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Obstetricians and Gynecologists

WOMEN'S HEALTH CARE PHYSICIANS

# COMMITTEE OPINION

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## Committee on Patient Safety and Quality Improvement

*This document reflects emerging concepts on patient safety and is subject to change. The information should not be construed as dictating an exclusive course of treatment or procedure to be followed.*

## Improving Medication Safety

**ABSTRACT:** Despite significant national attention, medical errors continue to pervade the U.S. health care system. Medication-related errors consistently rank at the top of all medical errors, which account for thousands of preventable deaths annually in the United States. There are a variety of methods—ranging from broad-based error reduction strategies to the adoption of sophisticated health information technologies—that can assist obstetrician–gynecologists in minimizing the risk of medication errors. Practicing obstetrician–gynecologists should be familiar with these various approaches that, along with efforts directed at assisting the patient in understanding the medical condition for which a medication is prescribed, can improve the safety and efficacy of medication use.

### Background

In its report, *Preventing Medication Errors*, the Institute of Medicine (IOM) defines a *medication error* as “any error occurring in the medication-use process” (1). Examples include wrong dosage prescribed, wrong dosage administered for a prescribed medication, or failure to give a medication (by the health care provider) or take a medication (by the patient). Research has shown that there is at least one medication error per hospital patient per day (1). Studies indicate that 400,000 preventable drug-related injuries occur each year in hospitals, which result in additional costs estimated at 3.5 billion dollars (1). Many of the early studies identified rates of errors and adverse drug events in large, academic hospitals; however, one study reported an adverse drug event rate of 15.0 per 100 admissions in the community setting, where most patients receive care (2). These results are twice the adverse drug event rate identified in earlier studies performed in the academic setting (6.5 adverse drug events per 100 admissions) (3). Seventy five percent of the adverse drug events identified in this study were classified as preventable.

Despite improved technology in the health care setting, errors related to medication use continue. In a study that involved 10 hospitals in North Carolina, investigators reported that harm occurred in 18.1% of patient admissions. Among the causes of harm, medications are ranked second after procedures (4).

Human factors inherently limit the safety of health care processes and contribute to medication errors. Factors such as fatigue, inattention, memory lapse, lack of knowledge, failure to communicate, use of poorly

designed equipment, noisy working conditions, interruptions, and numerous other personal and environmental factors all play a role. Researchers have found that communication errors are the most common contributing factor in medication errors and adverse drug events (5). Communication issues noted in this study included both written and verbal issues. Examples of written communication problems included wrong dosages or wrong drugs on written prescriptions or wrong medications noted on patient medication lists. Verbal communication issues noted included “misunderstood verbal physician orders, miscommunication between patients and pharmacists, and miscommunication between nurses and pharmacists regarding correct medication or dosage” (5). According to The Joint Commission, accurate and complete medication reconciliation, the process of comparing a patient’s medication orders to all of the medications that the patient has been taking, can prevent numerous prescribing and administration errors (6). Leading patient safety organizations are focusing on improving practices that involve medication prescribing and administration and have endorsed systems improvements, including automated and nonautomated technologies to reduce harmful medication-related errors.

Research has shown that approximately 75% of all medication errors occur at the ordering or administration phase (3). There are several types and causes of medication order errors, such as allergy-related contraindications that go undetected, inappropriate dosage forms, and excessive dose administration (7, 8). Medication order errors also occur from fundamental causes, such as

poorly written or misinterpreted handwritten medication orders. Recent findings suggest that incomplete computer-generated prescriptions also can be fraught with errors, which indicates that “implementing a computerized prescribing system without comprehensive functionality and processes in place to ensure meaningful system use does not decrease medication errors” (9).

The complexity of prescribing drugs is attributed, in part, to the number of agents, which has increased at a staggering rate. Prescription problems, such as illegible words, missing components, and the inappropriate use of abbreviations, have been anecdotally reported for many years. The problem has been compounded in recent years because of the influx of new drugs with names that look-alike and sound-alike, which make prescription interpretation more difficult (10). Similarity, sound-alike trade names also can be problematic. The Institute for Safe Medication Practices issues alerts about similarities in medication names or packaging.

### **Broad-Based Strategies for Improving Medication Safety**

A fundamental step in improving medication safety is for physicians and other health care providers to be familiar with the medications that are available to treat their patients. There are several ways to accomplish this:

- Maintain up-to-date references of current medications and have those references available at the time the drug is prescribed.
- Understand the patient’s condition and diagnosis and indications for the medication considered, including all alternative therapies.
- Consider conditions that may affect the efficacy of the medication, such as dosages, route of administration, patient weight, renal and hepatic functioning, and other important patient characteristics, such as pregnancy.
- Understand the potential interactions between a newly prescribed medication and other medications already being used by the patient, including non-prescribed medications and supplements, as well as therapies being considered (including surgical treatments).
- Recognize the potential risk of high-alert medications, those drugs that bear a heightened risk of causing significant patient harm if there is an error in the medication-use process. Intravenous oxytocin has been identified by the Institute for Safe Medication Practices as one such drug (11).

Other strategies to improve medication safety include the following:

- Ensure that a patient’s current medication is continued, if appropriate, when admitting that patient to the hospital and that additional medication used dur-

ing the hospital stay is compatible with the patient’s current therapeutic regimen.

- Emphasize medication reconciliation during periods of care transition, including admission and discharge and subsequent follow-up in the ambulatory setting.
- Provide relevant patient education about the reason the medication is needed. Pay attention to cultural or educational needs to ensure understanding, and communicate the reasons for changes to a patient’s medication regimen.

The essentials of safely writing medication orders include focusing on certain elements of the order as follows:

- Medication orders should be legible and should include the following components: name of the drug, dose, route of administration, frequency (or rate), reason or conditions under which the drug should be administered if prescribing *pro re nata* (p.r.n.); and patient’s weight and age (if relevant to dosage). Writing an incomplete medication order substantially increases the risk of a medication error. The prescriber’s signature and identification number should be included in the prescription.
- Zeros and decimal points. The misuse of leading decimals and trailing zeros can be dangerous. The adage “always lead, never follow” can help mitigate errors, which can lead to 10-fold or 100-fold dosage errors (eg, always write 0.1, never write 1.0).
- Standardized abbreviations. The use of nonstandardized abbreviations creates confusion and can contribute to medication errors if the abbreviations are not interpreted as intended by the prescriber. Most health care institutions have standardized lists of acceptable abbreviations. The Joint Commission has also developed a list of “Do Not Use” abbreviations that has been supported by the American College of Obstetricians and Gynecologists. In addition, some organizations provide alerts about dangerous abbreviations and other medication safety recommendations on their web sites (11, 12).
- *Pro re nata* medication orders. When prescribing a medication, it is important to provide the reasons for giving the medication or the parameters for giving a p.r.n. dose. This is particularly helpful in preventing errors with medications that sound-alike and look-alike or for medications that are to be given on an as-needed basis (eg, p.r.n. moderate to severe cramping, rather than just p.r.n.).
- Verbal medication orders should be limited to urgent situations in which written (or electronic) medication orders are not feasible. To ensure accuracy, verbal medication orders (whether in person or by telephone) should always be followed by a read-back by the person receiving the order. The prescriber should ask the receiver to repeat the order to the prescriber if it has not been read back already. Because many

drugs have names that sound alike, it is also helpful to include the indication for the drug in verbal medication orders.

Interruptions may potentially result in medical errors. It is important for all members of the team to eliminate or minimize interruptions of the nurse who is preparing medications or in the process of dispensing medications. Strategies, such as no distraction zones, do not disturb signs over medication preparation areas, and use of colored vests worn by health care providers during the medication administration process are examples of methods for alerting colleagues not to interrupt health care providers while they are focused on tasks related to the preparation or administration of medications.

## Using Health Information Technology to Improve Medication Safety

In 2009, the Health Information Technology for Economic and Clinical Health Act created an opportunity for professionals and hospitals to qualify for Medicare and Medicaid incentive payments if they implemented a certified electronic health record (EHR) technology that met specific objectives. As of 2011, health care providers and hospitals must demonstrate “meaningful use of a certified EHR” in order to receive these bonus payments. Among the Meaningful Use Core Measures, several objectives are specific to medication management and include the following (13):

- Maintain an active medication allergy list
- Maintain an active medication list
- Use computerized physician order entry for medication orders
- Generate and transmit electronic prescriptions for noncontrolled substances

There are many information technology applications for medication safety. These include computerized physician order entry, electronic prescribing, automated dispensing cabinets, bar coding coupled with an electronic medication administration record, and intravenous infusion technology (smart pumps). Evidence now exists to support the patient safety benefit of each of these technology systems. Two technology-based strategies specific to obstetrician–gynecologists who have direct involvement in the ordering and prescribing of medications include computerized physician order entry and electronic prescribing.

## Computerized Physician Order Entry

Computerized physician order entry refers to a computer-based system of ordering medications, laboratory tests, and diagnostic tests. Health care providers directly enter orders into a computer system that ensures standardized, legible, and complete orders. To maximize its benefits, computerized physician order entry should include some levels of clinical decision support. A clinical decision sup-

port system is an “active knowledge system that uses two or more items of patient data to generate case-specific advice” (14). The system typically is designed to integrate a medical knowledge base, patient data, and an inference engine to generate case-specific advice. Computerized physician order entry has been evaluated and endorsed by the IOM, Agency for Health Care Research and Quality, The Leapfrog Group, National Quality Forum, Institute for Safe Medication Practices, and the American Hospital Association (14–16).

To meet Stage 1 Meaningful Use criteria, eligible health care providers must demonstrate that more than 30% of their patients who have at least one medication listed on their medication list have at least one medication order entered using computerized physician order entry.

## Electronic Prescribing

Electronic prescribing (also known as e-prescribing) refers to a prescriber’s ability to electronically send an accurate, error-free, and understandable prescription directly to a pharmacy from the point-of-care (17). Although electronic prescribing is a function usually found within computerized physician order entry systems and embedded in many, if not all, electronic medical records, free-standing electronic prescribing systems also are available. These programs are Internet accessible and can be used with existing office computers or wireless systems. Similar to computerized provider order entry, electronic prescribing can contribute to patient safety by reducing the chances that illegible prescriptions or improper dosages are accidentally written. In addition, the direct transmission of a prescription to the pharmacy, as well as the formulary checks many systems can perform, have the potential to reduce phone calls from pharmacists who request clarification (1). Research has shown that electronic prescribing with direct transmission can reduce dispensing errors and, therefore, improve safety. In one study, the electronic prescribing dispensing error rate for electronically transmitted prescriptions from a clinic directly to the pharmacy was one half that of the clinic’s baseline dispensing error rate ( $P=0.03$ ), which had involved generating the prescription with an outpatient computerized physician order entry system, printing it, and giving it to the patient (18). Stage 1 Meaningful Use Criteria also includes the requirement that “more than 40 percent of all permissible prescriptions written by the eligible provider are transmitted electronically using certified EHR technology” (13).

Computerized physician order entry systems are primarily beneficial during the ordering and transcription processes. Errors can still occur if physicians override important and relevant system alerts. Both computerized physician order entry and many electronic prescribing systems are written with clinical decision support systems, a critical safety feature that alerts prescribers about potential drug, allergy, or disease contraindications to a medication before it is prescribed. Some clinical deci-

sion support features are comprehensive, but not clinically relevant and, thereby, generate a large number of alerts (also known as pop-ups) to which prescribers may become desensitized (also known as pop-up fatigue). Studies show that health care providers override between 49–96% of these alerts because of clinical irrelevance (19). Customizing drug alert systems to make them more clinically relevant, including tiering of alerts and incorporating patient-specific data into the development of clinical decision support software, can help maximize the use of clinical decision support systems (20, 21).

Major challenges exist in implementing automated system technology. Such challenges can significantly affect their adoption, effectiveness, or both. These challenges include cost to implement, intuitive user interfaces, engagement of health care providers in system design and integration into health care processes, health care provider resistance to change, increased time and workload, fears regarding loss of control over clinical care and how data will be used, and health care provider workarounds that intentionally bypass safety features.

Studies have shown that acceptance of a clinical decision support system is significantly improved if health care providers trust the system to help them take better care of their patients, the system reminds them of something they may have forgotten, or it provides them with information that was previously unavailable (22).

## **Patient Education and Shared Decision Making to Enhance Medication Safety**

Regardless of whether nonautomated or automated systems are used as part of the medication order process, patients need to be involved in the process as appropriate. Clinicians should confirm with the patient that she understands the medical condition for which a medication has been prescribed. For example, the teach-back method is useful for determining the retention and understanding of medication usage by asking the patient to repeat her understanding of the information back to the health care provider. Engaging the patient in her own care may improve adherence, outcome, and patient satisfaction, and also reduce opportunities for error. This requires the concerted effort of all members of the medical team, both in and out of the hospital. Such education may take the form of oral communication or handouts that explain the use, dosage, expected benefits, and possible adverse effects of the medication prescribed. Patients should be given ample opportunity to ask questions and reiterate, to the clinician's satisfaction, their understanding of proper use of their medications. Allergies should be well documented and reviewed with the patient. A list of other medications currently used by the patient should be documented, and the patient should retain a copy of this list for personal benefit and to show to health care providers at each encounter. Extending this education to family members who will assist the patient

in medication use may promote the accurate use of the prescribed medication.

## **Conclusion**

Health care providers feel a sense of urgency to reduce medical errors that occur as a result of their care. Obstetrician–gynecologists need heightened vigilance with regard to the medication use process when caring for both the pregnant woman and her fetus, as well as the postreproductive woman with the potential for increased comorbidities. Following these suggestions related to medication safety will not only assist in reducing errors but, more importantly, will create the awareness necessary to provide safe care.

Automated health care technologies hold perhaps the greatest potential for dramatically reducing the incidence of harm caused by medication-related errors. Equally clear is the fact that the effect of these technologies depends on the speed with which national standards emerge and the success with which they are integrated into well-designed care processes. In the meantime, non-automated methods can still be used to improve medication safety. The American College of Obstetricians and Gynecologists encourages health care providers to continue to examine all aspects of medication safety, both in the hospital setting as well as within their offices.

## **Resources**

*The following list is for information purposes only. Referral to these sources and web sites does not imply the endorsement of the American College of Obstetricians and Gynecologists. This list is not meant to be comprehensive. The exclusion of a source or web site does not reflect the quality of that source or web site. Please note that web sites are subject to change without notice.*

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200 Lakeside Drive, Suite 200  
Horsham, PA 19044  
(215) 947-7797  
<http://www.ismp.org>

National Coordinating Council for Medication Error Reporting and Prevention  
<http://www.nccmerp.org>

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