A Technician's Role in Preventing Adverse Drug Events
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A medication error is defined by the Nation Coordinating Council for Medication Error and Prevention (NCC MERP) as "A medication error is any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems, including prescribing, order communication, product labeling, packaging, and nomenclature, compounding, dispensing, distribution, administration, education, monitoring, and use."

Adverse Drug Events

Medicines are generally safe when used as prescribed or as directed by the label, but there are risks in taking any medicine. An adverse drug event is when someone is harmed by a medicine. Certain types of adverse drug events are more common for specific medication classes, such as insulin, antibiotics, and opioids.

Why Reports of Serious Adverse Drug Events Continue to Grow?

The last four years have seen a 90% increase in the number of serious adverse drug reports received by the Food and Drug Administration (FDA). Investigating the reasons for the four-year trend, we concluded that they could be divided into three groups. Reports for the new drugs not widely used in 2008 accounted for 23% of the growth; increasing reports for drugs seen in all four years accounted for 40%. The substantial remainder (37%) was due to special circumstances involving a few suspect drugs that resulted in greatly increased numbers of reports (ISMP, 2012).

ISMP: Four Identified, Distinctive, and Severe (ADEs) Categories:

1. Rhabdomyolysis: the destruction of skeletal muscle cells accompanied by the release of cellular proteins into the blood, with a substantial risk of causing acute renal failure.
2. Serotonin syndrome (SS) and neuroleptic malignant syndrome (NMS): neurologic disorders caused by drugs that trigger abnormal serotonin levels (with SS) or block dopamine (with NMS), which results in aberrant behavior and thought, muscle spasms, and compromises to the autonomic nervous system.
3. Stevens-Johnson syndrome/toxic epidermal necrolysis (SJS/TEN): a disorder in which the body’s immune system attacks and destroys the skin, producing a condition similar to severe burns.
4. Progressive multifocal leukoencephalopathy (PML): an often fatal viral infection of the brain that occurs when immunosuppressive drugs or human immunodeficiency virus (HIV) compromise the body’s ability to hold a prevalent virus in check.

Cases Reported to FDA for Four Severe Adverse Drug Events in 2017

<table>
<thead>
<tr>
<th>Adverse Drug Events</th>
<th>Number of Cases</th>
<th>Mortality Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rhabdomyolysis</td>
<td>1,549</td>
<td>12%</td>
</tr>
<tr>
<td>Serotonin and Neuroleptic Malignant Syndromes</td>
<td>1,485</td>
<td>11%</td>
</tr>
<tr>
<td>Stevens-Johnson Syndrome/Toxic Epidermal Necrolysis</td>
<td>1,178</td>
<td>18%</td>
</tr>
<tr>
<td>Progressive Multifocal Leukoencephalopathy</td>
<td>419</td>
<td>29%</td>
</tr>
</tbody>
</table>
Case Description: For about 16 months, a young child had been receiving a 3 gram dose of tryptophan 150 mg/mL oral suspension (ISMP, 2009). This dose was intended to be compounded in an appropriate dosage form, as an oral suspension, a capsule to the pharmacy. However, the compounding pharmacy that had prepared the suspension is the past. That day, the child was found unresponsive. Post-mortem examination identified a complex sleep disorder. Tryptophan was available as a dietary supplement in capsule form, but for this child, it needed to be compounded in an appropriate dosage form, as an oral suspension. A refill of the tryptophan prescription was ordered and picked up from the compounding pharmacy that had prepared the suspension. The next morning, the child was found dead. Post-mortem examination identified a complex sleep disorder. Tryptophan was available as a dietary supplement in capsule form, but for this child, it needed to be compounded in an appropriate dosage form, as an oral suspension.

Death Due to Pharmacy Compounding Error Reinforces Need for Safety Focus

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Conclusion: The selection error described above, with its tragic result, could have occurred in any community or hospital pharmacy or drug preparation facility that compunds medications. Compounding of medications is a high-risk activity that results in a final product for which ingredients cannot be verified through physical inspection alone. It is often necessary to have commercially available alternatives used if available, and there should be an evidence-based or otherwise appropriate clinical rationale for the use of the compounded product.
The use of opioid (narcotic) analgesics (pain relievers) as part of pain management regimens has contributed to a poisoning epidemic (ADEs, 2018).

- The increase in drug poisoning coincides with an increase in the prescription of major types of opioid analgesics, as physicians were encouraged to prescribe stronger analgesics (i.e., opioids) for pain management (ADEs, 2018).
- In 2013, the rate of drug poisoning deaths involving opioid analgesics remained higher than the rate for deaths involving heroin, but the rate of deaths involving heroin had almost tripled from 2010 (ADEs, 2018).

- The overall goal should be to identify ways to reduce deaths from opioid analgesics without reducing the quality of care for patients who legitimately need pain management (ADEs, 2018).
A Technician’s Role in Preventing ADE’s

Question

Which of the following statements is true regarding medication errors and adverse drug reactions?

a. All adverse drug reactions are preventable
b. All medication errors cause patient harm
c. All adverse drug reactions are caused by process errors
d. All medication errors are preventable
e. None of the above

Correct Answer: D

Medication errors are a type of adverse drug event (ADE). ADE’s include adverse drug reactions and medication errors. Medication errors can be viewed as process errors, while adverse reactions are negative clinical outcomes. All adverse drug reactions cause patient harm, but not all adverse drug reactions are preventable. All medication errors are preventable, but not all medication errors cause patient harm.

A Technician’s Role in Preventing ADE’s

Question

According to studies, medication errors occur most frequently in which of the following patients populations?

a. Very young and very old patients
b. Female patients
c. Adolescent patients
d. Patients enrolled in medication reconciliation programs
e. Male patients
f. None of the above

Correct Answer: A

Medication errors occur more frequently in very young and very old patients and the errors tend to me more serious in these populations.

A Technician’s Role in Preventing ADE’s

Question

Approximately what percentage of individuals who use medications do so incorrectly or inappropriately?

a. 20%
b. 30%
c. 50%
d. 70%
e. 80%

Correct Answer: C

It is estimated that one-half of individuals who use medications do so incorrectly or inappropriately.
A Technician’s Role in Preventing ADE’s

Question
Which of the following errors occur during the prescribing step of the medication-use process?

- a. Incorrectly preparing the medication
- b. Affixing the wrong label to the prescription container
- c. Duplicating existing drug therapy
- d. Improperly storing a medication

Correct Answer: C

Errors that occur during the prescribing stage of medication use include irrational, inappropriate, or ineffective choice of medication based on indication; prescribing a medication for a patient with a known allergy; duplicating existing drug therapy; choosing an incorrect dose (under-prescribing or over-prescribing) or dosage form; providing incorrect instructions for use; and writing the prescription with illegible handwriting.

A Technician’s Role in Preventing ADE’s

Question
According to the pharmacy technician survey mentioned in the activity, technicians indicated that the following factors were the most frequent cause of medication errors:

- a. Too many technicians on duty and noise
- b. Equipment malfunctions and phone calls
- c. Illegible handwriting and poor lighting
- d. Interruptions and inadequate staffing
- e. None of the above

Correct Answer: D

Rationale: Pharmacies across all care settings offer numerous opportunities for many types of medication errors. A survey of pharmacy technicians revealed that interruptions and inadequate staffing were the most frequent causes of medication errors. Other common sources of error in community pharmacy included handwritten prescriptions, similar packaging or naming conventions, and lack of control in the process of preparing and labeling prescriptions.

A Technician’s Role in Preventing ADE’s

Question
According to the Institute for Safe Medication Practices (ISMP), which of the following medications (or group of medications) is considered high-risk?

- a. Acetaminophen
- b. Any combination product
- c. Homeopathic agents
- d. Insulin
- e. Opioids

Correct Answer: D

The list of high-alert medications in community settings includes carbamazepine, metformin, warfarin, all antiretroviral agents, all chemotherapeutic agents, insulin, opioids, pediatric medications that require measurement, and medications categorized as pregnancy category X. The entire list, as well as lists of high-alert medications in other settings, is available on the ISMP website.
Which of the following prescriptions is written correctly, in terms of abbreviations, symbols, and designations?

a. APAP 1000 mg t.i.d.
b. Ciprodex 4gtts AU b.i.d.
c. Clonazepam 0.25 mg twice daily
d. Humalog SSRI per MD instructions

Correct Answer: C

Unapproved abbreviations include “µg” for micrograms; AD, AS, and AU and OD, OS, and OU for right ear, left ear, and both ears and right eye, left eye, and both eyes, respectively; the abbreviation “cc” for cubic centimeters; the abbreviation “q.d.” for daily; and the abbreviations “SSI” and “SSRI” for sliding scale insulin and sliding scale regular insulin, respectively. Drug names should not be abbreviated or written in shorthand. Trailing zeros should never be used after a decimal point and a zero should always precede a decimal point when the dose is less than a whole unit. When these symbols, abbreviations, or designations appear on prescriptions, pharmacy technicians should bring these to the attention of the pharmacist—this will help mitigate the chance of a medication error.

Which of the following is a characteristic of a just culture?

a. Employees are encouraged to report errors and analyze why the errors occurred.
b. Each error is considered a stand-alone incident.
c. Errors are considered system failures, so no personal accountability is required.
d. Blame for an error is directly assigned to the person who made the mistake.

Correct Answer: A

A “just culture” is crucial to successful monitoring and reporting of medication errors. This blame-free attitude focuses on the system failures that led to an error, rather than the person who made the error. This concept avoids punishment for the error, and, instead, uses the error as an opportunity to learn and improve the system. Negligent or reckless behaviors are still punishable, and, as such, a “just culture” still requires personal accountability. Employees are encouraged to report and document errors, but, more than that, they are encouraged to understand risk and improve systems to mitigate the risks.

Which system would be used to report an ADE related to a cosmetic product?

a. HAMMERS
b. The Joint Commission
c. MedWatch
d. None of the Above

Correct Answer: C

The Food and Drug Administration’s MedWatch system is a voluntary surveillance program for adverse events related to marketed drugs and devices. Errors reported to MedWatch involve not only prescription and over-the-counter drug products, but also vitamins, nutritional supplements, infant formulas, and cosmetics.
A Technician’s Role in Preventing ADE’s

Question

What steps can be taken to minimize the selection of the wrong medication stock bottle from the pharmacy shelf?

a. Use the barcode scanner
b. Rewrite the prescription using tall-man lettering
c. Obtain a verbal order from the physician’s office
d. Perform a root cause analysis

Correct Answer: A

During the filling of a prescription, it is easy to select the wrong stock bottle from a pharmacy shelf since many medications have names and packages that look and sound alike. Many pharmacies have systems in place, such as barcode scanning or National Drug Code verification, to decrease the likelihood of choosing the wrong drug product.