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EPINEPHrine for anaphylaxis: Autoinjector or 1mg vial or ampul?

- 0.3-0.5mg IM dose recommended for treatment of anaphylaxis in adults; repeat at 5-15 minute intervals
- Potential error – 1mg dose and IV route
- Cost $400/two pack
- Tough choice
  - ISMP: outpatient clinics and office practices (contrast and chemotherapy)
  - Some hospitals have created kits with proper warnings
Confusion About Epinephrine Dosing

**Figure.** Clearly labeled prefilled syringes containing (upper box) 0.3 mg of 1:10,000 concentration IM dose in an autoinjector labeled “for anaphylaxis use only.” Lower box contains 1 mg of 1:10,000 concentration IV dose labeled “for cardiac arrest use only.”
Leg laceration following EpiPen use

Epinephrine auto-injectors provide life-saving treatment of anaphylaxis. Prompt treatment in the home and community is associated with decreased morbidity and mortality. Many hospitals stock auto-injectors to enable rapid access to the medication in emergencies. Most often, auto-injectors are used successfully without complications. However, the ISMP National Medication Errors Reporting Program just received two reports of leg lacerations following **EpiPen Jr (Epinephrine)** auto-injector use.

A 4-year-old boy at daycare had an allergic reaction. The staff administered EpiPen Jr by holding the injector against the child’s exposed lateral thigh. The child was standing with a daycare staff member behind him for support. Another staff member held the child’s leg and administered the injection. The child kicked during administration, resulting in a
Intended to inspire and mobilize national adoption of consensus-based best practices related to medication safety that continue to cause harmful and fatal medication errors, despite repeated warnings from ISMP
<table>
<thead>
<tr>
<th>Targeted Medication Safety Best Practice (see full description of each practice in article)</th>
<th>Date of Survey</th>
<th>Percent (%) Implementation*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>A</td>
</tr>
<tr>
<td>1. Dispense vincristine (and other vinca alkaloids) in a minibag, not a syringe</td>
<td>Early 2014</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Late 2014</td>
<td>13</td>
</tr>
<tr>
<td>2a. Use a weekly dosage regimen default for oral methotrexate; if overridden to daily, require a hard stop verification of cancer indication</td>
<td>Early 2014</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Late 2014</td>
<td>19</td>
</tr>
<tr>
<td>2b. Pharmacists provide education to patients discharged on weekly oral methotrexate</td>
<td>Early 2014</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Late 2014</td>
<td>37</td>
</tr>
<tr>
<td>3. Measure and express patient weights in metric units only; scales set and measure only in metric units and lock out the ability to measure in pounds; only measured weights are used</td>
<td>Early 2014</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Late 2014</td>
<td>7</td>
</tr>
<tr>
<td>4. Dispense oral liquids not commercially available as unit dose products in oral syringes that do not connect to parenteral tubing; use auxiliary labels that state “For Oral Use Only”</td>
<td>Early 2014</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Late 2014</td>
<td>3</td>
</tr>
<tr>
<td>5. Use oral liquid dosing devices that display only the metric scale; provide patients discharged on oral liquid medication with oral syringes</td>
<td>Early 2014</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Late 2014</td>
<td>16</td>
</tr>
<tr>
<td>6. Eliminate glacial acetic acid from the hospital and replace with vinegar (5%) or commercially available diluted products (0.25%, 2%)</td>
<td>Early 2014</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Late 2014</td>
<td>4</td>
</tr>
</tbody>
</table>

* Key
A: No activity  
B: Considered but decided not to implement  
C: Planned but not implemented yet  
D: Partial implementation in some or all areas  
E: Full implementation in some areas  
F: Full implementation
SAFETY briefs

Oral syringe scale not user friendly.

When a hospital pharmacy ordered Baxa (now Baxter) oral syringes through its regular wholesaler, syringes arrived with the numbers on the syringe scale printed upside down (Figure 1). This presentation, of course, is unlike all other syringes, oral or

Figure 1. Oral syringe on left has a measurement scale printed upside down.

Transdermal patches and heat sources.

While hospitalized, a woman with multiple myeloma was placed on transdermal fentaNYL (DURAGESIC) 25 mcg per hour for back pain management. The patient had previously suffered two vertebral compression fractures. During her first 2 weeks at home, she was doing well. But soon thereafter, a family member noticed that the patient seemed disoriented, was losing her balance, and had nausea and vomiting.

A thorough investigation was conducted, and it was discovered that the fentaNYL patch was being applied to the patient’s back. At the same time, the patient routinely sat in her favorite recliner which vibrates and has a heating component that was activated. The heat from this chair over the area that the patch was applied likely led to the patient’s symptoms of fentaNYL toxicity.
**ISMP Medication Safety Alert**

**Nov 6, 2014**

**Strengthen your resolve:**

**No unlabeled containers anywhere, ever!**

**SAFE PRACTICE RECOMMENDATIONS**

- Provide labels
- Require labels
- Differentiate look-alike names
- Label one at a time
- Confirm medications and labels
- Prepare and label syringes

- Limit access
- Reverify with relief staff
- Discard unlabeled medications
- Conduct walkarounds
- No tolerance of unlabeled products
The “Dirty Dozen”
12 persistent safety gaffes that we need to resolve!

3 Patient counseling:
Still only a veiled “offer” in many states

8 Disrespectful behavior:
A history of tolerance in healthcare

9 Independent double-checks:
Undervalued and misused

10 Beyond-use dating of drugs:
CMS standards lead to costly waste

11 Vaccine errors:
Repetitive errors reported in the last decade
Tragic vaccine diluent mix-ups in Syria have also happened here. You may have seen news reports last week about a terrible tragedy in Syria where 15 children died after being vaccinated against measles. The diluent turned out to be atracurium. Don’t think that something similar couldn’t happen here. It has, many times.
Safe use if health information technology

Problem Examples:

• A drug was ordered as an intramuscular injection when it was supposed to be administered intravenously. The physician did not choose the appropriate delivery route from the drop-down menu.

• A nurse noted that a patient had a new order for acetaminophen. After speaking with the pharmacist, the nurse determined that the order was placed for the wrong patient. The pharmacist had two patient records open, was interrupted, and subsequently entered the order for the wrong patient.
TJC SEA #54

Safe use if health information technology

Actions suggested:

• Use standardized coded data elements to record allergies, problem lists and diagnostic test results.

• Make evidence-based standard order sets (approved by the organization), clinical guidelines and charting templates available for common conditions, procedures and services.

• Ensure that embedded clinical content, including pharmacy dictionaries and medication libraries, is correctly loaded and regularly reviewed, particularly when changes are made to related systems. Assign responsibility for the ongoing management of this content.
Safe use if health information technology

Actions suggested:

• Limit the number of patient records that can be displayed on the same computer at the same time to one, unless all subsequent patient records are opened as "read only" and are clearly differentiated to the user.

• Maximize use of the EHR to order medications, diagnostic tests and procedures.

• Establish order sets for common medications and diagnostic testing.
Since 2001, at least 49 outbreaks have occurred due to the mishandling of injectable medical products, according to the CDC ... more than 150,000 patients required notification during this time frame to undergo bloodborne pathogen testing after their potential exposure to unsafe injections.4

TJC SEA #52

Preventing infection from the misuse of vials
The misuse of vials primarily involves the reuse of single-dose vials, which are intended to be used once for a single patient. Single-dose vials typically lack preservatives; therefore, using these vials more than once carries substantial risks for bacterial contamination, growth and infection.
SDV

- Use a single-dose/single-use vial for a single patient during the course of a single procedure.
- If a single-dose/single-use vial must be entered more than once during a single procedure for a single patient to achieve safe and accurate titration of dosage, use a new needle and new syringe for each entry.

MDV

- Only vials clearly labeled by the manufacturer for multiple dose use can be used more than once.
- Limit the use of a multiple-dose vial to only a single patient, whenever possible, to reduce the risk of contamination.
- When multiple-dose vials are used more than once, use a new needle and new syringe for each entry.
- Disinfect the vial’s rubber septum before piercing.
- Assign a “beyond-use” date.
Use safe injection practices for multiple-dose vials

Apply Aseptic Technique with MDVs <28 Days Open

1. Scrub the rubber septum with an approved antiseptic swab.
2. Allow to dry.
3. Insert a new needle attached to a new syringe for each entry.
Welcome to the Pennsylvania Patient Safety Authority Site

Articles from the Advisory

Hospital-Acquired Pressure Ulcers Remain a Top Concern for Hospitals
Events reported to the Pennsylvania Patient Safety Authority from 2007 through 2013 suggest need for improvement in identification of pressure ulcers present on admission; accurate staging; and prevention of hospital-acquired pressure ulcers.

Wrong-Site Orthopedic Operations on the Extremities: The Pennsylvania Experience
The Authority analyzed 83 wrong-site extremity procedures reported over a nine-year period. The most common body parts involved were the hand, knee, and foot, representing 88% of all wrong-site extremity procedures within the domain of orthopedic surgery.

Standardized Emergency Codes May Minimize "Code Confusion"
Analysis of reported events and a hospital survey identified the use of 80 different codes. To help promote consistency and decrease confusion, organizations may consider developing a standardized system or encouraging the use of plain-language codes.
### Top Five Medication Error Event Types (430 of 519) from June 2004 through September 2010

<table>
<thead>
<tr>
<th>EVENT TYPE</th>
<th>NUMBER</th>
<th>% OF TOTAL EVENTS (N = 519)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wrong drug</td>
<td>158</td>
<td>30.4%</td>
</tr>
<tr>
<td>Drug omission</td>
<td>150</td>
<td>28.9</td>
</tr>
<tr>
<td>Prescription/refill delay</td>
<td>57</td>
<td>11.0</td>
</tr>
<tr>
<td>Wrong dose/underdosage</td>
<td>35</td>
<td>6.7</td>
</tr>
<tr>
<td>Extra dose</td>
<td>30</td>
<td>5.8</td>
</tr>
</tbody>
</table>
Table 2. Top 10 Medications Involved in Events That Occurred After the Pharmacy Was Closed (166 of 519) from June 2004 through September 2010

<table>
<thead>
<tr>
<th>RANK</th>
<th>MEDICATION NAME</th>
<th>NUMBER</th>
<th>% OF TOTAL EVENTS (N = 519)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Warfarin sodium*</td>
<td>23</td>
<td>4.4%</td>
</tr>
<tr>
<td>2</td>
<td>Hydration solution</td>
<td>20</td>
<td>3.9</td>
</tr>
<tr>
<td>3</td>
<td>Insulin*</td>
<td>19</td>
<td>3.7</td>
</tr>
<tr>
<td>4</td>
<td>GuaiFENesin</td>
<td>18</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Vancomycin hydrochloride</td>
<td>18</td>
<td>3.5</td>
</tr>
<tr>
<td>6</td>
<td>Potassium chloride*</td>
<td>14</td>
<td>2.7</td>
</tr>
<tr>
<td>7</td>
<td>CefTRIAxone sodium</td>
<td>9</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>MethylPREDNISolone</td>
<td>9</td>
<td>1.7</td>
</tr>
<tr>
<td>9</td>
<td>CeFAZolin sodium</td>
<td>8</td>
<td>1.5</td>
</tr>
<tr>
<td>10</td>
<td>Carbidopa/levodopa</td>
<td>7</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Levofloxxacin</td>
<td>7</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Metoprolol</td>
<td>7</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Morphine sulfate*</td>
<td>7</td>
<td>1.4</td>
</tr>
</tbody>
</table>

* A high-alert medication
Stories

• A patient was ordered quinine sulfate and needed the dose after the pharmacy had closed. The nursing supervisor retrieved quinidine sulfate from the night stock for the patient, and the patient’s nurse then administered the wrong medication.

• Order was placed for cefepime 1 gram. First dose was not checked by pharmacist due to pharmacy being closed on nights. The staff used another patient’s dose. The patient developed a rash because he is also allergic to Rocephin®, which is also a cephalosporin.
Explore the possibility of establishing on-site 24-hour pharmaceutical services.

If establishment of on-site 24-hour pharmaceutical services is not possible, investigate the concept of remote, or off-site, pharmacy order entry services.

Each morning, pharmacy staff should reconcile all medications removed from the ADCs and night cabinets while pharmacy was closed by comparing what was removed against the prescribers’ orders.
Medication Access and Storage

- Provide access to a limited supply medications to be used for urgent medication orders.
- Ensure that drugs stocked in patient care areas and night cabinets are in ready-to-administer, unit-of-use forms.
- Standardize processes for accessing medications when the pharmacy is closed to reduce variability and opportunity for error.
- Incorporate an independent double check by another practitioner at vulnerable points of the after-hours medication-use system.
- Separate and segregate products using bins and dividers to improve safe drug storage. For ADCs, convert matrix drawers to drawers with locking lids.
Allergy Information

Make the allergy “reaction” selection a mandatory entry in the organization’s order entry systems for prescribers and pharmacists.

Test computer systems to ensure complete allergy information crosses interfaces among systems.

Standardize locations (e.g., front of medical record, on top of order forms, computer screens, assessment forms) in which practitioners document and retrieve complete allergy information, including descriptions of any reaction.
Questions?