Published in final edited form as:

Clin Ther. 2008 November ; 30(11): 2156–2158. doi:10.1016/j.clinthera.2008.11.010.

Consumer medication management and error

Denys T. Lau, PhD [Assistant Professor]

Buehler Center on Aging, Health & Society Northwestern University, Feinberg School of Medicine
Chicago, Illinois

Beginning in 1999, the Institute of Medicine (IOM) has issued a series of landmark reports on patient safety and, in particular, on medication errors and adverse events.^{1,2} Despite the existence of national and local initiatives in the public and private sectors of the US health care system, the general consensus is that safety progress has been slow.³ The estimated annual US health care cost of drug-related morbidity and mortality is ~\$177 billion.⁴ Nationally, >7000 drug-related deaths occur each year and 1.3 million people are injured due to preventable medication errors.⁵ Although medication errors are most often documented in the inpatient and long-term care settings, many preventable errors happen while medications are under the consumer's control. As more medications are used in ambulatory settings, the consumers' role in and capability for self-management, both for themselves and for family members, will become increasingly important in promoting the appropriate and safe use of medications.

According to the National Coordinating Council for Medication Error, 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.”⁶ Thus far, the published literature on medication error and consumer self-management has focused on medication nonadherence and chronic disease management. The documented prevalence of medication nonadherence averages ~25%, with higher rates among those who are older, are cognitively impaired, have low literacy, do not have insurance, or have multiple drug regimens.^{7,8} It has been reported that as many as 188 million visits to health care providers result from problems involving medication non-adherence.⁸ Interventions for the self-management of a variety of chronic diseases (eg, diabetes, cancer, depression) have primarily addressed consumers' ability to monitor their condition, recognize adverse reactions, and adjust self-administered medications.^{9,10} While some authors have reported improvements in adherence and the accuracy of medication management in association with self-management support programs,¹¹ a study evaluating medication-adherence interventions found an inconsistent impact on long-term health-related outcomes.¹² As the prevalence of chronic conditions continues to grow, there is a need for research to examine how medication-adherence and self-management programs can be better tailored to consumers' values and psychosocial circumstances, and to evaluate how such programs affect adverse drug events, cost-effectiveness, and overall quality of life.

In addition to concerns about adherence and disease management, there is growing attention to consumer's initiation of medications, particularly with respect to over-the-counter (OTC) and complementary and alternative medicine (CAM) products. Despite the increasing use of such products, no studies have yet documented CAM-related error rates, and only a few small-scale studies have estimated OTC-related error rates, which have been reported to range from 12% to 51 %, mainly in association with incorrect dosing.^{13,14} There are reports of adverse interactions between OTC products and other drugs,¹⁵ and between CAM products and prescription drugs¹⁶; however, warnings of serious adverse reactions or interactions are rarely highlighted on the labeling for OTC or CAM products. In addition, there is considerable controversy about consumers' ability to understand direct-to-consumer drug advertisements in the media or to interpret the labeling for OTC or CAM products when deciding which product

to take and how to take it. Research is needed to examine how promotional materials and product labeling can be best presented to increase their comprehensibility and utility for consumers. Given reports that as many as 80% of consumers do not consult OTC product labels for information on adverse effects and 77% do not read dosing instructions,¹⁷ improvements in product labeling should be accompanied by consumer education to encourage informed decision making.

The proper acquisition of medications is another important part of consumer medication management and prevention of medication errors. Internet pharmacies have proliferated in recent years, offering a convenient way for consumers to purchase medications. Concerns about medication safety are raised when prescription drugs can be purchased without a prescription, when drug information is inaccurate or biased toward drug benefits, or when Internet pharmacies do not comply with pharmacy regulations and sell medications that are counterfeit, unapproved, or improperly packaged.¹⁸ The effect of Internet pharmacies on consumers' medication-management practices and health-related outcomes has not been well documented and warrants further investigation. Meanwhile, because many Internet pharmacies have global operations, international coordination of regulatory bodies will be necessary to hold Internet pharmacies accountable for meeting quality standards, in terms of both medical products and consumer health information. In fact, addressing the problem of counterfeit and substandard drugs is one of the top 10 patient safety research priorities established by the World Health Organization's World Alliance for Patient Safety.¹⁹

As the patient safety movement has taught us, addressing the problem of medication errors will require systemwide efforts to create and sustain safety culture and change in practice. The IOM argues that in theory, factors that influence consumers' ability to effectively self-manage medications can range from health care policy initiatives and service delivery systems to drug manufacturers and distributors.² For example, merely implementing consumer education programs to increase knowledge will be inadequate without also establishing standards for better-designed ergonomic technologies to deliver health information and biomedical treatment, foster culture change in consumers' attitudes toward more responsible self-management, and break down communication barriers to improve provider-consumer relationships. In adopting such a comprehensive systems framework, the patient safety movement embraces a multidisciplinary approach that applies principles from such fields as organizational theory, information sciences, sociocognitive psychology, and human factors engineering to improve health services delivery. Similarly, medication safety research and practices will need to adopt a multidisciplinary systems approach to address the consumer's role. Integrating multiple disciplines to further examine medication adherence, disease management, use of OTC and CAM products, and Internet drug purchasing will be an important step in promoting evidence-based policies and practices to prevent and reduce medication errors, and to ultimately improve drug-related health outcomes.

REFERENCES

1. Kohn, LT.; Corrigan, JM.; Donaldson, MS.; for the Committee on Quality of Health Care in America, Institute of Medicine. , editors. *To Err Is Human: Building a Safer Health System*. National Academies Press; Washington, DC: 2000.
2. Aspden, P.; Wolcott, J.; Bootman, JL.; Cronenwett, LR.; for the Committee on Identifying and Preventing Medication Errors, Institute of Medicine. , editors. *Preventing Medication Errors: Quality Chasm Series*. National Academies Press; Washington, DC: 2007.
3. Leape LL, Berwick DM. Five years after *To Err Is Human*: What have we learned? *JAMA* 2005;29:2384–2390. [PubMed: 15900009]
4. Ernst FR, Grizzle AJ. Drug-related morbidity and mortality: Updating the cost-of-illness model. *J Am Pharm Assoc (Wash)* 2001;41:192–199. [PubMed: 11297331]

5. Medication errors. [US Food and Drug Administration Web site].
<http://www.fda.gov/cder/handbook/mederror.htm>. Accessed October 30, 2008
6. National Council focuses on coordinating error reduction efforts. *USP Quality Rev* 1997;57:1–4.
7. Improving Use of Prescription Medications: A National Action Plan. National Quality Forum; Washington, DC: 2005.
8. DiMatteo MR. Variations in patients' adherence to medical recommendations: A quantitative review of 50 years of research. *Med Care* 2004;42:200–209. [PubMed: 15076819]
9. Grissinger M, Kroon L, Penna P. Misadventures in insulin therapy: Are your members at risk? *J Manag Care Pharm* 2003;9(Suppl):2–9.
10. Ikesue H, Ishida M, Uchida M, et al. Monitoring for potential adverse drug reactions in patients receiving chemotherapy. *Am J Health Syst Pharm* 2004;61:2366–2369. [PubMed: 15581259]
11. Sawicki PT, for the Working Group for the Study of Patient Self-Management of Oral Anticoagulation. A structured teaching and self-management program for patients receiving oral anticoagulation: A randomized controlled trial. *JAMA* 1999;281:145–150. [PubMed: 9917117]
12. McDonald HP, Garg AX, Haynes RB. Interventions to enhance patient adherence to medication prescriptions: Scientific review. *JAWA* 2002;288:2868–2879.[published correction appears in *JAMA*. 2003;289:3242]
13. Li SF, Lacher B, Cram EF. Acetaminophen and ibuprofen dosing by parents. *Pediatr Emerg Care* 2000;16:394–397. [PubMed: 11138879]
14. McErlean MA, Bartfield JM, Kennedy DA, et al. Home antipyretic use in children brought to the emergency department. *Pediatr Emerg Care* 2001;17:249–251. [PubMed: 11493823]
15. Piscitelli SC, Gallicano KD. Interactions among drugs for HIV and opportunistic infections. *N Engl J Med* 2001;344:984–996. [PubMed: 11274626]
16. Calls KA, Young LR. Clinical analysis of adverse drug reactions: A primer for clinicians. *Hosp Pharm* 2004;39:697–712.
17. Cropper CM. Counter intelligence: To use over-the-counter drugs safely, educate yourself about dosage, possible interactions, and even ingredients. *Bus Week*. 2005
18. Report to the Chairman, Permanent Subcommittee on Investigations, Committee of Governmental Affairs, US Senate. Internet Pharmacies: Some Pose Safety Risks for Consumers and Are Unreliable in Their Business Practices. General Accounting Office; Washington, DC: 2004. GAO-04-820
19. Edwards IR. The WHO World Alliance for Patient Safety: A new challenge or an old one neglected? *Drug Saf* 2005;28:379–386. [PubMed: 15853440]