Clinical Safety & Effectiveness
Cohort # 7

Medication Errors and Safety

CENTER FOR PATIENT SAFETY & HEALTH POLICY
UT HEALTH SCIENCE CENTER™
SAN ANTONIO

Educating for Quality Improvement & Patient Safety

DISCLOSURE

Mandie Tiball Svatek, MD has no relevant financial relationships with commercial interests to disclose.

Rayanne Wilson, RN, BSN, MBA has no relevant financial relationships with commercial interests to disclose.

The Team

- Division
  - CSE Participant
    - Mandie Svatek, MD
    - Rayanne Wilson, RN, BSN, MBA
  - Group Participant
    - Melissa Johnson, Pharm D
    - Lisa Carlton, RNC, BSN, MBA
    - Dana Rohman, RN, BSN, CCRN, CPN
  - Facilitator
    - Amruta Parekh, MD,MPH

- Sponsor Department
  - Shawn Ralston, M.D. – Inpatient Departmental Chair

What We Are Trying to Accomplish?

OUR AIM STATEMENT

To decrease the number of medication errors for the Pediatric Medical Care Unit at CHRISTUS Santa Rosa Children's Hospital by 10% by June 2011.

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Project Milestones

- Team Created   January 2011
- AIM statement created   February 2011
- Weekly Team Meetings   Jan – June 2011
- Background Data, Brainstorm Sessions   Feb-April 2011
  Workflow and Fishbone Analyses
- Interventions Implemented   12/2010 – 6/2011
- Data Analysis   Jan - June
- CS&E Presentation   June 2011

Medication Errors

- Medication Errors have led to detrimental outcomes and are due to systematic errors rather than one individual

- Economic burden for all areas of health care from drug misadventures exceeds **$100 billion annually** in the United States

- 1999 Institute of Medicine Report
  - Medication errors as direct cause of up to **98,000 patient deaths** annually
  - Increase in inpatient health care costs by an estimated $4700 per hospital admission = $2.8 million annually for a 700-bed teaching hospital

- Physician Insurers Association of America
  - Medical Liability Suits
    - January 1985 - December 2001 medication error was the fifth most common misadventure for **pediatricians**
      - More than 30% of these cases resulted in a paid claim, with total indemnity at **$14.7 million**.

Medication Errors (con't)

- **Pediatric Inpatient Setting**
  - **Errors as high as 1 per every 6.4 orders written**
    - **Incorrect dosing**
    - **Computation errors in dosing**
    - **Wrong route**
    - **Missed/Late dosing**
    - **IV fluids**

- **The Future** of Christus Santa Rosa Hospital:
  - Teich et al, Bates et al: **Computerized physician order entry**
    - non-missed-dose medication error rate fell 81 percent, from 142 per 1,000 patient-days in the baseline period to 26.6 per 1,000 patient-days in the final period ($P < 0.0001$).

  - National Initiative for Children's Health Care Quality Advisory
    - CPOE vital in reducing number of medication errors

Safety Culture – Institute for Safe Medication Practices

- Organization safety culture most critical
  - Most stable and significant force to:.[7-8]
    - consider dangerous vs safe
    - attitudes and behaviors toward risk, danger, and safety are appropriate.[8]
- Wakefield et el - factors that influence health professionals
  - Reporting hazards and errors and, intervening when an error is witnessed [12].
  - Two strongest predictors of high-level patient safety
    - Observed behaviors of professional peers
      - **Attending physicians 1.5 times** more likely than medical residents to exhibit patient safety behaviors
      - **Experienced nurses 6 times** more likely to exhibit these behaviors.
    - A genuine belief in the safety outcomes of the behaviors (preventive action beliefs)
- **Conclusion**
  - Peer-to-peer mentorship needed to encourage safe behavioral choices and foster a culture of safety within the organization. [8]

Process Analysis Tools

- Brainstorming
  - Medication Safety Team- September 2010
  - Survey to Nurses and Residents
- Flowchart – 3rd floor
- Fishbone diagram

1. Which of the following references do you use to check for the proper dosing of a medication written for?

Reference		Count	Percent
Harriet Lane		10	67%
Pharmacy Formulary		5	33%
Nursing Consult		1	7%
Call Pharmacist		6	40%
Other, please specify View Responses		2	13%

2. Do you ALWAYS check dosing on a medication ordered? If not, why?

		Count	Percent
Yes		11	73%
No		4	27%
Total		15	100%

View 5 Responses

3. Once an order is written, who scans the order to pharmacy?

		Count	Percent
Unit Clerk		9	60%
Nurse caring for the patient		14	93%
Other Nurse		3	20%
Nurse Supervisor		1	7%

4. Do you report ALL medication errors and/or near misses? If not, why?

		Count	Percent
Yes		13	93%
No		1	7%
Total		14	100%

View 1 Responses

Phone nursing manager or supervisor		2	13%
Yellow pharmacy incident report		12	80%
Other, please specify View Responses		2	13%

6. Do you ALWAYS reconcile the paper order when you are acknowledging the MAR? If not, why?

Yes		13	87%
No		2	13%
	Total	15	100%

View 2 Responses

7. Why do you think medication errors occur at Santa Rosa and what do you think can be improved upon (aside from an electronic medical record and/or physician order entry) to help with this?
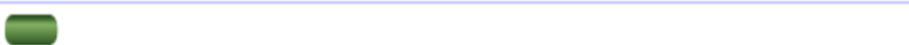
CSR Nurses Perspective on Med Errors

- "PHARMACY DEPT SHOULD BE ABLE TO PRINT OUT LIST OF RESIDENTS ON LIKE THE UNITS SO THEY ARE ABLE TO HAVE AVAILABLE BEEPERS & LESS PHONE CALLS TO NURSING UNITS"

- "rechecking multiple times"

- "Nurses … do not note the paper order until have it reconcile with the MAR…."

- "the mars can be confusing the way the order appears on the mar at times and then when you go to pull it from the pixus it is even more confusing."

- "education on types of meds errors that occur and what can be done to improve on them"

- "Nurses should not note orders in the paper chart until they have acknowledged them and gotten any errors fixed that need to be corrected. "

- "…, high work load does not allow time to verify doses and times of meds to be given. "

- "IGNORANCE, STAFFING ASSIGNMENTS"

1. When writing medication orders how are they to be written?

ceftriaxone 1000mg iv q 24 hrs		0	0%
ceftriaxone 100mg/5kg iv q 24hrs		0	0%
ceftriaxone 1000mg iv q 24 hrs (100mg/kg/dose)		28	100%
ceftriaxone 1000mg q 24 hrs (100mg/kg/dose)		0	0%

2. What reference do you use when writing for medications?

Harriet Lane		26	93%
Pocket handbook		1	4%
Epocrates		10	36%
Other, please specify View Responses		9	32%

3. When dosing your medication, how do you calculate?

Calculator checking only once		6	21%
Calculator checking twice		18	64%
Most of the time a calculator but sometimes in my head		5	18%
Calculator and have another MD check the dosing with me		1	4%

4. When dosing a high alert medication ie opiates, phenobarbital, what measures do you take to ensure appropriate dosing?

Have another physician review your order		9	32%
Use a high alert order set		4	14%
Consult with the pharmacist		21	75%
Other, please specify View Responses		6	21%

CSR Resident Perspective on Med Errors

- "we just get careless/rushed in doing orders…"

- "There needs to be a better system of checks and balances."

- "Electronic medical record would help…."

- "rushing because on-call we are expected to be ten places at once, writing orders during fast-paced rounds, not having pharmacy round with team anymore"

- "It would be nice for nurses to check mg/kg dosing…"

- "1. Patient volume 2. Providing weight based charts for most commonly used medications, math done too quickly, verbal orders"

Children's 3rd Floor

Order is written

↓

Order is "flagged" (folded over)

↓

Chart placed in "Physician Order" bin

↓

Unit Secretary enters the order ——— Calls nurse for medication order review prior to scan

↓

Unit Secretary Scans Order

↓

Orders stamped "faxed"

Physician Order Written

- Miscalculation
- No reference used
- Extra step in calculating from mg/kg
- Incomplete orders
- Improper Weight
- Different methods of acknowledging the order and references for checking doses

Order Reviewed by Nurse

- Order scanned by unit clerk
- Order not flagged or placed in bin
- Nurse nervous about calling physician
- Nurse does not have time to review order

Pyxis

- Improper placement of meds in pyxis
- One does dispensed as two separate quantities
- Ability to overide
- Look alike sound alike in close proximity on carousel

Order Entered by Pharmacy

- Distractions ie phone calls
- Improper typing
- Scope of alarm system too broad
- No dedicated Pedi PharmD

Meditech

- STAT orders not priortized
- Volume of orders
- Number of alerts
- Incorrect MAR

Order Reviewed by Nurse with original order

- Nurse rushed to give med
- Lack of review of order
- Another nurse gives the med
- Nurse fatigue and workload

How Will We Know That a Change is an Improvement?

- Types of measures
  - **Dosing errors**
  - **Transcription errors**
- How you will measure
  - Medmarx
- Specific targets for change
  - **Dosing**
    - Scanning of orders by nurses to review dosing over clerks
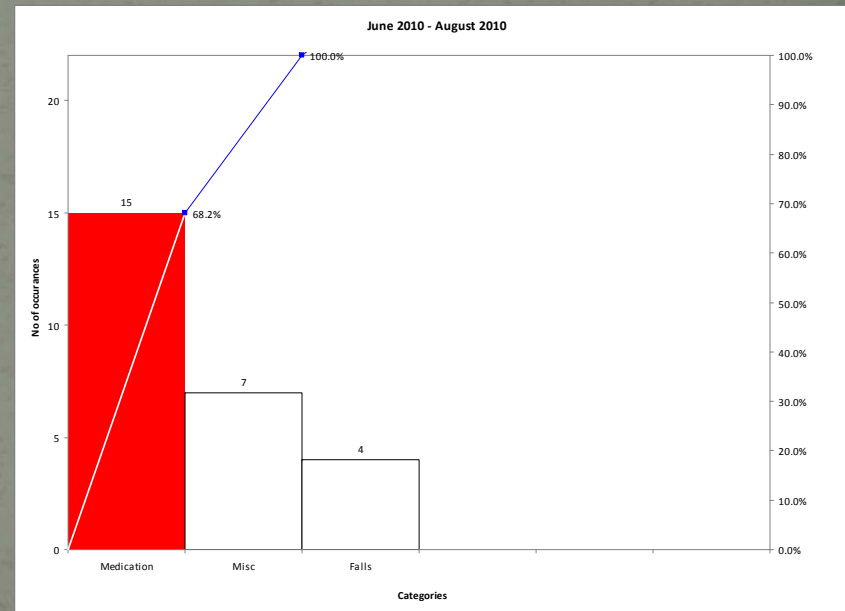   - Reducing the number of alarms in Meditech
  - **Transcription**
    - Confirming proper transcription completed by nurses with original paper order
    - Pharmacy intervention?
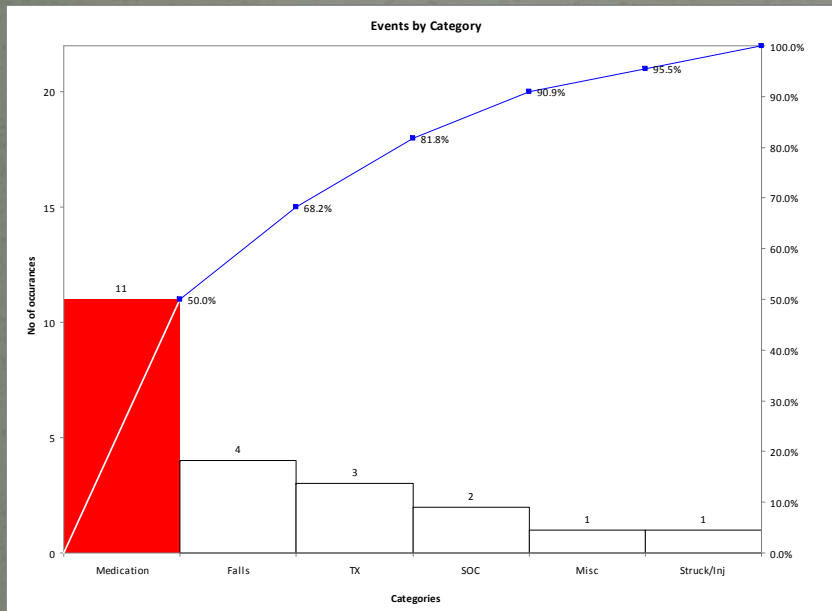
Intervention

Plan

Dedicated Pediatric Medication Safety Team formed in September 2010 to address specific errors on the Pediatric side of CSR.

Target Safety Team: Have **all nurses check dosing** on order before they are scanned. The nurse instead of the unit clerk will scan the orders.

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Implementing the Change

Do

- December
  - Meeting with Nurses to discuss need to scan order instead of unit clerk so to check dosing prior to scanning.
  - Reducing the number of alarms on medications in Meditech so as to not disengage the pharmacist of alerts.
  - Reiteration that EMR date still not certain
- February (lessons learned)
  - Placing a **Stop sign** at the scanner to remind nurses to check orders.
  - Reminder that EMR date still not certain
- June (lessons learned)
  - Interviewing for dedicated Pediatric PharmD
  - Continued Reminder of EMR

ATTENTION: Nurses

Please make sure you check the dosing on the medication ordered before sending.

Number of Medication Errors for the Week:

And please remember to recheck your medication with the original order once received.

Thank you!

Results/Impact

Check

Obtain the number of Med Errors found via MedMarX – reporting data system.

3rd and 9th Floor Medication Errors

Pre

MEDMARX chart based on Type of error

from 1/1/2010 to 12/31/2010 (your facility)

Post

MEDMARX chart based on Type of error

from 1/1/2011 to 6/15/2011 (your facility)

7th Floor Medication Errors

Pre

MEDMARX chart based on Type of error

from 1/1/2010 to 12/31/2010 (your facility)

Post

MEDMARX chart based on Type of error

from 1/1/2011 to 6/15/2011 (your facility)
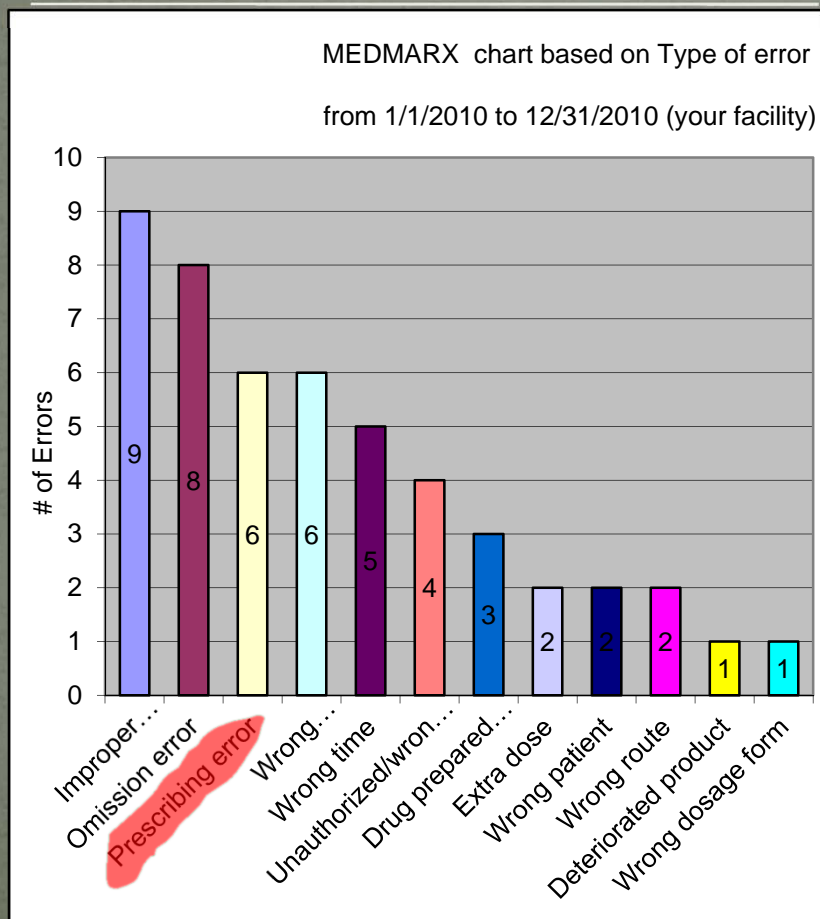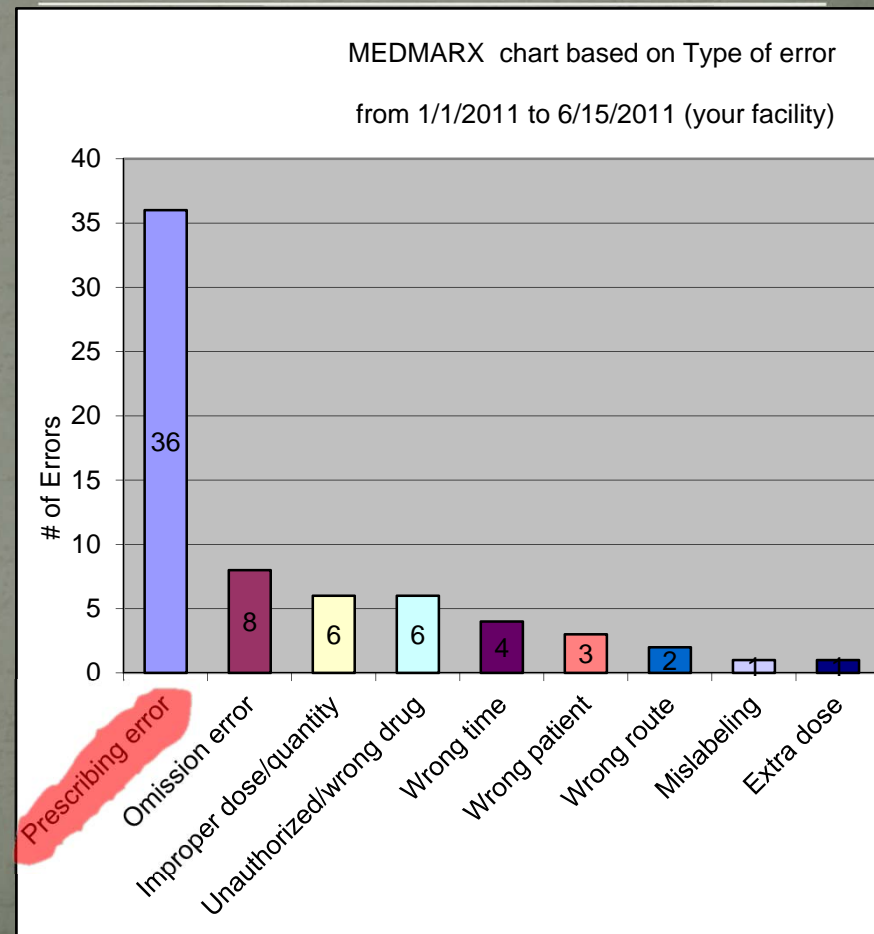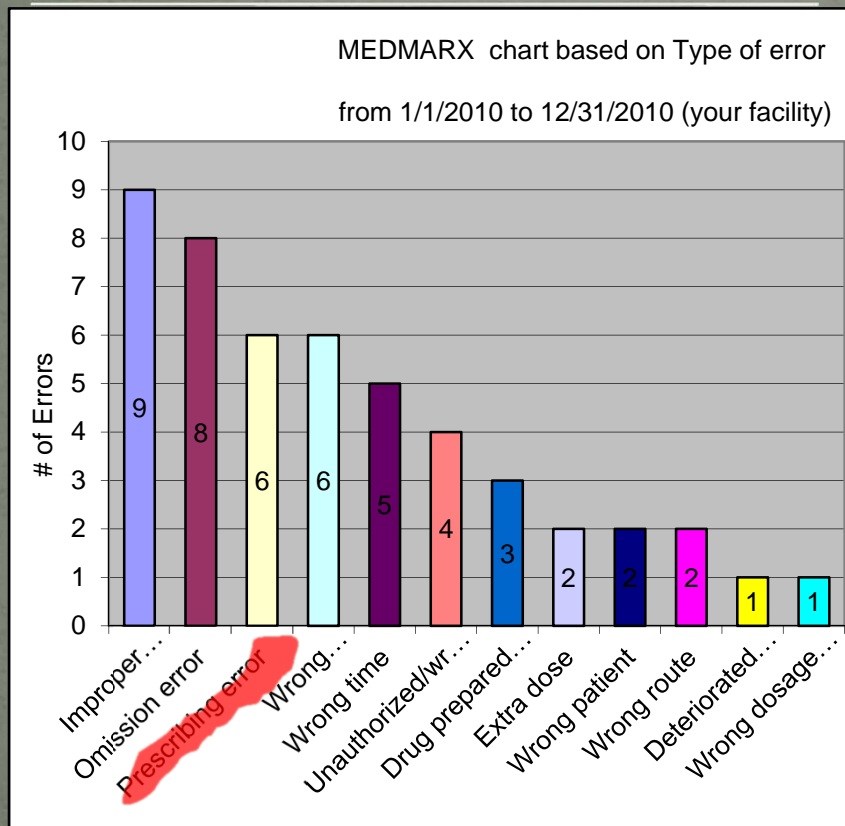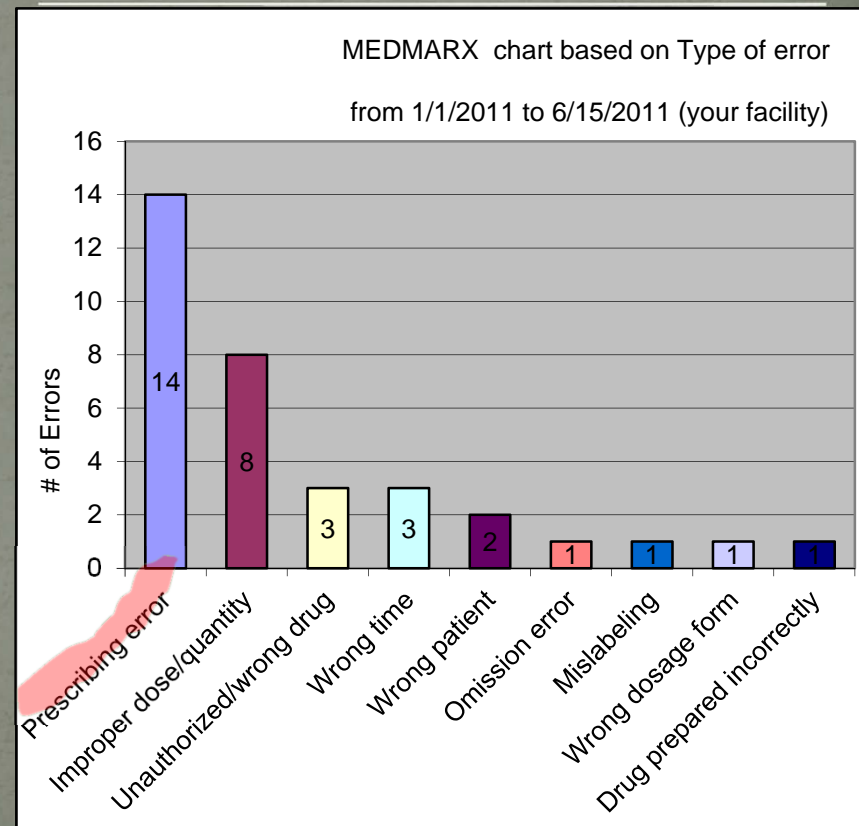
No. of Errors per month on 3rd and 9th at CSRCH
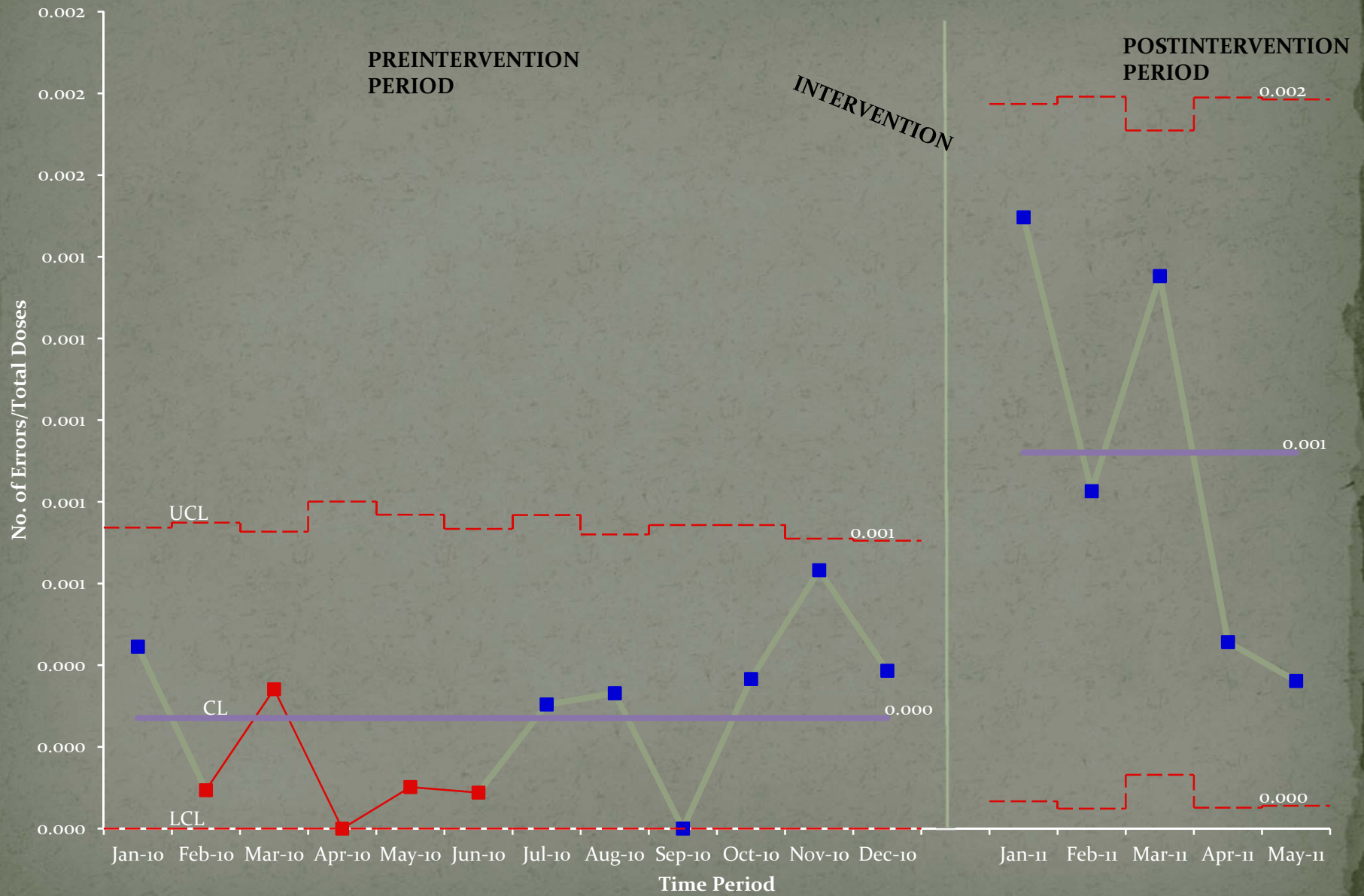
No of Errors on 7th at CSRCH
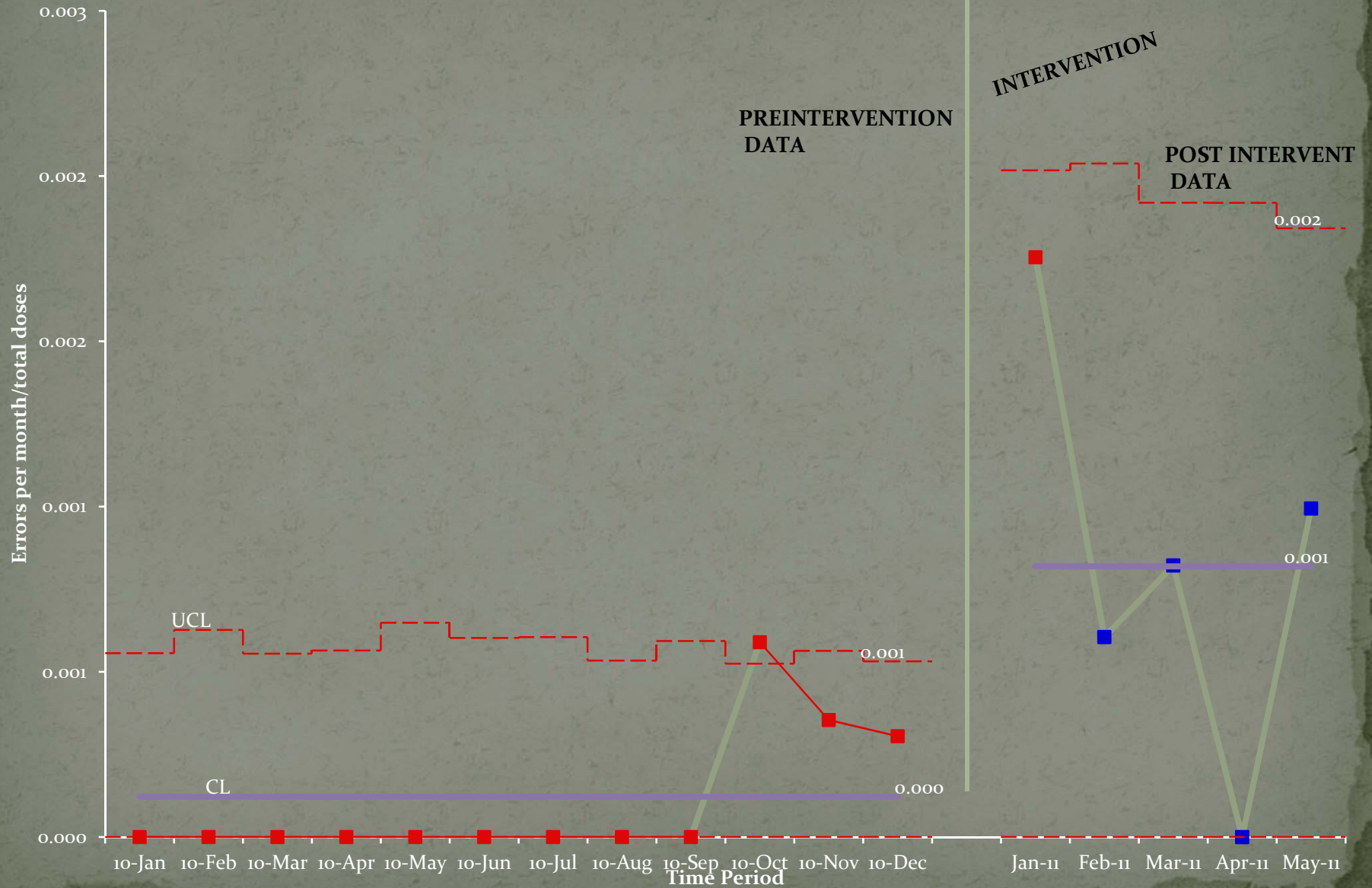
Conclusion – Number of Med Errors

- 3rd and 9th Floor Jan-May 2011 vs Jan-May 2010
  - **Increased by over 300%** from 12 to 53 (7th floor went from 0 to 24)

- 3rd Floor Comparison with previous QI on Reporting June-Aug 2010 vs Jan-March 2011
  - **Increased Med Reporting by over 300%** from 7 to 31

- Errors post intervention period increased...or should we say **REPORTING increased**

Expansion of Our Implementation

Act

We will further extend our changes to the 7th floor and continue to process our results and then further expand to units such as NICU and PICU.

Interviewing in process for dedicated pediatric Pharm D.

What's Next

- Barriers:
  - The idea of an EMR solving the problem and not taking action now.
  - The presence of an EMR simply does not solve the problem

- **Continue to Change the Overall Culture of CSR** until an adequate EMR obtained
  - Educate
  - Encourage Reporting
  - Reevaluation of Pyxis processes
  - Standard reference guide: check doses on medications

- Dedicated Pediatric PharmD

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- 12) Gaba DM. Structural and organizational issues in patient safety: a comparison of health care to other high-hazard industries. Calif Manage

- Quality Improvement: Kelsey Sherburne MD and team**: Increase the mean number of variance reports from the 3ʳᵈ and 6ᵗʰ floor of the CHRISTUS Santa Rosa Children's Hospital by 50% by the end of August 2010.**

Thank you!

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