

Patient Safety Bulletin Number 3 Minimizing Medication Errors: Communication about Drug Orders

*A Joint Statement of the American Academy of Ophthalmology, the
American Society of Ophthalmic Registered Nurses and the American Association of Eye
and Ear Hospitals*

Medication Errors: Definition of the Problem

Medication errors are defined as “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,” by the National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP).¹ Information about medication errors is collected through reports to the U.S. Food and Drug Administration (FDA),² direct contact reports (MedWatch)³ or reports from the U.S. Pharmacopeia (USP)⁴ or Institute for Safe Medication Practices (ISMP).⁵

Medication errors are a common cause of malpractice claims against physicians. The Physician Insurers Association of American reviewed data on 117,000 claims and lawsuits and found that medication errors were the second most common cause for claims.⁶ In a review of 700 medicolegal cases in ophthalmology, medication errors were found to be the third most frequent complaint.⁷ Although this was found to be only 2% of claims for the Ophthalmic Mutual OMIC insureds, claims of medication errors have been more costly than the average case and more likely to result in indemnity payments.⁸ There is a significant potential for error because of the high volume of medications prescribed and dispensed. In 1995, it was estimated that ophthalmologists prescribe medications at 52.4% of all patient visits in the office (21,340,000 visits of a total 40,714,000 visits), according to the National Ambulatory Medical Care Survey.⁹ Of all patient visits, 23.8% of the visits involved 1 medication, 15.1% of the visits involved 2 medications, and 13.5% of the visits involved more than 2 medications. A total of 42,098,276 or over 40 million medications were prescribed or provided in 1995 in ophthalmologists’ offices.

Contributing Factors to the Problem:

The American Hospital Association lists these common factors that contribute to medication errors¹⁰:

1. incomplete patient information (not knowing about patients’ allergies, other medicines they are taking, previous diagnoses, and lab results, for example)
2. unavailable drug information (such as lack of up-to-date warnings)

3. miscommunication of drug orders, which can involve poor handwriting, confusion between drugs with similar names, misuse of zeroes and decimal points, confusion of metric and other dosing units and inappropriate abbreviations
4. lack of appropriate labeling as a drug is prepared and repackaged into smaller units
5. environmental factors, such as lighting, heat, noise and interruptions, that can distract health professionals from their medical tasks.
6. failure to follow institution/facility policies and procedure.

In December 2000, the USP released a report on the 1999 national database for hospital medication error reporting.¹¹ The analysis showed that most errors (97%) did not result in patient harm. The most frequent types of errors were: omission (failure to administer an ordered dose), improper dose/quantity, and unauthorized or wrong drug. The primary factors that contributed to medication errors were described as workload increases and distractions.

In this Patient Safety Bulletin, the focus will be on errors in communication and administration of drug orders, and recommendations for minimizing risk and preventing potential errors. The following topics will be addressed: drugs with similar names, verbal communications, writing of prescriptions and medication orders, transcription and verification of medication orders, medication administration/documentation, and medication events reports and analysis.

Drugs with Similar Names

The JCAHO released a Sentinel Event Alert in May 2001 about look-alike, sound-alike drug names, pointing out that the potential for error was significant.¹² About 15% of all drug errors to the USP Medication Errors Reporting Program involve drugs that are similar when written or spoken.¹³ In March 2001, the USP released a Quality Review, “Use Caution – Avoid Confusion”, which listed over 750 drug names that had been reported because of confusion over similar brand names, similar generic names and similar brand and generic names. Factors contributing to this confusion are the introduction of new drug products, illegible handwriting, similar packaging, incomplete knowledge of the full drug name, and errors in selecting the appropriate drug from a computerized listing. In its 2000 report, “To Err is Human: Building a Safer Health System.” the Institute of Medicine recommended that FDA require manufacturing companies to test proposed drug names in order to identify and remedy potential sound-alike and look-alike confusion with existing drugs.¹⁴ Currently, the FDA reviews and evaluates proposed drug names and rejects names for their potential for confusion. A list of drugs used in ophthalmology that have been reported to the USP as confusing with other drug names include:

| | |
|--------------|--------------|
| Atropine | Akrapine |
| Betagan | Betoptic |
| Betopic | Betopic S |
| Erythromycin | Azithromycin |
| Murocel | Murocoll-2 |

| | |
|----------|----------|
| Ocufen | Ocuflox |
| Ocufen | Ocupress |
| Refresh | ReFresh |
| Tobradex | Tobrex |
| Voltaren | Tramadol |
| Voltaren | Ultram |

JCAHO standards require that all dispensed medications be labeled in a standardized method, having both the generic and the brand name. JCAHO also stipulates that hospitals and ambulatory care centers consider the potential for medication errors in terms of selection of products for a formulary. For example, an institution may decide not to select products with similar names or packaging, or else take precautions with the storage and handling of both medications.

Verbal Medication Orders

Verbal drug orders have greater potential for error than written or electronic orders because of problems in interpreting what someone else is saying. Contributing factors include incomplete knowledge about the drugs, noise and distractions, or different pronunciations of drug names.¹⁵ In addition, verbal orders are then transcribed, introducing another route for errors. For example, a pharmacist may receive a call for a medication, which is based on a written transcription of a verbal order from a physician. Drug names and dosage numbers can be misinterpreted. Because of the potential for misinterpretation, the NCCMERP recommends that verbal medication orders be limited to urgent situations where written or electronic communication is not possible.¹⁶ The NCCMERP recommends that health care organizations establish policies that describe situations when verbal orders may be used, who can send and receive orders and what elements should be included for completeness.

Writing of Prescriptions

The NCCMERP emphasizes that illegible prescriptions have resulted in injuries and harm to patients.¹⁷ For example, a letter or number could be read or interpreted differently than intended.¹⁸ Even computerized physician order entry may not eliminate all errors, because computer-generated letters and numbers could be confused, for example, a lower case “l” letter with the number “1”, the letter “O” with the number “0”, and the letter “Z” with the number “2”. The NCCMERP also recommends that all orders be written in the metric system, wherever possible. This will help reduce miscalculations when converting to the metric system, which is used for product labelling.

Other errors found have been in use of abbreviations and symbols, because they can be misunderstood (e.g., AU has been mistaken for OU, HCL has been confused for potassium chloride, per os has been confused with OS, o.d. has been mistaken for OD). The NCCMERP determined that any standardization of abbreviations would still not address the potential for error and misinterpretation. Lists of abbreviations that are

potentially confusing are available.^{19 20} Ten-fold errors in the dosage and strength of medications have occurred because there is misinterpretation of the absence of a leading zero in front of a decimal expression less than one, (e.g., .5 has been interpreted as 5), and the presence of a leading zero in front of a number greater than 1 (e.g., 5.0 has been interpreted as 50).

Suggestions for Improving Patient Safety:

The following suggestions can help to minimize errors in communication of drug orders:

Confusion over Drugs with Similar Names:

1. If the institution/facility has a formulary, consider whether drugs that look alike or sound like are allowed. If allowed, identify these as being “high-risk” and add extra steps to assure accurate ordering, dispensing and administration.
2. If medications are stored in the office or hospital, label with both the generic and the brand name, if known.
3. Don’t store drugs with similar names alphabetically. Instead, store them apart from each other or in different locations.
4. Provide both the generic and brand name in communications of drug orders, if known.
5. Write the purpose for the medication on the prescription to help the pharmacist interpret the order accurately.
6. Provide patients with written information about their medications, including both brand and generic names.

Writing of prescriptions:

1. Write in block letters, using upper-case (not cursive).
2. Use the metric system (instead of the apothecary and avoirdupois systems).
3. Avoid use of abbreviations and Latin directions for use (e.g., q.i.d., b.i.d.), and instead write it out, e.g., four times a day, twice a day.
4. Use a leading zero if a number is less than one (0.1), and don’t use a trailing zero after a decimal (5~~0~~).
5. Prescriptions should include: date, drug name, dosage, route of administration, frequency of administration, and signature and professional designation of authorized prescriber.
 - PRN orders should indicate a specific time interval.

Written Medication Orders:

1. The institution/facility policy and procedure should identify authorized prescribers.

- non-physician prescribers (nurse practitioner, physician assistant) are responsible that orders prescribed are within the scope of their written agreement.
 - a consulting physician may write an order with approval from an authorized prescriber of the service responsible for the patient.
 - orders written by medical students (including sub-interns) should be countersigned by an authorized prescriber.
 - an institution/facility may allow a registered nurse to initiate certain orders without co-signature from an authorized prescriber such as over the counter lozenges or reorder replacement supply of multiple dose medications previously ordered by an authorized prescriber (e.g. eyedrops).
2. Include all known patient allergies in admission and transfer orders. The designation “no known allergies” should be used as appropriate.
 3. Use only approved abbreviations as specified in the institution/facility policy.
 4. The institution/facility may have a policy on approved medication protocols that nurses may administer drugs as specified in the protocol. The institution/facility pharmacy should have a copy of the protocol.
 5. Medication orders sheets should have the patient’s name and other identification such as hospital number, date of birth etc.
 6. Orders for medication should include: date and time ordered, drug name, dosage, route of administration, frequency of administration, and signature and professional designation of authorized prescriber.
 - PRN orders should indicate a specific time interval.
 7. An existing order may not be corrected, altered added to, or modified in any way.
 8. If change is necessary, the order must be discontinued and a new order written by the authorized prescriber.
 9. When discontinuing a medication, the prescriber should write the name of the drug being discontinued and not an order number.
 10. Use a leading zero if a number is less than one (0.1), and don’t use a trailing zero after a decimal (5~~0~~).

Verbal medication orders:

1. If there is an alternative, don’t use verbal orders; instead use faxes, electronic mail or computerized physician order entry systems. Develop guidelines on the use of verbal orders, and who is authorized to provide and receive verbal orders.

2. If possible, have a second person listen to the verbal order, especially if the receiver is inexperienced. Verbal orders may need to be clarified by the pharmacist.
3. If verbal orders are used, the receiver should repeat the order to confirm understanding.
4. Develop guidelines on what should be included in a verbal order. For example, elements could include the patient name, age and weight, if relevant, both brand and generic drug name, dosage, strength or concentration, frequency, duration, purpose or indication, and instructions for use, if needed.
5. The person authorized to accept verbal orders records the verbal order directly onto the appropriate medication order sheet or enters the order electronically, writes the name of the prescriber and signs the order with his/her professional designation.
6. The prescriber should verify the verbal order in the patient's chart and sign such order within the timeframe as defined by the institution/facility. The individual institution/facility may include in their policy that no additional verbal orders will be accepted, providing no adverse consequences are anticipated for that patient, until outstanding verbal orders are signed by the prescriber.

Transcription and Verification of Medication Orders:

1. The institution/facility should identify staff authorized to transcribe medication orders.
2. The registered nurse (RN) is responsible for checking orders transcribed by a non-RN for accuracy. The RN initials or countersigns the signature of the non-RN transcribing the order as part of the verification for accuracy.

Medication Administration/Documentation:²¹

1. Prior to administering any medication, the RN/LPN (licensed practical nurse) will:
 - check that the initial transcription and verification has been completed by a RN.
 - review the ordered medication with respect to desired outcome, therapeutic duplication, possible drug interactions allergies and adverse effects/toxicity.
 - check the time, dose, and route of packaged medication against that transcribed on the institution/facility document and check the patient allergy.
 - check the patient name band to verify patient identity.
2. Document medication administered on the appropriate documentation tool.
 - Never alter patient records. All corrections and late entries should be clearly marked as such.
 - Do not erase, obliterate, or attempt to edit notes previously written. Do not use correction fluid or tape.

- Indicate errors by drawing a single line through the error, writing the word “error” above the error, and initialing the error.
 - Late entries, entries made out of time sequence, or addenda should be clearly marked as such in the record, and properly dated, time and signed.
3. Document the evaluation of the patient response to the medication, when appropriate.
 4. Document any identified possible adverse reaction to the medications administered.
 5. Document explanation of any omitted doses.
 6. Nurses are only permitted to administer medications for specific doses as ordered while the patient is hospitalized. (Dispensing of medications by the nurse is not permitted by state and federal laws).
 7. The institution/facility should have a policy on:
 - medications that may not be administered by a LPN
 - drugs requiring verification by a second nurse such as insulin.
 - drugs requiring an infusion pump.

Medication Events Reporting and Analysis:²²

1. Define a standard mechanism for identifying, reporting and analyzing medication events as well as a flow diagram for communicating the event.
2. Include in the communication channel the office/committee on performance improvement/risk management and if appropriate, the office of claims and litigation.
3. Define a system to address and manage an identified sentinel event.

EXAMPLE POLICY ON MEDICATION EVENT REPORTING AND ANALYSIS

(Please visit our website to view and download the **Johns Hopkins Hospital Reporting and Analysis of Medication Errors** form - <http://www.aao.org/aaoweb1/Library/2001.cfm>)

Developed by the AAO Quality of Care Secretariat in collaboration with ASORN and AAEEH. The American Academy of Ophthalmology, representing over 95% of practicing ophthalmologists in the United States, is committed to promoting high-quality eye care and its continuous improvement. The American Society of Ophthalmic Registered Nurses (ASORN) and the American Association of Eye and Ear Hospitals (AAEEH) are collaborative partners with the Academy's commitment to quality patient care and its ongoing quality of care activities. ASORN is a society of registered nurses whose mission is to foster excellence in ophthalmic patient care and to support the ophthalmic team through individual development, education, and evidence-based practice. AAEEH is composed of domestic and international institutions, which are dedicated to quality medicine, research, education and surgical excellence.

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