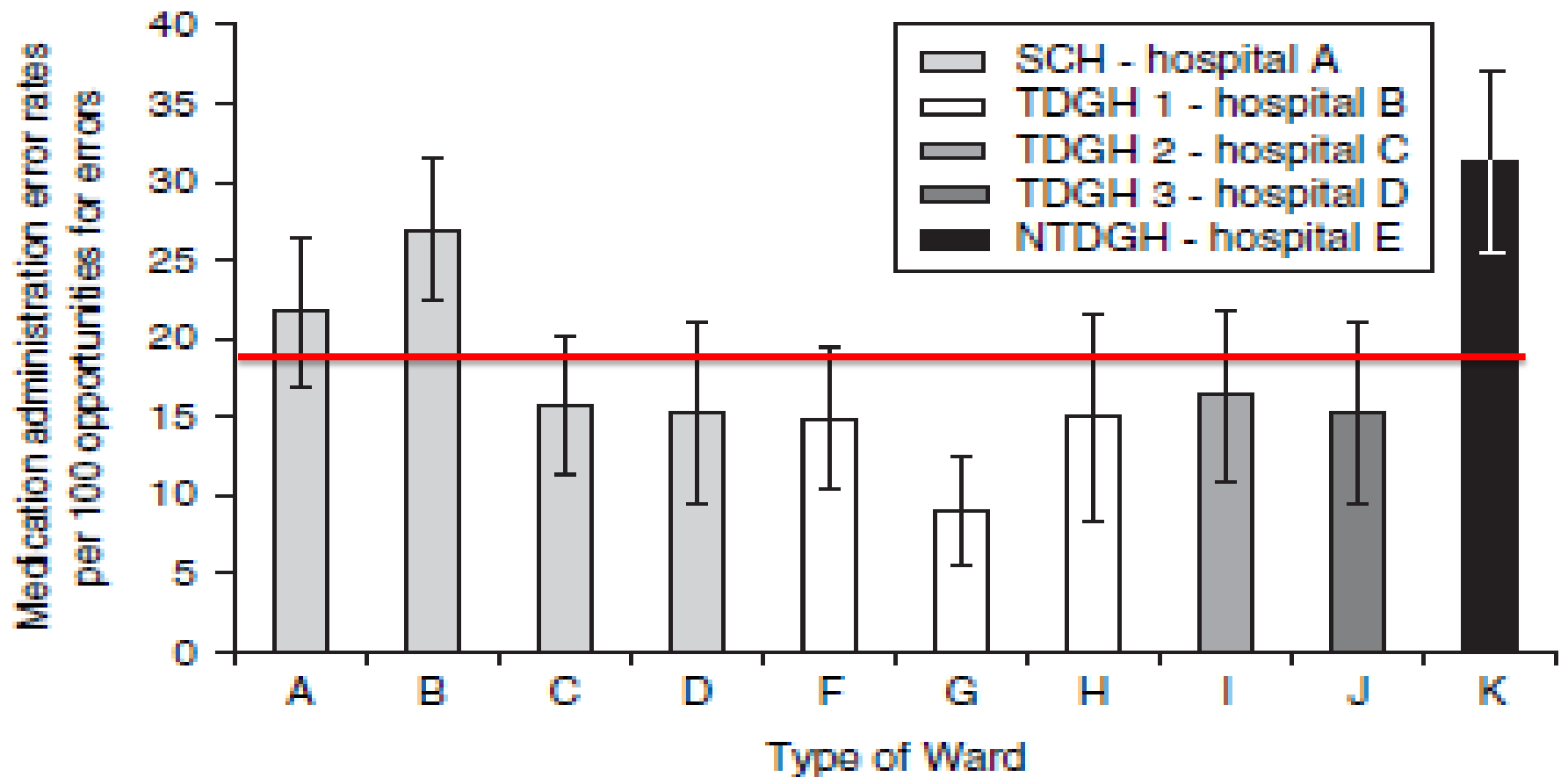
**Main outcome measures:** Number, types and incidence of prescribing and medication administration

### What is already known about this topic

- ▶ Medication use in paediatrics is particularly prone to error.
- ▶ Limited evidence from the US suggests that medication errors and corresponding harm could be higher in children than in adults.
- ▶ There have been no large-scale studies to investigate the incidence of prescribing and medication administration errors in the UK; hence, the epidemiology of medication errors in the paediatric inpatient setting in the UK is unclear.



**Figure 1** Prescribing error rates across the 11 wards in the five hospitals. A, surgical 1; B, medical 1; C, PICU 1; D, medical 2; E, NICU 1; F, PICU 2; G, general-medical ward 1; H, NICU 2; I, general-medical ward 2; J, Adolescent unit; K, general-medical ward 3. NTDGH, non-teaching district general hospital; SCH, specialist children's hospital; TDGH, teaching district general hospital.\* Error bars represent 95% CI.



**Figure 2** Medication administration error rates and 95% CI across the 10 wards in the five hospitals. A, surgical 1; B, medical 1; C, PICU 1; D, NICU 1; F, PICU 2; G, general-medical ward 1; H, NICU 2; I, general-medical ward 2; J, Adolescent unit; K, general-medical ward 3. NTDGH, non-teaching district general hospital; SCH, specialist children's hospital; TDGH, teaching district general hospital. \*Error bars represent 95% CI.

## Why children may be at greater risk from medication errors

- Drug doses are calculated based on a patient's age, weight or body surface area.
- Weight changes over time & recalculation of drug doses is required, particularly in neonates.
- Inadequate information.
- Inadequate availability of appropriate dosage forms and concentrations.
- Fewer internal reserves to buffer any medication errors which may occur.



# Medication errors can occur at various stages

1 Prescribing

2 Transcribing

3 Dispensing

4 Administration

# Mother Says Children's Hospital Should've Had Safeguards In Place Before Mistake That Cost Her Teen Boy His Life

Fifteen year old Michael Blankenship was prescribed a fentanyl patch after his dental work. The problem was: the medication should have never been prescribed and what was prescribed was given at the highest dose possible.

Q13 FOX News | Web Reporter  
9:59 PM PDT, October 1, 2009



SEATTLE - The mother of a 15-year-old autistic boy says Seattle's Children's Hospital should have had safeguards in place before making a fatal mistake they admitted was wrong.

Tammy Jarbo-Blankenship lost her son Michael last March after a visit to Seattle Children's Hospital for routine dental work. Michael had been prescribed a fentanyl patch after his dental work, and died at home in his bed overnight.

The medical examiner found the teen died from an accidental overdose, and the hospital admits they made a mistake in prescribing the medication usually reserved for much more

serious cases like people with cancer.

"I just want people to know it was preventable, that Michael was a human being, and deserved the same respect and care that any individual would have walking into a hospital," said Jarbo-Blankenship, "and that Michael had a very long and happy life ahead of him and Children's took that from him."

On Tuesday, officials at Seattle Children's Hospital admitted the error, apologized and said they have changed their procedures. They say, "A thorough investigation revealed that this was not the fault of any one individual. Our detailed root cause analysis identified that this occurred because our processes failed at multiple points. We have since changed the way we prescribe and administer fentanyl patches."

"Michael shouldn't have had to die for Children's to put safeguards in place to make sure this doesn't happen," said Jarbo-Blankenship Thursday.

The family has filed a civil suit in King County Superior Court, and names Seattle Children's Hospital and the physicians who were involved with Blankenship's treatment.

Tammy says they are taking life minute-by-minute right now, and Michael's brother has really suffered, and not only won't return to the home, but has had to endure counseling since his brother's death.

"Jeffrey hasn't been able to return to our home since that day we found Michael dead," said Jarbo-Blankenship, "so essentially I lost both of my children."

Tammy says Michael loved to do all the things kids typically like to do like rollerblading, dancing, listening to rock and roll, and she says he loved to play games with his youth group. She says the family has started a foundation in Michael's name with the goal of "educating and informing the medical community about safe and effective ways to treat children with disabilities including autism."

Oral  
surgeon  
prescribed  
wrong  
formulation  
and dose of  
fentanyl

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# Four-month-old baby 'dies of overdose after mother was given wrong prescription'

By DAILY MAIL REPORTER

Last updated at 12:52 AM on 30th January 2010



Receptionist  
put the wrong  
information in  
electronic  
patients  
record

**Tragic: Four-month-old Abbie Jones died after 'receiving a potentially fatal dose of medicine after her mother was given the wrong prescription'**

The Sheffield inquest has heard how a receptionist at the GP's surgery made out an incorrect prescription for the drug.

She put wrong information into a computer which printed the prescription, and overrode a warning which flagged up if too much medicine was being prescribed.

It was presented to the doctor as a repeat prescription and the error was not spotted.

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Tuesday, January 19, 1999 Published at 18:05 GMT

## Health

# Chemists face manslaughter charge



Matthew Young died at Alder Hey Hospital last year

Two Boots chemists accused of the manslaughter of a three-week-old boy who allegedly died after taking peppermint water which was prescribed for wind, have been given bail.

Pharmacist Lisa Taylor Lloyd and trainee pharmacist Ziad Khatib

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# Pharmacist Prepared Wrong strength of Peppermint water 20 times overdose

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**4 Administration**

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# Baby died after 'decimal' error

**A mistake over a decimal point caused the death of a Derby baby who was given 10 times the recommended amount of heart medication, a coroner has ruled.**

Two nurses gave the wrong dosage to 15-day-old baby George Bartram when trying to reduce his rapid heartbeat.



Baby George died at Glenfield Hospital in Leicester

The massive influx of the drugs caused him to have a cardiac arrest.

Coroner Martin Symington ruled the two nurses were not guilty of neglect, but said a verdict of accidental death would not tell the full story.

## Breathing problems

"The mistake made by the nurses was a mathematical miscalculation which in other working environments might not have been quite so catastrophic," the coroner said in recording a narrative verdict.

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# Nurse injected 10 times more digoxin to a baby

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# Be aware

- Mistakes can happen at any stage.
- Everyone in the healthcare team can make a mistake.
- Including you!



When you make a mistake, admit it,  
correct it, and learn from it -  
immediately.

Stephen Covey

# Summary of High Risk

## 1) High risk paediatric groups

Neonatal, learning difficulty and oncology

## 2) High risk drug groups

Analgesics, anticonvulsants, any high potent drugs

## 3) High risk pharmaceutical formulations

Adult formulations for paediatric use, IV, Unlicensed products

## 4) High risk healthcare workers

Unqualified, Inexperienced, Newly appointed and Tired

## 5) High risk changing care settings

Admission and discharge

# Is it you?

I NEVER MAKE  
the same MISTAKE  
TWICE. I Strive  
FOR Five or  
Six times.



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06-09-07

# GRiP

[www.grip-network.org](http://www.grip-network.org)

- The “Global Research in Paediatrics – Network of Excellence (GRiP)” is an EU-funded project.
- GRiP aims to implement an infrastructure matrix to stimulate & facilitate the development & safe use of pediatric medicines.



# References

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