

Look-Alike, Sound-Alike Medication Names

Patient Safety Solutions

| volume 1, solution 1 | May 2007



► STATEMENT OF PROBLEM AND IMPACT:

The existence of confusing drug names is one of the most common causes of medication error and is of concern worldwide (1). With tens of thousands of drugs currently on the market, the potential for error due to confusing drug names is significant. This includes nonproprietary names and proprietary (brand or trademarked) names. Many drug names look or sound like other drug names. Contributing to this confusion are illegible handwriting, incomplete knowledge of drug names, newly available products, similar packaging or labeling, similar clinical use, similar strengths, dosage forms, frequency of administration, and the failure of manufacturers and regulatory authorities to recognize the potential for error and to conduct rigorous risk assessments, both

for nonproprietary and brand names, prior to approving new product names (2,3).

More than 33 000 trademarked and 8 000 nonproprietary medication names were reported in the United States of America alone in 2004 (4), and an estimated 24 000 therapeutic health products were reported in the Canadian market (5). The Institute for Safe Medication Practices (ISMP) has posted an eight-page listing of medication name pairs actually involved in medication errors (6). There are many other look-alike, sound-alike (LASA) combinations that could potentially result in medication errors. Table I includes examples of name pairs that have been confused in several countries around the world.

Table 1 – Examples of confused drug name pairs in selected countries
Brand name is shown in *italics*—Nonproprietary name is shown in **bold**

Country	Brand name (Nonproprietary name)	Brand name (Nonproprietary name)
Australia	<i>Avanza</i> (mirtazapine)	<i>Avandia</i> (rosiglitazone)
	<i>Losec</i> (omeprazole)	<i>Lasix</i> (frusemide)
Brazil	<i>Losec</i> (omeprazol)	<i>Lasix</i> (furosemda)
	<i>Quelicin</i> (succinilcolina)	<i>Keflin</i> (cefalotina)
Canada	<i>Celebrex</i> (celecoxib)	<i>Cerebyx</i> (fosphenytoin)
	<i>Losec</i> (omeprazole)	<i>Lasix</i> (furosemda)
France	fluoxétine	<i>Fluvoxamine</i>
	<i>Reminyl</i> (galantamine hydrobromide)	<i>Amarel</i> (glimepiride)
Ireland	<i>Losec</i> (omeprazole)	<i>Lasix</i> (furosemda)
	morphine	hydromorphone
Italy	<i>Diamox</i> (acetazolamide)	<i>Zimox</i> (amoxicillina triidrato)
	<i>Flomax</i> (morniflumato)	<i>Volmax</i> (salbutamolo solfato)
Japan	<i>Almarl</i> (arotinolol)	<i>Amaryl</i> (glimepiride)
	<i>Taxotere</i> (docetaxel)	<i>Taxol</i> (paclitaxel)
Spain	<i>Dianben</i> (metformin)	<i>Diovan</i> (valsartan)
	<i>Ecazide</i> (captopril/hydrochlorothiazide)	<i>Eskazine</i> (trifluoperazine)
Sweden	<i>Avastin</i> (bvacizumab)	<i>Avaxim</i> (hepatitis A vaccine)
	<i>Lantus</i> (insulin glargine)	<i>Lanvis</i> (toguanine)

► ASSOCIATED ISSUES:

The World Health Organization's International Nonproprietary Names Expert Group works to develop international nonproprietary names for pharmaceutical medicinal substances for acceptance worldwide. However, brand names are developed by the product's sponsor and often differ significantly between countries. Some medicines, although marketed under the same or similar-sounding brand names may contain different active ingredients in different countries. Furthermore, the same drug marketed by more than one company may have more than one brand name.

Brand names—also referred to as trademarked names or invented names—are approved by a regulatory authority such as the Food and Drug Administration in the United States or the Invented Names Review Group/CPMP in the European Union. In recent years, during the naming process, authorities have assessed the potential for name confusion with other drugs, amongst other criteria. Also, drug manufacturers have begun to incorporate computerized screening methods and practitioner testing in their name development process. Still, new names that are similar to existing names continue to be approved, and medication errors continue to occur. In addition, many problem drug name pairs that have surfaced in one country are similarly problematic elsewhere. For example, the drugs Losec (omeprazole) and Lasix (furosemide) are problematic worldwide. More research is needed to develop the best methods for assuring that new brand names and nonproprietary names cannot be confused. In addition, world regulatory authorities and the global pharmaceutical industry must place more emphasis on the safety issues associated with drug names.

The increasing potential for LASA medication errors was highlighted in the Joint Commission's Sentinel Event Alert (7) in the United States of America and was incorporated into the Joint Commission's National Patient Safety Goals (8). Recommendations focus on ensuring prescription legibility through improved handwriting and printing, or the use of pre-printed orders or electronic prescribing. Requiring medication orders and prescriptions that include both the brand name and nonproprietary name, dosage form, strength, directions, and the indication for use can be helpful in differentiating look-alike or sound-alike medication names. Requiring read-back¹ clarification of oral orders and improvements in communications with patients are other important ways to reduce the potential for error (9). Other recommendations aimed at minimizing name confusion include conducting a periodic analysis of new product names; physically separating medicines with LASA names in all storage areas; including both the brand name and nonproprietary name on medication orders to provide redundancy; and using "tall man" (mixed case) lettering (e.g. DOPamine versus DoBUTamine) to emphasize drug name differences (10). Health-care professional training and education on LASA medications and the significant risk for medication errors is also recommended because inadequate education of health-care professionals can be a contributing factor for failing to address this problem. By incorporating measures such as these, health-care organizations can greatly reduce the risk for LASA medication errors.

While many LASA errors occur in hospitals, the problem is at least as great in outpatient care settings, which require the same degree of rigour in implementing risk reduction strategies.

¹ - A process whereby an oral communication occurs, is transcribed, and read back to the speaker. This process best ensures that the message has been heard and transcribed correctly.

► SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Ensuring that health-care organizations actively identify and manage the risks associated with LASA medications by:
 - a. Annually reviewing the LASA medications used in their organization.
 - b. Implementing clinical protocols which:
 - ▶ *Minimize the use of verbal and telephone orders.*
 - ▶ *Emphasize the need to carefully read the label each time a medication is accessed and again prior to administration, rather than relying on visual recognition, location, or other less specific cues.*
 - ▶ *Emphasize the need to check the purpose of the medication on the prescription/order and, prior to administering the medication, check for an active diagnosis that matches the purpose/indication.*
 - ▶ *Include both the nonproprietary name and the brand name of the medication on medication orders and labels, with the nonproprietary name in proximity to and in larger font size than the brand name.*
 - c. Developing strategies to avoid confusion or misinterpretation caused by illegible prescribing or medication orders, including those that:
 - ▶ *Require the printing of drug names and dosages.*
 - ▶ *Emphasize drug name differences using methods such as "tall man" lettering.*
 - d. Storing problem medications in separate locations or in non-alphabetical order, such as by bin number, on shelves, or in automated dispensing devices.
 - e. Using techniques such as boldface and colour differences to reduce the confusion associated with the use of LASA names on labels, storage bins and shelves, computer screens, automated dispensing devices, and medication administration records.
 - f. Developing strategies to involve patients and their caregivers in reducing risks through:
 - ▶ *Providing patients and their caregivers with written medication information, including medication indication, nonproprietary and brand names, and potential medication side effects.*
 - ▶ *Developing strategies to accommodate patients with sight impairment, language differences, and limited knowledge of health care.*
 - ▶ *Providing for pharmacist review of dispensed medications with the patient to confirm indications and expected appearance, especially when dispensing a drug that is known to have a problematic name.*
 - g. Ensuring that all steps in the medication management process are carried out by qualified and competent individuals.

2. Incorporating education on potential LASA medications into the educational curricula, orientation, and continuing professional development for health-care professionals.
3. Ensuring that organizations with responsibility for procurement of medicines:
 - a. Incorporate LASA considerations and user testing into the new product acquisition process.
 - b. Are aware that a single brand name may be associated with different drugs in different countries.
4. Advocating increased emphasis on patient safety in the naming of drugs and the elimination of LASA names through participation on national and international regulatory, standard, and advisory boards.
5. Collaborating with international agencies and industries to implement:
 - a. A universal drug naming convention.
 - b. Screening of existing drug names for potential confusion with a new drug name prior to approval of the latter.
 - c. Standardized suffixes (e.g. sustained release medications).
 - d. Strategies for focusing efforts on newly-introduced medications.

▶ LOOKING FORWARD:

- ▶ Member States planning to use technologies such as computerized physician order entry (CPOE), bar coding, or automated dispensing devices to minimize medication errors should recognize risks associated with CPOE. These include limited field size, resulting in the truncation of names or “auto-fill” data entry fields. The possibility of including suffix definitions in CPOE systems and the incorporation of name alert warnings in CPOE systems should be explored.

▶ STRENGTH OF EVIDENCE:

- ▶ Expert opinion and consensus.

▶ APPLICABILITY:

- ▶ Regulators (health authorities and agencies).
- ▶ Pharmaceutical companies.
- ▶ WHO INN programme.
- ▶ All settings where medications are ordered, dispensed, or administered.
- ▶ Bedside medication management situations, including self-administration and family/caregiver administration.

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

- ▶ Advise, instruct, and sensitize patients, families, and surrogates (caregivers) regarding potential problems related to LASA medications and how to avoid them—for example, how to read “tall man” lettering on labels.

- ▶ Encourage patients, families, and caregivers to learn the nonproprietary name as the key identifier of their medication products.
- ▶ Instruct patients to alert caregivers whenever a medicine appears to vary in any way from what is usually taken or administered.
- ▶ Alert patients to the problem of LASA drug names when obtaining medicines via the Internet.
- ▶ Encourage patients to use their community pharmacies as sources of information about LASA drugs and other sources of medication error and how to avoid them.

▶ POTENTIAL BARRIERS:

- ▶ Continued production and marketing of LASA drugs.
- ▶ Personal preferences of prescribers and their unwillingness to conform to a limited formulary.
- ▶ Complex education campaign required to inform patients and practitioners.
- ▶ Costs related to the introduction of prescribing technology applications.
- ▶ Wide variability in pharmacy/pharmaceutical regulations among countries.
- ▶ Language barriers among multinational health-care professionals, especially when practicing as expatriates in a country where a different primary language is used.
- ▶ Lack of resources to implement technological support, such as CPOE.
- ▶ Expanding industry use of brand recognition packaging.
- ▶ Increase in development of multistrength combination products with common suffix descriptors.
- ▶ Lack of a standard method for “tall man” lettering.
- ▶ Systematic use of brand names instead of nonproprietary names.
- ▶ Marketing pressure by pharmaceutical companies to use brand names.
- ▶ Reluctance of health-care authorities and professionals to encourage the use of nonproprietary drug names.
- ▶ Concerns that if the use of nonproprietary drug names is promoted, patients may receive lower quality medications if “generic” drugs, which are often marketed under nonproprietary names, are substituted for brand name products.
- ▶ Insufficient generally accepted research, data, and economic rationale regarding cost-benefit analysis or return on investment (ROI) for implementing these recommendations.

▶ RISKS FOR UNINTENDED CONSEQUENCES:

- ▶ Perceived need for increased production costs that are then transferred to patients and institutions.
- ▶ Promotion of brand name use by focusing on risk reduction strategies rather than on risk prevention through the use of nonproprietary names.

► REFERENCES:

1. Lambert BL et al. Similarity as a risk factor in drug-name confusion errors. *Medical Care*, 1999, 37(12):1214–1225.
2. McCoy LK. Look-alike, sound-alike drugs review: include look-alike packaging as an additional safety check. *Joint Commission Journal on Quality and Patient Safety*, 2005, 31(1):47–53.
3. Hoffman JM, Proulx SM. Medication errors caused by drug name confusion. *Drug Safety*, 2003,26:445–452.
4. Drug name confusion: preventing medication errors. *FDA Consumer Magazine*, July–August 2005, 39(4). http://www.fda.gov/fdac/features/2005/405_confusion.html.
5. Look-alike and sound-alike drug names—a step forward. *Hospital News*, January 2004. <http://ismp-canada.org/download/HNews0401.pdf>.
6. ISMP's list of confused drug names. Huntingdon Valley, PA, Institute for Safe Medication Practices, 1 April 2005 (<http://www.ismp.org/Tools/confuseddrugnames.pdf>, accessed 11 June 2006).
7. Look-alike, sound-alike drug names. *Sentinel Event Alert*, Issue 19, May 2001. *Joint Commission*.http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_19.htm.
8. 2006 National Patient Safety Goals. Oakbrook Terrace, IL, The Joint Commission, 2006 (http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/06_npsg_cah.htm?print=yes, accessed 11 June 2006).
9. Davis NM, Cohen MR, Teplitsky B. Look-alike and sound-alike drug names: the problem and the solution. *Hospital Pharmacy*, 1992, 27:95–98, 102–105, 108–110.
10. Filik R et al. Drug name confusion. Evaluating the effectiveness of capital (« Tall Man ») letters using eye movement data. *Social Science & Medicine*, 2004, 59:2597–2601.

► OTHER SELECTED RESOURCES:

1. Improve core processes for dispensing medications: eliminate or reduce the availability of multiple medication strengths. *IHI Patient Safety Medication Systems Changes*. Cambridge, MA, Institute for Healthcare Improvement, 2006 (<http://www.ihl.org/IHI/Topics/PatientSafety/MedicationSystems/Changes/Improve+Core+Processes+for+Dispensing+Medications.htm>, accessed 11 June 2006).
2. Look-alike/sound-alike medication errors. *Safety First Alert*, January 2001. Massachusetts Coalition for the Prevention of Medical Errors. <http://www.macoalition.org/documents/SafetyFirst4.pdf>.
3. National Quality Forum (NQF) Safe Practices for Better Health Care: http://www.qualityforum.org/projects/completed/safe_practices/

© World Health Organization 2007

All rights reserved. Publications of the World Health Organization can be obtained from WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland (tel.: +41 22 791 3264; fax: +41 22 791 4857; e-mail: bookorders@who.int). Requests for permission to reproduce or translate WHO publications – whether for sale or for noncommercial distribution – should be addressed to WHO Press, at the above address (fax: +41 22 791 4806; e-mail: permissions@who.int).

The designations employed and the presentation of the material in this publication do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

The mention of specific companies or of certain manufacturers' products does not imply that they are endorsed or recommended by the World Health Organization in preference to others of a similar nature that are not mentioned. Errors and omissions excepted, the names of proprietary products are distinguished by initial capital letters.

All reasonable precautions have been taken by the World Health Organization to verify the information contained in this publication. However, the published material is being distributed without warranty of any kind, either expressed or implied. The responsibility for the interpretation and use of the material lies with the reader. In no event shall the World Health Organization be liable for damages arising from its use.

This publication contains the collective views of the WHO Collaborating Centre for Patient Safety Solutions and its International Steering Committee and does not necessarily represent the decisions or the stated policy of the World Health Organization.

