



The Kids' Campaign

How-to-guide Pediatric supplement

Adverse Drug Events

Pediatric Affinity Group



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Working in concert with the following leadership hospitals: Arkansas Children's Hospital, Cincinnati Children's Hospital Medical Center, Johns Hopkins Children's Center, Children's Hospitals and Clinics of Minnesota, Children's Hospital of Philadelphia, Lucile Packard Children's Hospital at Stanford, UMass Memorial Health Care, and Mayo Clinic.

Incidence of Inpatient Pediatric Adverse Drug Events

Published estimates of adverse drug event rates in pediatrics are few^{1,2,3} compared to adults⁴⁻¹¹. The earlier two pediatric studies^{2,3} used a combination of “voluntary and verbally solicited reports from house officers, nurses and pharmacists; and by medication order sheet, medication administration records and chart review of all hospitalized patients” to identify ADE rates. In one study, Kaushal, et al² reported ADE rates in children on the inpatient wards at two urban teaching hospitals to be 2.3 per 100 admissions (26 events), with an additional *potential* ADE rate of 10 per 100 admissions (115 events). Of the 26 true ADEs, 5 (19%) were determined to be preventable. In the second study, Holdsworth, et al³ reported an ADE rate in pediatric inpatients (pediatric intensive care unit and general care unit at a university hospital) of 6 per 100 admissions (76 events), with 61% judged as preventable, and a potential ADE rate of 8.0 per 100 patient days (94 events).

The only study to date using the trigger methodology to identify pediatric adverse drug event rates was undertaken by Takata, et al¹ as part of a 12-site children’s hospital study. In this study, 960 inpatient pediatric admissions were reviewed, revealing an ADE rate of 11.1 ADEs per 100 admissions. Twenty-two percent of these adverse events were deemed to be preventable, and the ratio of ADEs detected by the trigger tool compared to ADEs detected by occurrence reports was 22 to 1. Assuming that all ADEs identified in each of these 3 studies were accurately identified, the pediatric ADE trigger tool identified between 1.8 and 4.8-fold more ADEs than the methods using unfocused chart review and reports described above. The trigger tool used in this study was modified for pediatrics from the IHI developed general adult ADE trigger tool which identified an ADE rate in the adult population of 24 per 100 admissions.¹²

Severity of Inpatient Pediatric Adverse Drug Events

Fortunately, the majority of adverse drug events in inpatient pediatric patients appear to be of relatively low severity. In the study by Kaushal, et al,² the 26 ADEs identified were categorized as 66% “significant” 24% “serious” and 10% fatal/life threatening. In the study by Holdsworth, et al,³ the 76 ADEs were classified as 76% significant, 13% serious, and 11% life threatening. Severity in these 2 studies was defined on the basis of actual outcomes using a previously published scale.^{13,14} Finally in Takata’s report, using the more detailed scale published by the National Coordinating Council for Medication Error Reduction and Prevention¹⁵, 97% were classified as “contributed to or resulted in temporary harm to the patient and required intervention” (severity level E), while only 3% were classified as “contributed to or resulted in temporary harm to the patients and required initial or prolonged hospitalization” (severity level F). None was associated with permanent harm, or death. When the severity of ADEs are compared to AEs as a whole, the evidence suggests that medication related harm is far less severe than non-medication related harm in the inpatient setting.

Strategies to Prevent Medication Errors

Using physician raters to evaluate error prevention strategies, Fortescue and colleagues identified three priority strategies for preventing medication error and adverse drug events in pediatric patients.¹⁶ Computerized physician order entry with clinical decision support systems, ward-based clinical pharmacists, and improved communication among physicians, nurses, and pharmacists were rated as having the greatest potential to reduce medication errors in pediatrics.¹⁶

The American Academy of Pediatrics (AAP) issued Prevention of Medication Errors in the Pediatric Inpatient Setting in 2003. In this paper, the AAP calls for additional specific safeguards, above and beyond those for adult patients, to assure the safe administration of medications to hospitalized infants and children. The AAP recommends that medication error improvement programs focus on system improvements and team communication. These programs should: 1. include active participation from multidisciplinary teams, 2. involve the family in all areas of the medication program, 3. be integrated into the institutional quality assurance and quality performance activities, and, 4. when possible, incorporate computer-assisted drug ordering and monitoring.¹⁷

Acknowledging the complexity of implementing CPOE systems, the importance of implementing these systems carefully, and that many pediatric facilities have implemented or moving toward this approach, the focus of this pediatric supplement is to identify interventions clinical teams, caring for pediatric patients could implement in a relatively short period of time with limited commitment of resources. The recommendations focus on enhancing communication among the clinical team.

Pediatric Modifications of IHI 100K Lives Campaign

1. Use a trigger tool to detect harm from medications
2. Appropriate use of standardization :
 - a. Standardize doses
 - b. Standardize concentrations
 - c. Standardized order sets
3. Reconcile medications
 - a. Promote the use of home medication lists including herbal and/or dietary supplements; begin with population of children with special health care needs or those with high risk drugs
 - b. Simultaneously develop and maintain current and past-year medication lists, an adverse drug reaction or intolerance history, and allergy information
4. Avoid known allergens
5. Identify high alert medications; consider frequency and severity
 - a. Examples include, narcotics, concentrated electrolytes, acetaminophen, and chloral hydrate

Additional care aspects to consider:

The likelihood for error and resulting harm is greater in pediatrics because:

1. virtually all pediatric medications are weight based
2. many pediatric medications must be mixed by pharmacists or nurse at the time of use
3. many pediatric medications come in multiple formulations
4. children have less ability than adult patients to recognize and communicate an error or adverse event.⁵

Tools:

Attachment A – CHCA Adverse Drug Event Trigger Toolkit

Attachment B – Example standard order sets

Attachment C – Pediatric Home Medication List - NICHQ

Attachment D – Example script to standardize the collection of allergy information

Attachment E – 20 tips to help prevent medical errors in children

References:

1. Takata, G, Currier K. Enhancing patient safety through improved detection of adverse drug events. Presentation at 13th Annual Forum on Quality Improvement in Health Care [Institute for Healthcare Improvement]. Orlando, Florida. December 2001.
2. Kaushal, R Bates, DW, Landrigan, C, et al. Medication errors and adverse drug events in pediatric inpatients. *JAMA*. 2001; 285:2114-2120.
3. Holdsworth, MT, Fichtl, RD, Behta, M, et al. Incidence and impact of adverse drug events in pediatric inpatients. *Arch Pediatr Adolesc Med*. 2003; 157: 60-65.
4. Brennan TA, Leape LL, Laird NM, et al. Incidence of adverse events and negligence in hospitalized patients: Results of the Harvard Medical Practice Study I. *N Engl J Med*. 1991;324:370-376.
5. Thomas EJ, Studdert DM, Burstin HR, et al. Incidence and types of adverse events and negligent care in Utah and Colorado. *Med Care*. 2000;38:261-271.
6. Nebeker JR, Hoffman JM, Weir CR, Bennett CL, Hurdle JF. High rates of adverse drug events in a highly computerized hospital. *Arch Intern Med*. 2005;165:1111-6
7. Killbridge P, Classen D. Surveillance for adverse drug events: history, methods, and current issues. *VHA research Series*. 2002;3:1-48
8. Bates DW, Boyle DL, Vander Vliet MB, Schneider J, Leape L. Relationship between medication errors and adverse drug events. *J Gen Internal Med*. 1995;10:199-205
9. Classen DC, Pestotnik SL, Evans RS, et al. Adverse drug events in hospitalized patients. Excessive length of stay, extra costs and attributable mortality. *JAMA*. 1997;277:301-6
10. Classen DC, Pestotnik SL, Evans RS, Burke JP. Computerized surveillance of adverse drug events in hospital patients. *JAMA*. 1991;266:2847-2851
11. Bates DW, Cullen DJ, Laird N, et al. Incidence of adverse drug events and potential adverse drug events. *JAMA*. 1995;274:29-34.
12. Rozich JD, Haraden CR, Resar RK. Adverse drug event trigger tool: a practical methodology for measuring medication related harm, *Qual Saf Health Care*. 2003;12:194-200.
13. Kaushal R, Bates DW. Computerized physician order entry with clinical decision support systems. In Shojania KG, Duncan BW, McDonald KM, Wachter RM. [editors]. *Making healthcare safer: A critical analysis of patient safety practices 2001*. [Evidence report, technology assessment No 43, AHRQ publication number 01-E058. <http://www.ahrq.gov/clinic/ptsafety>. Accessed May 10, 2006
14. Lesar TS, Briceland LL, Delcours K, Parmalee JC, Masta-Gornic V, Pohl H. Medication prescribing errors in a teaching hospital. *JAMA*. 1990;263:2329-2334
15. National Coordinating Council for Medication Error Reporting and Prevention. Taxonomy of medication errors. Available at <http://www.nccmerp.org/medErrorCatIndex.html>. Accessed May 10, 2006.
16. Fortesque, EB, Kaushal, R, Landrigan, CP et al. Prioritizing Strategies for Preventing Medication Errors and Adverse Drug Events in Pediatric Inpatients. *Pediatrics*. 2003; 111, 722-729.
17. AAP Committee on Drugs and Committee on Hospital Care Pediatrics. Vol 112, No. 2, August 2003

Additional Resources:

Crowly, E. Willimas R, Cousins, D. Medication errors in children: a descriptive summary of medication error reports submitted to the United State Pharmacopeia. *Current Therapy Research*. 2001; 26; 627-640.

Landrigan, C. The safety of inpatient pediatrics: preventing medical errors and injuries among hospitalized children. *Pediatric Clinics of North America*. 2005; 52 (4): 979-93.

Levine, S. Guidelines for preventing medication errors in pediatrics. *J Pediatr Pharmacol Ther*. 2001; 6: 426-42. link at <http://www.ismp.org/newsletters/acutecare/articles/20020601.asp>

Sharek, PJ, Classen D. The incidence of adverse events and medical error in pediatrics. *Pediatric Clinics of North America*. 2006. *In press*.

TRIGGER CHART REVIEW
ADVERSE DRUG EVENT
MEASUREMENT
KIT
(Child Health Accountability Initiative
Pediatric Version)

(Version 1, Pediatric)

Idealized Design of the Medication System
Design Group
(Revisions by the Child Health Accountability Initiative)
May 2002

Institute for Healthcare Improvement
Boston, MA

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I. INTRODUCTION/BACKGROUND

The Child Health Accountability Initiative (CHAI) in 1999 made medication safety its top priority area. At that time CHAI adopted the Institute for Healthcare Improvement (IHI) definition of adverse drug event (ADE) prior to the start of its first medication safety project:

"An injury, large or small, caused by the use (including non-use) of a drug.
This may be as harmless as a drug rash or as serious as death from an overdose."
(IHI, 1997)

CHAI also adopted the IHI definition of medication error (ME):

"Any error, large or small, at any point in the medication process from the time
the drug is ordered until the patient receives it."
(IHI, 1997)

Representatives of CHAI have been active participants in the Institute for Healthcare Improvement Idealized Design of the Medication System (IDMS) Design Group that began in May 2000. This group of physicians, pharmacists, nurses, and statisticians established an aim to design a medication system that is safer by a factor of 10, and more cost effective than that currently in use. For ADE's this means the number that now occur in a month would be approximately the total ADE's that occur in an entire year.

Integral to the IDMS aim was to establish a measure for ADE's that is accurate and without bias, especially undercounts. The decision of the Design Group was to measure harm. Medication errors are noted only when associated with an ADE. Harm is temporary or permanent impairment of physical or psychological body function or structure. The IDMS decided to use the National Coordinating Council for Medication Error Reporting and Prevention (NCC MERP) Index for Categorizing Errors (NCC MERP, 2001) to rate the severity of ADE's. CHAI had made a similar decision in 1999. The following NCC MERP categories are not relevant to ADE's:

- Category A: Circumstances or events that have the capacity to cause error
- Category B: An error occurred but the error did not reach the patient (An "error of omission" does reach the patient)
- Category C: An error occurred that reached the patient but did not cause patient harm
- Category D: An error occurred that reached the patient and required monitoring or intervention to confirm that it resulted in no harm to the patient and/or required intervention to preclude harm

Categories E through I of the NCC MERP Index are relevant to ADE's:

- Category E: contributed to or resulted in temporary harm to the patient and required intervention
- Category F: contributed to or resulted in temporary harm to the patients and required initial or prolonged hospitalization

Category G: contributed to or resulted in permanent patient harm

Category H: required intervention to sustain life

Category I: contributed to or resulted in the patient's death

Though the index was formulated by the NCC MERP for categorization of medication errors, categories E through I can be used to categorize adverse drug events.

The NCC MERP provides the following definitions for terms used:

Harm: Temporary or permanent impairment of the physical, emotional, or psychological function or structure of the body and/or pain resulting there from requiring intervention.

Monitoring: To observe or record relevant physiological or psychological signs.

Intervention: May include change in therapy or active medical/surgical treatment.

Intervention Necessary to Sustain Life: Includes cardiovascular and respiratory support (e.g., CPR, defibrillation, intubation, etc.)

In addition, the NCC MERP provides an algorithm to aid in use of the index, NCC MERP Index for Categorizing Medication Errors Algorithm, at its website, www.nccmerp.org.

The trigger chart review methodology combines an active surveillance methodology with random sampling to provide a more valid and less biased estimate of adverse drug events occurring in an institution. The improved accuracy of the estimate will increase the power of the information obtained to lead to identification of appropriate areas for improvement, i.e. root causes.

This kit includes an operational definition of an ADE and a method to obtain the measurement. The kit is divided into 3 major parts:

- A. Sequence of Events
 1. Sampling Plan and Chart Review Summary Template
 2. Adverse Drug Event Trigger Chart Review Tool
 3. Adverse Drug Event Chart Review Procedure
 4. Process of Investigation for Positive Trigger Points
 5. Identified Adverse Drug Event(s) Description
- B. Case Study Training Aid
- C. Data Collection Tools

A. Sequence of Events

1. ADE Sampling Plan and Chart Review Summary Template

With an ADE operationally defined, a method to obtain the measurement in your system is needed. To reduce the workload involved, the following sampling plan has been devised. The steps to this sampling plan are:

- a. List of discharges for a two week period (minimum of 2 days stay) of inpatients 0-18 years old, excluding patients in the normal newborn nursery and any patients whose initial unit of entry was the normal newborn nursery
- b. Take a random sample of 20 (each chart has an equal chance of being selected): To ensure this, a list of all discharges for a given two week period should be listed, then 20 charts should be randomly selected from the list. Examples of random selection are use of a table of random numbers or a random number generator in the Medical Records information system or as found in the Excel Analysis ToolPak. Selecting a convenience sample of charts off the discharge shelves is not a random sample.
- c. Go to medical records and pull charts
- d. Review chart with ADE Trigger Chart Review Tool
- e. Using the tool, determine the number of ADE's
- f. Determine the total number of doses and medications for each patient (manual count)
- g. Review internal reporting and determine number of ADE's for these 20 patients. *It is important that this step be completed after chart reviews are finished to avoid bias of looking for ADE information found on the internal reporting forms.*

A chart review summary template to record your results is provided in the PDA. One chart review summary should be filled out for each sample of twenty discharges as selected above. Specific questions that should be answered include:

1. How many discharges fitting the study criteria occurred in the two-week period? This is for the 2-week study period not the annual discharges.
2. How many total hospital days were there for the discharges fitting the study criteria in the two-week period?
3. How many ADE's were identified by the hospital's voluntary incident reporting system for the discharges fitting the study criteria in the two-week period?

The statistician will use this data to calculate trigger chart review ADE rate estimates and standard deviations (per 100 doses, per 100 hospital days, and per admission) and incident report ADE rate estimates and standard deviations (per 100 hospital days and per admission) for your institution. We will also calculate the proportion of patients with an ADE identified by trigger chart review, the total number of ADE's identified by trigger chart review not identified by your hospital's voluntary incident reporting system, and the number of ADE's

identified by your hospital's voluntary incident reporting system not identified by trigger chart review. This process will be repeated for each cycle of trigger chart review.

Note: The Medical Record number will be collected and stored in an encrypted form. When data is redistributed to project participants in a non-aggregated form, the Medical Record number will be replaced by a key ID. This key ID can then be used along with a paper document, which will be mailed separately, that will translate each key ID into a Medical Record Number.

2. ADE Trigger Chart Review Tool

This tool has identified 15 triggers that provide “clues” to studying patient charts for potential ADE’s. Eleven of these triggers are based on the initial work of the CHAI Medication Errors project, as well as David Classen’s work (Classen, Pestotnik, Evans, and Burke, 1991) with additions by the IDMS (Diphenhydramine; Antiemetics; Narcan; Sodium Polystyrene; Ptt > 100; Rising serum creatinine; Oversedation, lethargy, fall, hypotension; rash; abrupt medication stop). Four new triggers (Serum glucose > 150; high serum potassium; Called codes; laxative or stool softener) have been added to meet the needs of the pediatric patients. All triggers that are positive should be investigated for possible harm to the patient.

3. Adverse Drug Event Chart Review Procedure

Read through the chart paying particular attention to the following sections:

- Discharge summary – may include adverse events
- Procedure notes (diagnostic, surgical) – look at the narrative sections for adverse events
- Physician progress notes – may indicate changes in plan of care related to effects of medications
- Laboratory reports – looking for trigger lab results
- Physician orders or Medication Administration Records (MARs) – looking for trigger medications
- Nursing flow sheets – looking for altered level of consciousness, skin rash
- Nursing/Multidisciplinary progress notes – looking for over-sedation, lethargy, fall, hypotension, rash, nausea/vomiting, or other adverse events

Manually count both medications and individual dosages by reviewing the Medication Administration Record

If you find a trigger, read through the appropriate parts of the chart to determine whether the finding was related to medication administration. Sometimes professional judgment will be required to make this determination. For example, a patient received an anti-emetic an hour after a

narcotic. If the patient continued to receive the narcotic without further anti-emetic, the incidents are probably unrelated. If the patient continued to require anti-emetics after narcotics, an adverse drug event probably occurred. Some adverse drug events will result in more than one trigger. Use best judgment in determining the number of independent ADE's in that situation. Also, multiple doses of an antidote, such as diphenhydramine, given to counteract a single ADE or multiple laboratory measurements, such as serum glucose <50, measured to monitor a single ADE will only be considered one count of that trigger. For each trigger, the total number of times that trigger was found and the total number of times an associated ADE was found should be written in Attachment 1.

[Note: We are not including intentional drug overdoses as ADE's. In addition, hypotension occurring during titration of continuous drip of inotropes or vasodilators or sedatives will not be considered an ADE unless there was an abrupt stop (trigger 23) or change in the titration drip or some other trigger associated with the titration.]

4. Process of Investigation for Positive Trigger Point

The chart review using trigger points can be very valuable in finding ADE's if the thought process used in the investigation is standardized. The following standardized process will be followed in the chart review.

1. **Diphenhydramine (T₁):** Diphenhydramine, or Benadryl, is frequently used for allergic reactions to drugs but can also be ordered as a sleep aid, a pre-op/pre-procedure medication, or for seasonal allergies. If the drug has been administered, review the chart to determine if it was ordered for symptoms of an allergic reaction to a drug administered either during the hospitalization or prior to admission.
2. **Vitamin K (T₂):** Determine whether Vitamin K was used as a response to a prolonged protime or INR. If either lab value is high, review the chart for evidence of bleeding. Look in the lab reports for a drop in hematocrit or for guaiac-positive stools. Check the progress notes for evidence of excessive bruising or a GI bleed. Less likely, a hemorrhagic stroke or other internal bleeding might have occurred.
3. **Flumazenil (Romazicon) (T₃):** This drug reverses benzodiazepine drugs. Determine why the drug was used. If hypotension or marked, prolonged sedation occurred following benzodiazepine administration, an ADE has occurred.
4. **Anti-Emetics (T₄):** Nausea and vomiting can be the result of drug toxicity or overdose, particularly in patients with impaired renal function. Drugs such as theophylline preparations frequently cause nausea and vomiting when levels get high. Antiemetics are also commonly administered to patients post-operatively or those receiving chemotherapy. Professional judgment must be used in these situations to determine if an ADE has occurred.
5. **Naloxone (Narcan) (T₅):** This is a powerful narcotic antagonist. If it has been used, overdosage of narcotics is a frequent finding. If it was used and the patient's condition didn't change, doubt excessive narcotic administration.

6. **Sodium polystyrene (Kayexalate) (T7):** Removes potassium by exchanging sodium ions for potassium ions in the intestine before the resin is passed from the body. Treatment for hyperkalemia. Dosage form can be either oral or rectal.
7. **PTT > 100 seconds (T10):** This is not an infrequent occurrence when patients are on heparin. As with Vitamin K, look for evidence of bleeding to determine if an ADE has occurred. Use professional judgment for patients with high PTTs receiving heparin during a surgical procedure.
8. **Rising serum creatinine (T16):** A rising serum creatinine is defined as a serum creatinine which becomes elevated relative to age-specific normal values or as an increase in serum creatinine of ≥ 0.4 mg/dL (Faden, Deshpande, Grossi, 1982).
9. **Oversedation, lethargy, falls, hypotension (T21):** Look in the physician progress notes, nursing or multidisciplinary notes for evidence of oversedation, lethargy and falls. If found, look for a relationship between the event and administration of a sedative, analgesic, or muscle relaxant. Intentional overdose resulting in sedation is not included.
10. **Rash (T22):** There are many causes for a rash. Look for evidence that the rash is related to drug administration, including overuse of antibiotics resulting in yeast infections.
11. **Abrupt medication stop (T23):** In the order sets, whenever "hold" or "stop" medication orders appear, look for the reason this was done. Frequently it indicates an event of some kind.
12. **Serum glucose >150 mg/dl (T25):** Look for serum glucose values exceeding this level.
13. **Hyperkalemia (High serum potassium) (T26):** The following are the normal ranges for patients based on age:
 1. 0 – 3 months = 3.7 – 5.9 mEq/L
 2. 3 months – 1 year = 4.1 – 5.3 mEq/L
 3. 1 year – adult = 3.6 – 5.0 mEq/L

Look for lab values outside of these ranges, but use the range values as determined by individual institutional norms.

14. **Called codes (T27):** Look in the progress notes for documentation of "code called"; documentation may be on a special flow sheet; includes cardiac arrest, respiratory arrest, and respiratory distress; patients in ICU requiring emergency intubation - code may not be called due to resources available in the unit, but should be included in this trigger category.
15. **Laxative or stool softeners (T28):** Look for evidence referring to the use of stool softener or laxatives (Colace, Peri-colace, Dulcolax, Cephulac, Metamucil, Fleets enema, etc.).

5. Identified ADE Description

For each ADE identified by trigger chart review, confirm the ADE with a second reviewer. For each confirmed ADE, the following information should be determined either through your

institution's regular policies and procedures or by answering the following questions. This information will aid in identification of appropriate areas for improvement, i.e. root causes.

1. Describe the ADE including diagnosis, unit where ADE occurred, medication(s) involved, indication for use of medication(s) and dates of therapy, concomitant therapies, laboratory values and dates, other relevant history such as allergies, and interventions following the ADE.
2. Could the ADE have been prevented, identified earlier during the course of management, or mitigated more effectively? If yes to any of these, answer the following as appropriate.
 - a. If the ADE could have been prevented, identified earlier during the course of management, or mitigated more effectively:
 - 1) In which process(es) did the problem(s) occur, i.e. manufacturing of the medication, purchasing of the medication, inventory of the medication, prescribing, ordering, transcription, dispensing, administration, or monitoring? In which of these processes was the origin of the problem?
 - 2) What were the causes of the ADE?¹
 - 3) What were the contributing factors (systems related), if any?²
 - b. If the ADE could have been prevented, what type of medication error led to the adverse drug event, i.e. dose omission, improper dose (overdosage, underdosage, extra dose), wrong strength/concentration, wrong drug, wrong dosage form, wrong technique (including inappropriate crushing to tablets), wrong route of administration, wrong rate (too fast, too slow), wrong duration, wrong time (administration outside a predefined time interval from its scheduled administration time, as defined by each health care facility), wrong patient, monitoring error (drug-drug interaction, drug-food/nutrient interaction, documented allergy, drug-disease interaction, clinical [e.g. blood glucose, prothrombin, blood pressure], deteriorated drug error (expired drug), and other (NCC MERP, 1998)?
3. Describe any other characteristics about the ADE which your institution may be interested in, i.e., whether the ADE was identified by the incident reporting system, details about the medication(s) [strength; dose; frequency; route; whether formulary, nonformulary, or

¹ i.e. communication (verbal miscommunication, written miscommunication, order misinterpretation), name confusion (proprietary name confusion, generic name confusion), labeling (manufacturer/distributor/repackager label problem, practitioner label problem [e.g. pharmacy, nursing, anesthesiology], package insert problem, electronic reference problem, printed reference material problem, advertising problem), human factors (knowledge deficit, performance deficit, miscalculation, computer error [e.g. incorrect selection by operator, incorrect programming, lack of screening for allergies, interactions, et cetera], error in stocking/restocking/cart filling, drug preparation error, transcription error, stress [e.g. high volume workload, etc.], fatigue/lack of sleep, confrontational or intimidating behavior), packing/design (inappropriate packing or design, dosage form confusion [e.g. similar color, shape, size to another product; similar color, shape, size to same product with different strength]), devices [malfunction, wrong device selected, adapters {e.g. parenteral vs enteral}, automated distribution/vending systems, automated counting machines, automated compounders, oral measuring devices {e.g. syringes, cups, spoons}, infusion {e.g. PCA, infusion pumps}). (NCC MERP, 1998)

² i.e. lighting, noise level, frequent interruptions and distractions, training, staffing, lack of availability of health care professional [e.g. medical, other allied health care professional, pharmacy, nursing, other], assignment or placement of health care provider or inexperienced personnel, system for covering patient care [e.g. floating personnel, agency coverage] [e.g. medical, other allied health care professional, pharmacy, nursing, other], policies and procedures, communication systems between health care practitioners, patient counseling, floor stock, pre-printed medication orders, other. (NCC MERP, 1998)

investigational; manufacturer; dosage form; unit/standard dose or not,], time of day, personnel involved, et cetera.

**Attachment 2 should be filled out for each ADE identified through the trigger chart review process, both those identified by a trigger and those identified incidentally whether or not identified by voluntary report, for each ADE identified only by the voluntary report for the patients selected, and for each ADE identified by voluntary report for patients discharged in the study period meeting the study criteria who were not selected for the trigger chart review.*

B. Case Study Training Aid

Using the ADE chart review procedure in Part 2, the reviewer completed the following:

- 1) Reviewed the physician's orders looking for any of the identified triggers, especially the trigger drugs.
- 2) If triggers were found, reviewed progress notes, nursing notes, multidisciplinary notes for evidence of an ADE. If an ADE was found, then score the ADE using Attachment 2.
- 3) Reviewed laboratory findings for any of the lab triggers. If triggers were found, reviewed progress notes, nursing notes, multidisciplinary notes for evidence of an ADE. If an ADE was found, then determined the harm level.
- 4) Manually count both medications and individual dosages.

Scenario 1

While reviewing the patient's chart, there is an order to discontinue Levaquin. The patient had only received two doses of the IV Levaquin. This is the first trigger that is identified (T24 – abrupt stop of medication). Further in the chart, on the same day is an order for Benadryl 25 mg IV now. This is the second trigger that is identified (T1). At this time, the physician progress notes are reviewed for information about a potential ADE. In the progress notes, the physician does document that patient has developed a rash to the Levaquin. This is another trigger (T22). Also, in the nurse's notes, there is documentation about the development of a red, itchy rash. Physician notified, antibiotic stopped. Later nurse's notes on the same day document that the rash is still present and patient is complaining of itching. Physician notified and order for Benadryl received.

The rest of the chart is reviewed, including labs and no other ADEs are identified.

One ADE is identified with a harm category of E, because the patient did require discontinuation of therapy and treatment with another drug.

Scenario 2

While reviewing the chart, no triggers were identified from the physician orders. While reviewing laboratory values, found an Accu-Chek glucose level of 33. (Trigger T8) Went to the physician progress notes and nothing was documented regarding low glucose levels or any changes in insulin orders. Reviewed the nurse's notes and there was documentation of patient being very shaky, lethargic, and slightly confused. Accu-Chek was 33. Physician was notified and orange with sugar was prescribed, with follow-up Accu-Cheks. Later that day, there was a physician order to change the sliding scale insulin. Reviewed the MAR and regular insulin on a sliding scale had been given approximately 90 minutes prior to the low glucose level.

No other triggers were identified.

One ADE was identified and a harm category of E was assigned, due to the increased monitoring and the change of the medication.

References

- Child Health Accountability Initiative. Results from Phase I of the Medication Errors Trigger List project. January 2002.
- Classen DC, Pestotnik SL, Evans RS, Burke JP. Computerized Surveillance of Adverse Drug Events in Hospital Patients. *JAMA* 1991;266(20):2847-2851.
- Faden H, Deshpande G, Grossi M. Renal and Auditory Toxic Effects of Amikacin in Children with Cancer. *Am J Dis Child* 1982;136:223-225.
- Institute for Healthcare Improvement. Definitions and Glossary. Syllabus: National Congress: IHI Breakthrough Series on Reducing Adverse Drug Events and Medication Errors, St. Louis, Missouri, 1997.
- National Coordinating Council for Medication Error Reporting and Prevention. NCC MERP Index for Categorizing Medication Errors. <http://www.nccmerp.org/main.htm>, 2001.
- National Coordinating Council for Medication Error Reporting and Prevention. NCC MERP Index for Categorizing Medication Errors Algorithm. <http://www.nccmerp.org/main.htm>, 2001.
- National Coordinating Council for Medication Error Reporting and Prevention. NCC MERP Taxonomy of Medication Errors. <http://www.nccmerp.org/main.htm>, 1998.

C. Data Collection Forms

ATTACHMENT 1

Data Collection Form-Medication Trigger 2002						
1. Patient Number <small>(Unique identifier assigned by hospital)</small>	2. Medical Record #	3. Chronic Dx ICD9 Code: <input type="checkbox"/> Not applicable	4. Principle Dx ICD9 Code			
5. Admission Date:		6. Discharge Date:		7. Gestational Age		
MONTH	DAY	YEAR	MONTH	DAY	YEAR	Weeks
8. Initial Unit: <small>(Check the initial inpatient unit)</small>	<input type="checkbox"/> General Medical <input type="checkbox"/> Hematology/Oncology <input type="checkbox"/> NICU <input type="checkbox"/> PICU <input type="checkbox"/> Rehab	<input type="checkbox"/> Specialty Unit <input type="checkbox"/> Surgical <input type="checkbox"/> OR <input type="checkbox"/> PACU	9. Does the patient have a communication barrier? <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, <input type="checkbox"/> Medical <input type="checkbox"/> Language <input type="checkbox"/> Cultural			
		Number of Times Present in Review	Number of ADEs found with this Trigger			
Trigger:						
T ₁ Diphenhydramine (Benadryl)						
T ₂ Vitamin K (Aqua-mephyton)						
T ₃ Flumazenil (Romazicon)						
T ₄ Antiemetics (inapsine, zofran, phenergan, vistaril, compazine, reglan)						
T ₅ Naloxone (Narcan)						
T ₇ Sodium Polystyrene (Kayexalate)						
T ₁₀ PTT > 100 seconds						
T ₁₆ Rising serum creatinine						
T ₂₁ Oversedation/lethargy/fall/hypotension						
T ₂₂ Rash						
T ₂₃ Abrupt medication stop						
T ₂₅ Serum Glucose > 150						
T ₂₆ Hyperkalemia (Elevated potassium)						
T ₂₇ Called Codes						
T ₂₈ Laxatives or Stool Softeners						
10. Total medications this patient received:			11. Total doses this patient received:			
12. Total transfers between units:		13. Time to review chart: (in minutes)		14. Chart Reviewer: (Circle)		
				MD RN RPh SN other: _____		

ATTACHMENT 2: Trigger and Adverse Drug Event (s) Report Form

Complete one of these pages for each Adverse Drug Event

15. Is there a trigger?		<input type="checkbox"/> Yes		<input type="checkbox"/> No	
16. Patient Trigger: (Check all that apply)	<input type="checkbox"/> T ₁ Diphenhydramine (Benadryl)		<input type="checkbox"/> T ₁₆ Rising serum creatinine		
	<input type="checkbox"/> T ₂ Vitamin K (Aqua-mephyton)		<input type="checkbox"/> T ₂₁ Oversedation/lethargy/fall/hypotension		
	<input type="checkbox"/> T ₃ Flumazenil (Romazicon)		<input type="checkbox"/> T ₂₂ Rash		
	<input type="checkbox"/> T ₄ Antiemetics (inapsine, zofran, phenergan, vistaril, compazine, reglan)		<input type="checkbox"/> T ₂₃ Abrupt medication stop		
	<input type="checkbox"/> T ₅ Naloxone (Narcan)		<input type="checkbox"/> T ₂₅ Serum Glucose > 150		
	<input type="checkbox"/> T ₇ Sodium Polystyrene (Kayexalate)		<input type="checkbox"/> T ₂₆ Hyperkalemia (Elevated potassium)		
	<input type="checkbox"/> T ₁₀ PTT > 100 seconds		<input type="checkbox"/> T ₂₇ Called Codes		
<input type="checkbox"/> T ₂₈ Laxatives or Stool Softeners					
17. Is there an ADE Associated with the trigger?		<input type="checkbox"/> Yes <input type="checkbox"/> No		18. Date of ADE:	
				Month	Day
				Year	
19. How was the ADE identified? (Select one)	<input type="checkbox"/> Trigger only	<input type="checkbox"/> Trigger and Voluntary ID	<input type="checkbox"/> Chart Review only	<input type="checkbox"/> Chart Review and Voluntary ID	<input type="checkbox"/> Voluntary ID only
20. Unit ADE occurred:	<input type="checkbox"/> General Medical		<input type="checkbox"/> PICU		<input type="checkbox"/> Surgical
	<input type="checkbox"/> Hematology/Oncology		<input type="checkbox"/> Rehab		<input type="checkbox"/> OR
	<input type="checkbox"/> NICU		<input type="checkbox"/> Specialty Unit		<input type="checkbox"/> PACU
21. ADE Outcome: (List found in dictionary)				22. Medication involved: (List found in Dictionary)	
23. Intervention: (Check all that apply)	<input type="checkbox"/> Unplanned transfer to PICU	<input type="checkbox"/> Administration of reversal agent	<input type="checkbox"/> Medication dosage change	<input type="checkbox"/> Medication change	<input type="checkbox"/> Medication discontinued
	<input type="checkbox"/> Code	<input type="checkbox"/> Increased monitoring (laboratory/vital signs)	<input type="checkbox"/> Transfer from ED to inpatient	<input type="checkbox"/> Other treatment	<input type="checkbox"/> None of above
24. What was the severity of the ADE: (Check only one)					
<input type="checkbox"/> E. An error occurred that resulted in the need for treatment or intervention and caused temporary patient harm			<input type="checkbox"/> F. An error occurred that resulted in initial or prolonged hospitalization and caused temporary harm.		
<input type="checkbox"/> G. An error occurred that resulted in permanent patient harm.		<input type="checkbox"/> H. An error occurred that resulted in near-death event (e.g. anaphylaxis, cardiac arrest.		<input type="checkbox"/> I. An error occurred that resulted in patient death.	
25. Categorize the ADE:		<input type="checkbox"/> Preventable		<input type="checkbox"/> Non-preventable	
26. The ADE could have been: (Check all that apply)					
<input type="checkbox"/> Identified earlier		<input type="checkbox"/> Mitigated more effectively		<input type="checkbox"/> None of the above	
27. Process problem: (Check all that apply, if more than one circle the primary process problem)					
<input type="checkbox"/> Prescribing/ordering		<input type="checkbox"/> Transcription		<input type="checkbox"/> Dispensing	
<input type="checkbox"/> Administration		<input type="checkbox"/> Monitoring		<input type="checkbox"/> None of the above	
28. Medication error (Check all that apply, if more than one circle the primary medication error)					
<input type="checkbox"/> Dose omission		<input type="checkbox"/> Wrong Drug		<input type="checkbox"/> Wrong rate	
<input type="checkbox"/> Monitoring error		<input type="checkbox"/> Wrong dosage form		<input type="checkbox"/> Wrong duration	
<input type="checkbox"/> Deteriorated drug error		<input type="checkbox"/> Wrong technique		<input type="checkbox"/> Wrong time	
<input type="checkbox"/> None of the above		<input type="checkbox"/> Wrong route		<input type="checkbox"/> Wrong patient	
<input type="checkbox"/> Other					

Lucile Salter Packard Children's Hospital
STANFORD UNIVERSITY MEDICAL CENTER
725 Welch Road Palo Alto, CA 94304



Medical Record Number

Patient Name

ORDERS • DIGOXIN

Addressograph or Label - Patient Name, Medical Record Number

Physician: Check all orders that pertain to the patient. Date, time & sign all orders.

Weight: _____ kg

NURSING

- 1. CV Monitor while on Digoxin
- 2. Obtain lead II rhythm strip before each IV dose

LABORATORY

- 1. Digoxin level for IV Digoxin at 24 hours _____ (Date/Time)
- 2. Digoxin level for PO Digoxin at 72 hours _____ (Date/Time)

MEDICATIONS

- 1. Oral
- 2. IV Injection

DIGITALIZING DOSES

- 3. Total Digitalizing Dose (TDD):
TDD = _____ mcg/kg = _____ mcg
(Maximum: 1.25 mg PO or 1 mg IV)

Divide TDD as follows:

Give ½ of TDD = _____ mcg x 1 dose, then 8 hours later,
Give ¼ of TDD = _____ mcg x 1 dose, then 8 hours later,
Give ¼ of TDD = _____ mcg x 1 dose.

Dosage recommendation for the TOTAL DIGITALIZING DOSE for Digoxin

Age	Total Digitalizing Dose (TDD)	
	PO	IV or IM
Neonates		
Pre-term	20 - 30 mcg/kg/TDD	15 - 25 mcg/kg/TDD
Full-term	25 - 35 mcg/kg/TDD	20 - 30 mcg/kg/TDD
Infants and Children		
1 mo - 2 y	35 - 60 mcg/kg/TDD	30 - 50 mcg/kg/TDD
2 - 5 y	30 - 40 mcg/kg/TDD	25 - 35 mcg/kg/TDD
5 - 10 y	20 - 35 mcg/kg/TDD	15 - 30 mcg/kg/TDD
Greater than 10 y	10 - 15 mcg/kg/TDD	8 - 12 mcg/kg/TDD
Adults	0.75 - 1.5 mg/TDD	0.5 - 1 mg/TDD

Dosage recommendation for the MAINTENANCE DOSE for Digoxin

Age	Maintenance Dose	
	PO	IV or IM
Pre-term	2.5 - 3.75 mcg/kg/DOSE q12hr	2 - 3 mcg/kg/DOSE q12hr
Full-term	3 - 5 mcg/kg/DOSE q12hr	2.5 - 4 mcg/kg/DOSE q12hr
1 mo - 2 y	5 - 7.5 mcg/kg/DOSE q12hr	3.75 - 6 mcg/kg/DOSE q12hr
2 - 5 y	3.75 - 5 mcg/kg/DOSE q12hr	3 - 4.5 mcg/kg/DOSE q12hr
5 - 10 y	2.5 - 5 mcg/kg/DOSE q12hr	2 - 4 mcg/kg/DOSE q12hr
Greater than 10 y	2.5 - 5 mcg/kg/DOSE q24hr	2 - 3 mcg/kg/DOSE q24hr
Adults	0.125 - 0.5 mg/DOSE q24hr	0.1 - 0.4 mg/DOSE q24hr

Based on lean body weight and normal renal function for age. Decrease maintenance dose in patients with decreased renal function by 50%.

MAINTENANCE DOSES

- 4. Digoxin _____ mcg/kg/dose:
Dose = _____ mcg/dose
• Dose not to exceed 0.25 mg/day PO or 0.2 mg/day IV
- 5. Dosing schedule:
 Every 12 hours, at 0800 and 2000
 Every 24 hours, at 0800

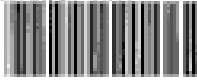
CALL ON-CALL M.D./NP /PA

- 1. Abnormal rhythm strip
- 2. To review lead II rhythm strip before each dose for all IV doses.
- 3. Evaluate for: (specify) _____

OTHER

- 1. All Digoxin orders **must be:**
• Signed by **two practitioners,**
one of whom must be a licensed physician.
• Checked by **two registered nurses.**

DATE	TIME	Physician Signature:	Pager:	Noted by:	Date/Time
Orders signed			License #:		
DATE	TIME	Physician Signature:	Pager:	RN Signature	Date/Time
Orders signed			License #:		



Medical Record Number

Patient Name

**ORDERS - IV POTASSIUM CHLORIDE INFUSION
 (REPLACEMENT THERAPY)**

Addressograph or Label - Patient Name, Medical Record Number

Physician: Check all orders that pertain to the patient. Date, time & sign all orders.

Weight: _____ kg Allergies (drug, food and environments): _____

Most recent laboratory results:

Serum Potassium level: _____ On: _____ At: _____
(Date) (Time)

Serum Creatinine level: _____ On: _____ At: _____
(Date) (Time)

Potassium Chloride to be given through (check one):

- Central venous line (0.4 mEq/mL - standard Pharmacy concentration)
- Peripheral venous line (0.1 mEq/mL - standard Pharmacy concentration)

NURSING

- 1. Continuous ECG monitoring
- 2. For peripheral administration, dilute potassium with at least an equal volume of IV solutions so final concentration is less than or equal to 0.05 mEq/mL

LABORATORY

- 1. Potassium level every 4 hours while infusing and within 2 hours of completion of infusion
- 2. If using ICU ONLY dosing, obtain ISTAT for Na, K, pH, pO₂, pCO₂, iCa, Hct, (EG7+ panel) between dose #1 and dose #2

CALL H.O.

- 1. Call H.O. for urine output less than 0.5mL/kg/hr.

POTASSIUM CHLORIDE INFUSION BASED ON SERUM POTASSIUM LEVEL

Serum Potassium Level:	Dose (Maximum dose)	Rate: Must be infused Over at least 1 hour (ICU exempt when specified below)
<input type="checkbox"/> ICU ONLY <input type="checkbox"/> Less than 3 mmol/L	ICU setting ONLY _____ mEq IV x 2 doses (Maximum single dose: 0.5 mEq/kg, not to exceed 30 mEq)	ICU setting ONLY Give dose #1 over _____ hours (minimum of 0.5 hours) Give dose #2 over _____ hours (minimum of 0.5 hours)
<input type="checkbox"/> Less than 3 mmol/L	_____ mEq IV (Maximum single dose: 0.5 mEq/kg, not to exceed 30 mEq)	Give over _____ hours (minimum of 1 hour)
<input type="checkbox"/> 3-3.5 mmol/L with arrhythmias	_____ mEq IV (Maximum single dose: 0.5 mEq/kg, not to exceed 30 mEq)	Give over _____ hours (minimum of 1 hour)
<input type="checkbox"/> 3-3.5 mmol/L with no arrhythmias	_____ mEq IV (Maximum single dose: 0.3 mEq/kg, not to exceed 30 mEq)	Give over _____ hours (minimum of 1 hour)
<input type="checkbox"/> Less than 4 mmol/L with arrhythmias in ADULTS	_____ mEq IV (Maximum single dose: 0.5 mEq/kg, not to exceed 30 mEq)	Give over _____ hours (minimum of 1 hour)

DATE	TIME	Provider Signature:	Pager:	Noted by:	Date/Time
Orders signed		PRINT Provider Name:		RN Signature	Date/Time

Attachment C



National Initiative for Children's Healthcare Quality

Home Medication List

Child's Name
 Parent/Guardian Name(s)

Phone
 Alt Phone

Emergency Contact Name:
 Phone
 Other Phone
 Email

Health Insurance: Plan & Number

Health Insurance Phone

Primary Care Provider Name:
 Phone
 Address
 Fax

Other Medical Care Provider name:
 Phone
 Address
 Fax

My Allergies / Health Problems
 1
 2
 3
 4
 5
 6
 7

Instructions:
 Cut off shaded area
 Fold on the black dotted line
 Fold on line of Qs.
 Fold on zigzag line
 This will form a credit card size document to be held in a wallet and/or put in a backpack

In these charts include all prescriptions, over-the-counter medicines, vitamins and other supplements taken by the patient.

Other information about me:

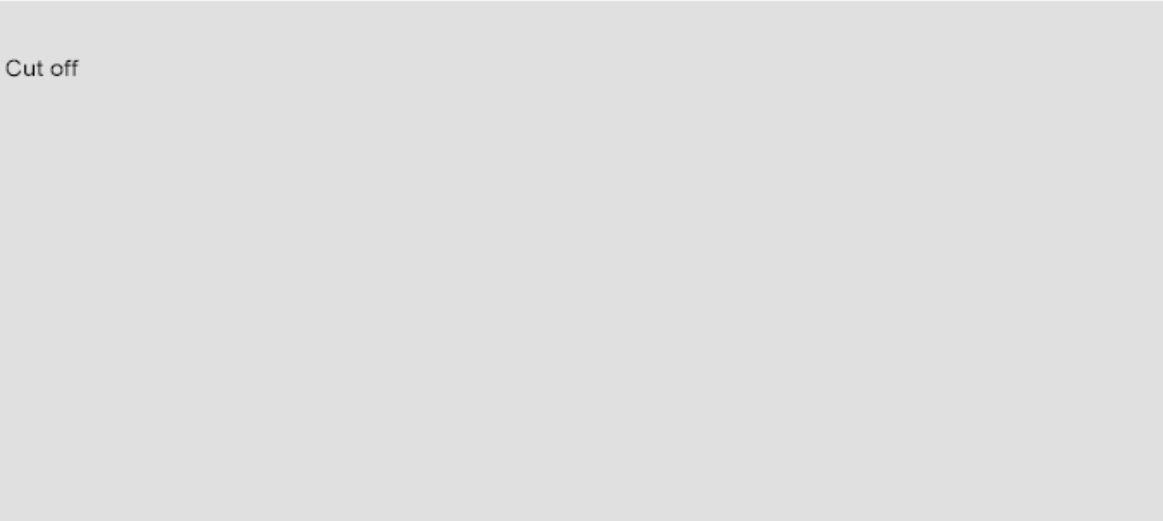
Medication	Dosage	Frequency	What used for?

Medication	Dosage	Frequency	What used for?

Updated by
 Date of update

Updated by
 Date of update

Updated by
 Date of update





Allergy Assessment Script

1. **Is your child allergic to or does he/she react to any of the following:**
 - a. **Prescription medicines?** If yes, which ones?
What was the reaction?
 - b. **Over the counter medicines, supplements, or herbal remedies?** If yes, which ones?
What was the reaction?
 - c. **Foods, food additives or drinks?** If yes, which ones? What happened?
 - d. **Latex or anything else such as bandages or tape?** If yes, which ones?
What happened?
 - e. **X-ray dyes?** If yes, how was it given? By IV, by mouth, or in the rectum? What type of study (CT, MRI, etc)?
What kind of dye was it, if known?
What was the reaction?
 - f. **Blood Products?** If yes, which ones?
What was the reaction?

2. **Does your child require pre-medications(s) before getting any medicine or blood products?** If yes, what pre-medications(s)?
For what reason?

3. **Are there any other medications or foods that your child should not have because of a medical problem?** If yes, what and why?

Note: While it is believed that a consistent methodology for obtaining allergy information will improve care by reducing variation, this practice has not been proven to improve allergy assessment.

For questions about this script or the associated practices, please contact **Sharon Wenczel** MSN RN at wenczel@email.chop.edu or **Trude Haecker** MD at haecker@email.chop.edu

20 Tips to Help Prevent Medical Errors in Children

20 Tips to Help Prevent Medical Errors in Children from the Agency of Healthcare Research and Quality (AHRQ) and the American Academy of Pediatrics (AAP)

Jan. 6 – From the doctor’s office to the pharmacy to the hospital, medical mistakes involving your children can happen anytime. The good news is that with a watchful eye, they are easy to prevent. The American Academy of Pediatrics put together a top 20 list of tips for parents to avoid mistakes and get the best care possible.

1. The single most important way you can help prevent errors is to be an active member of your child’s health care team. That means taking part in every decision about your child’s health care. Research shows that parents who are more involved with their child’s care tend to get better results. Some specific tips, based on the latest scientific evidence about what works best, follow.

MEDICINES

2. Make sure that all of your child’s doctors know about everything your child is taking and his or her weight. This includes prescription and over-the-counter medicines, and dietary supplements such as vitamins and herbs. At least once a year, bring all of your child’s medicines and supplements with you to the doctor. “Brown bagging” your child’s medicines can help you and your doctor talk about them and find out if there are any problems. Knowing your child’s medication history and weight can help your doctor keep your child’s records up to date, which can help your child get better quality care.

3. Make sure your child’s doctor knows about any allergies and how your child reacts to medicines. This can help you avoid getting a medicine that can harm your child.

4. When your child’s doctor writes you a prescription, make sure you can read it. If you can’t read the doctor’s handwriting, your pharmacist might not be able to either. Ask the doctor to use block letters to print the name of the drug.

5. When you pick up your child’s medicine from the pharmacy, ask: Is this the medicine that my child’s doctor prescribed? A study by the Massachusetts College of Pharmacy and Allied Health Sciences found that 88 percent of medicine errors involved the wrong drug or the wrong dose.

6. Ask for information about your child’s medicines in terms you can understand — both when the medicines are prescribed and when you receive them at the hospital or pharmacy.

- What is the name of the medicine?
- What is the medicine for?
- Is the dose of this medicine appropriate for my child based on his or her weight?
- How often is my child supposed to take it, and for how long?
- What side effects are likely? What do I do if they occur?

- Is this medicine safe for my child to take with other medicines or dietary supplements?
- What food, drink, or activities should my child avoid while taking this medicine?
- When should I see an improvement?

7. If you have any questions about the directions on your child's medicine labels, ask. Medicine labels can be hard to understand. For example, ask if "four doses daily" means taking a dose every 6 hours around the clock or just during regular waking hours.

8. Ask your pharmacist for the best device to measure your child's liquid medicine. Also, ask questions if you're not sure how to use the device. Research shows that many people do not understand the right way to measure liquid medicines. For example, many use household teaspoons, which often do not hold a true teaspoon of liquid. Special devices, like marked oral syringes, help people to measure the right dose. Being told how to use the devices helps even more.

9. Ask for written information about the side effects your child's medicine could cause. If you know what might happen, you will be better prepared if it does — or, if something unexpected happens instead. That way, you can report the problem right away and get help before it gets worse. A study found that written information about medicines can help people recognize problem side effects. If your child experiences side effects, alert the doctor and pharmacist right away.

HOSPITAL STAYS

10. If you have a choice, choose a hospital at which many children have the procedure or surgery your child needs. Research shows that patients tend to have better results when they are treated in hospitals that have a great deal of experience with their condition. Find out how many of the procedures have been performed at the hospital. While your child is in the hospital, make sure he or she is always wearing an identification bracelet.

11. If your child is in the hospital, ask all health care workers who have direct contact with your child whether they have washed their hands. Hand washing is an important way to prevent the spread of infections in hospitals. Yet, it is not done regularly or thoroughly enough. A study found that when patients checked whether health care workers washed their hands, the workers washed their hands more often and used more soap.

12. When your child is being discharged from the hospital, ask his or her doctor to explain the treatment plan you will use at home. This includes learning about your child's medicines and finding out when he or she can get back to regular activities. Research shows that at discharge time, doctors think people understand more than they really do about what they should or should not do when they return home.

SURGERY

13. If your child is having surgery, make sure that you, your child's doctor, and the surgeon all agree and are clear on exactly what will be done. Doing surgery at the wrong site (for example, operating on the left knee instead of the right) is rare — but even once is too often. The good news is that wrong-site surgery is 100 percent preventable. The American Academy of Orthopedic Surgeons urges its members to sign their initials directly on the site to be operated on before the surgery.

OTHER STEPS YOU CAN TAKE

14. Speak up if you have questions or concerns. You have a right to question anyone who is involved with your child's care.

15. Make sure that you know who is in charge of your child's care. This is especially important if your child has many health problems or is in a hospital.

16. Make sure that all health professionals involved in your child's care have important health information about him or her. Do not assume that everyone knows everything they need to. Don't be afraid to speak up.

17. Ask a family member or friend to be there with you and to be your advocate. Choose someone who can help get things done and speak up for you if you can't.

18. Ask why each test or procedure is being done. It is a good idea to find out why a test or treatment is needed and how it can help. Your child could be better off without it.

19. If your child has a test, ask when the results will be available. If you don't hear from the doctor or the lab, call to ask about the test results.

20. Learn about your child's condition and treatments by asking the doctor and nurse and by using other reliable sources. Ask your child's doctor if his or her treatment is based on the latest scientific evidence. For example, treatment recommendations based on the latest scientific evidence are available from the National Guideline Clearinghouse or other Web sites such as healthfinder[®] at <http://www.healthfinder.gov/>.

AHRQ, American Academy of Pediatrics Announce Partnership on "20 Tips to Help Prevent Medical Errors in Children". Press Release, January 6, 2003. Agency for Healthcare Research and Quality, Rockville, MD.
<http://www.ahrq.gov/news/press/pr2003/20tipschpr.htm>