Patient Safety Solutions Preamble - May 2007

Worldwide, the delivery of health care is challenged by a wide range of safety problems. The traditional medical oath—"First do no harm"—is rarely violated intentionally by physicians, nurses, or other practitioners, but the fact remains that patients are harmed every day in every country across the globe in the course of receiving health care. The first things that we must do are to acknowledge this disturbing truth; to reject the notion that the status quo is acceptable; and, perhaps most important, to act to correct the problems that are contributing to unsafe care.

All patients have a right to effective, safe care at all times.

Unintended harm to patients undergoing treatment is not a new phenomenon. The earliest record of this problem dates from the 17th century BC. The response in those days was clearly and solely punitive (for example, cutting off a surgeon's hand). Today, the solutions for improving patient safety offer a more constructive approach—one in which success (safer care) is determined by how well caregivers work together as a team, how effectively they communicate with one another and with patients, and how carefully the care delivery processes and supporting systems of care are designed. With the growing recognition of safety problems in health care, it is now time to create and disseminate "Solutions" for patient safety.

Fortunately, political leaders in some countries are framing their arguments for reforming health care in terms of higher quality and the elimination or correction of practices that are known to be unsafe or wasteful. Similarly, patients and their families are becoming increasingly skilled in accessing information to make personal health care decisions about treatments and their choice of providers, and demanding safer care as well. Health-care practitioners are also becoming more proficient at incorporating evidence-based knowledge into their clinical decision-making practices.

In 2005, the World Health Organization (WHO) launched the World Alliance for Patient Safety and identified six action areas. One of these action areas is the development of "Solutions for Patient Safety". In the same year, the Joint Commission and Joint Commission International were designated as a WHO Collaborating Centre for Patient Safety Solutions, to initiate and coordinate the work of developing and disseminating solutions for patient safety. The output from this component of the World Alliance will be delivered to the global health-care community as "Patient Safety Solutions".

▶ IDENTIFICATION, PRIORITIZATION AND DISSEMINATION OF SOLUTIONS:

Errors and adverse events can result from a variety of issues at different levels within health care—for example, at the level of government support (e.g. funding), the level of a health-care facility or system (e.g. structure or processes), or at the point of intervention between patients and practitioners (e.g. human error). The Solutions from this initiative will not address the broad underlying causes of patient safety problems (e.g. inadequate resources), but rather will be directed at the specific level where good process design can prevent (potential) human errors from actually reaching the patient. Solutions, therefore, will be intended to promote an environment and support systems that minimize the risk of harm despite the complexity and lack of standardization in modern health care.

Within the foregoing context, the term "*Patient Safety Solution*" is defined as:

Any system design or intervention that has demonstrated the ability to prevent or mitigate patient harm stemming from the processes of health care.

Solutions development for this action area of the World Alliance for Patient Safety involve extensive research to identify and prioritize the safety problems to be addressed and to review any existing solutions for those problems that might be adopted, adapted, or further developed for international dissemination. An International Steering Committee, a panel of international experts in patient safety, oversees the selection of topics and the development of a defined set of Solutions. The candidate Solutions are then prioritized based on potential impact, strength of evidence, and feasibility for adoption or adaptation in all countries, in the context of known cultural and economic differences. The highest-priority Solutions are reviewed by Regional Advisory Groups in different areas of the world and are then made available for an Internet-based field review, which permits comments and suggestions from any interested party. The International Steering Committee then finally approves the Solutions, which are then transmitted to the WHO for publication and dissemination.

▶ FORMAT FOR PATIENT SAFETY SOLUTIONS:
- ▶ Patient Safety Solution Title
- ▶ Statement of the Problem and Impact
- ▶ Background and Issues
- ▶ Suggested Actions
- ▶ Looking Forward
- ▶ Applicability
- ▶ Opportunities for Patient and Family Involvement
- ▶ Strength of the Evidence
- ▶ Potential Barriers to Implementation
- ▶ Risks for Unintended Consequences
- ▶ References
- ▶ Other Selected Resources

▶ INAUGURAL PATIENT SAFETY SOLUTIONS:
1. Look-Alike, Sound-Alike Medication Names
2. Patient Identification
3. Communication During Patient Hand-Overs
4. Performance of Correct Procedure at Correct Body Site
5. Control of Concentrated Electrolyte Solutions
6. Assuring Medication Accuracy at Transitions in Care
7. Avoiding Catheter and Tubing Mis-Connections
8. Single Use of Injection Devices
9. Improved Hand Hygiene to Prevent Health Care-Associated Infection

▶ NEXT STEPS:

The process for the identification, prioritization, and dissemination of Solutions, as described above, was developed because of the recognized complexity and challenges involved in implementing Solutions around the world. There are challenges also in the ability to effectively measure the impact and long-term effects of any Solution. To better delineate the issues related to the implementation of Solutions and the measurement of the impact and long-term results, a separate pilot programme is also under way. The results of that pilot programme will form the basis for the subsequent elaboration of strategies for the broad-ranging implementation of the Solutions.

Changes in health organization and professional cultures must eventually be part of the overall transformation that the World Alliance is seeking, but this will be a major challenge as it shifts values, beliefs, and behaviours at both the organization and professional leadership levels. Such changes are urgently needed to facilitate the front-line changes where the processes of care are actually applied. The Solutions provide insights and methods for managing patient safety at multiple levels, including, but not limited to, government and industry, health-care systems and facilities, and at the individual practitioner and patient level.

The cumulative information relating to the Solutions programme is being managed on a single secure database and being made accessible to the public on a stable web site housed at the Joint Commission International Center for Patient Safety. For further information and to provide suggestions for future Solutions please visit the web site (www.jcipatientsafety.org).

Look-Alike, Sound-Alike Medication Names

▶ 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	*Avanza* (**mirtazapine**)	*Avandia* (**rosiglitazone**)
	Losec (**omeprazole**)	*Lasix* (**frusemide**)
Brazil	*Losec* (**omeprazol**)	*Lasix* (**furosemida**)
	Quelicin (**succinilcolina**)	*Keflin* (**cefalotina**)
Canada	*Celebrex* (**celecoxib**)	*Cerebyx* (**fosphenytoin**)
	Losec (**omeprazole**)	*Lasix* (**furosemide**)
France	**fluoxétine**	*Fluvoxamine*
	Reminyl (**galantamine hydrobromide**)	*Amarel* (**glimepiride**)
Ireland	*Losec* (**omeprazole**)	*Lasix* (**furosemide**)
	morphine	**hydromorphone**
Italy	*Diamox* (**acetazolamide**)	*Zimox* (**amoxicillina triidrato**)
	Flomax (**morniflumato**)	*Volmax* (**salbutamolo solfato**)
Japan	*Almarl* (**arotinolol**)	*Amaryl* (**glimepiride**)
	Taxotere (**docetaxel**)	*Taxol* (**paclitaxel**)
Spain	*Dianben* (**metformin**)	*Diovan* (**valsartan**)
	Ecazide (**captopril/hydrochlorothiazide**)	*Eskazine* (**trifluoperazine**)
Sweden	*Avastin* (**bvacizumab**)	*Avaxim* (**hepatitis A vaccine**)
	Lantus (**insulin glargine**)	*Lanvis* (**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-back[1] 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.ihi.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/

Patient Identification

Patient Safety Solutions
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▶ STATEMENT OF PROBLEM AND IMPACT:

Throughout the health-care industry, the failure to correctly identify patients continues to result in medication errors, transfusion errors, testing errors, wrong person procedures, and the discharge of infants to the wrong families. Between November 2003 and July 2005, the United Kingdom National Patient Safety Agency reported 236 incidents and near misses related to missing wristbands or wristbands with incorrect information (1). Patient misidentification was cited in more than 100 individual root cause analyses by the United States Department of Veterans Affairs (VA) National Center for Patient Safety from January 2000 to March 2003 (2). Fortunately, available interventions and strategies can significantly reduce the risk of patient misidentification.

▶ ASSOCIATED ISSUES:

The major areas where patient misidentification can occur include drug administration, phlebotomy, blood transfusions, and surgical interventions. The trend towards limiting working hours for clinical team members leads to an increased number of team members caring for each patient, thereby increasing the likelihood of hand-over and other communication problems (3). Because patient misidentification is identified as a root cause of many errors, the Joint Commission, in the United States of America, listed improving patient identification accuracy as the first of its National Patient Safety Goals introduced in 2003, and this continues to be an accreditation requirement (4). While in some countries wristbands are traditionally used for identifying hospitalized patients, missing bands or incorrect information limit the efficacy of this system. Colour coding of wristbands facilitates rapid visual recognition of specific issues, but the lack of a standardized coding system has lead to errors by staff who provide care at multiple facilities (5).

There are newer technologies which can improve patient identification, for example, bar coding. Some of these have proved to be cost-effective (6-11).

Regardless of the technology or approach used for accurately identifying patients, careful planning for the processes of care will ensure proper patient identification prior to any medical intervention and provide safer care with significantly fewer errors.

▶ SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Ensure that health-care organizations have systems in place that:

    a. Emphasize the primary responsibility of health-care workers to check the identity of patients and match the correct patients with the correct care (e.g. laboratory results, specimens, procedures) before that care is administered.

    b. Encourage the use of at least two identifiers (e.g. name and date of birth) to verify a patient's identity upon admission or transfer to another hospital or other care setting and prior to the administration of care. Neither of these identifiers should be the patient's room number.

    c. Standardize the approaches to patient identification among different facilities within a health-care system. For example, use of white ID bands on which a standardized pattern or marker and specific information (e.g. name and date of birth) could be written, or implementation of biometric technologies.

d. Provide clear protocols for identifying patients who lack identification and for distinguishing the identity of patients with the same name. Non-verbal approaches for identifying comatose or confused patients should be developed and used.

e. Encourage patients to participate in all stages of the process.

f. Encourage the labeling of containers used for blood and other specimens in the presence of the patient.

g. Provide clear protocols for maintaining patient sample identities throughout pre-analytical, analytical, and post-analytical processes.

h. Provide clear protocols for questioning laboratory results or other test findings when they are not consistent with the patient's clinical history.

i. Provide for repeated checking and review in order to prevent automated multiplication of a computer entry error.

2. Incorporate training on procedures for checking/ verifying a patient's identity into the orientation and continuing professional development for health-care workers.

3. Educate patients on the importance and relevance of correct patient identification in a positive fashion that also respects concerns for privacy.

▶ LOOKING FORWARD:

▶ Consider implementation of automated systems (e.g. electronic order entry, bar coding, radiofrequency identification, biometrics) to decrease the potential for identification errors, where feasible.

▶ STRENGTH OF EVIDENCE:

▶ Expert consensus and reports of significant error reduction from individual facilities after implementing revised patient identification processes.

▶ APPLICABILITY:

▶ In all health-care settings.

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

▶ Educate patients about the risks related to patient misidentification.

▶ Ask patients or their family members to verify identifying information to confirm that it is correct.

▶ Ask patients to identify themselves before receiving any medication and prior to any diagnostic or therapeutic interventions.

▶ Encourage patients and their families or surrogates to be active participants in identification, to express concerns about safety and potential errors, and to ask questions about the correctness of their care.

▶ POTENTIAL BARRIERS:

▶ Difficulty in achieving individual behaviour change to comply with recommendations, including the use of short cuts and workarounds.

▶ Process variation among organizations within a geographic area.

▶ Process variation where there may be regional facilities staffed by the same practitioners (for example, colour-coded wrist bands with different meanings in different organizations).

▶ Costs associated with potential technical solutions.

▶ Integration of technology within and across organizations.

▶ Perception by health-care providers that relationship with the patient is compromised by repeated verification of patient identity.

▶ Technological solutions that fail to consider the reality of clinical care settings.

▶ Increase in staff workload and time spent away from patient care.

▶ Typing and entry errors when registering patients on computerized systems.

▶ Cultural issues, including:

  ▶ *Stigma associated with wearing an identification band.*

  ▶ *High risk of patient misidentification due to name structure, close similarity of names, and inaccuracies in birth dates for elderly patients.*

  ▶ *Patients using health cards belonging to other individuals, in order to access services.*

  ▶ *Clothing that conceals identity.*

  ▶ *Lack of familiarity with local names for increasing number of foreign health-care workers.*

▶ 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:

► Not assessing the basic processes for care while becoming preoccupied with technical and non-technical devices or solutions.

► Reliance on technical solutions without adapting the workflow process related to the new support systems.

► Reliance on imperfect technical solutions as if they were perfect.

► Elimination of human checking processes when automated systems are implemented.

► Rapid replication of errors in linked computer systems masking patient identification errors.

► Possible compromising of patient confidentiality and privacy by standardized identification systems.

EXAMPLE OF
Patient Identification

Policy	Emphasize that health-care providers have primary responsibility for checking/verifying a patient's identity, while patients should be actively involved and should receive education on the importance of correct patient identification.
Admission	Upon admission and prior to the administration of care, use at least two identifiers to verify a patient's identity, neither of which should be the patient's room number.
Patient Identifiers	► Standardize the approaches to patient identification among different facilities within a health-care system. For example, use white ID bands on which a standardized pattern or marker and specific information (e.g. name and date of birth) would be written. ► Develop an organizational protocol for identifying patients without identification or with the same name. ► Use other non-verbal approaches, such as biometrics, for comatose patients.
Intervention	Even if they are familiar to the health-care provider, check the details of a patient's identification to ensure the right patient receives the right care.
Patient	Involve patients in the process of patient identification.

This example is not necessarily appropriate for all health-care settings.

► REFERENCES:

1. *Wristbands for hospital inpatients improves safety. National Patient Safety Agency, Safer practice notice 11, 22 November 2005. http://www.npsa.nhs.uk/site/media/documents/1440_Safer_Patient_Identification_SPN.pdf*

2. *Mannos D. NCPS patient misidentification study: a summary of root cause analyses. VA NCPS Topics in Patient Safety. Washington, DC, United States Department of Veterans Affairs, June–July 2003 (http://www.va.gov/ncps/TIPS/Docs/TIPS_Jul03.doc, accessed 11 June 2006).*

3. *Thomas P, Evans C. An identity crisis? Aspects of patient misidentification. Clinical Risk, 2004, 10:18–22.*

4. *2006 National Patient Safety Goals. Oakbrook Terrace, IL; Joint Commission, 2006 (http://www.jcipatientsafety.org/show.asp?durki=10293&site=164&return=10289, accessed 11June 2006).*

5. *Use of color-coded patient wristbands creates unnecessary risk. Patient Safety Advisory Supplement, Vol. 2, Sup. 2. Harrisburg, Pennsylvania Patient Safety Authority, 14 December 2005 (http://www.psa.state.pa.us/psa/lib/psa/advisories/v2_s2_sup__advisory_dec_14_2005.pdf, accessed 11 June 2006).*

6. *Edozien L. Correct patient, correct site, correct procedure. Safer Health Care, 27 July 2005. http://www.saferhealthcare.org.uk/NR/rdonlyres/6D89DBA8-4414-4092-9CF0-62BEBB80F8D8/0/shc_patientidentification.pdf.*

7. *Right patient—right care. Improving patient safety through better manual and technology-based systems for identification and matching of patients and their care. London, National Patient Safety Agency, 2004 (http://www.npsa.nhs.uk/site/media/documents/781_Right%20patient%20right%20care%20final%20report.pdf, accessed 11 June 2006).*

8. *Dighe A et al. Massachusetts General Hospital—bar coded patient wristband initiative: a CPM initiative. IHI National Forum storyboard presentation, December 2004; Safety Improvement Reports. saferhealthcare, 2005 (http://www.saferhealthcare.org.uk/IHI/Topics/IntheRealWorld/PatientIdentification/ImprovementReports/MassachusettsGeneralHospital.htm, accessed 1 April 2007).*

9. *Wright AA et al. Bar coding for patient safety. New England Journal of Medicine, 2005, 354:329–331.*

10. *Emerging technology: hospitals turn to RFID. HealthLeaders, August 2005 http://www.healthleadersmedia.com/print.cfm?content_id=71598&parent=106.*

11. *Secure identification: the smart card revolution in health care. The Silicon Trust, 4 June 2003 (http://www.silicon-trust.com/trends/tr_healthcare.html, accessed 1 April 2007).*

► OTHER SELECTED RESOURCES:

1. *Greenly M: Helping Hippocrates: a cross-functional approach to patient identification. Joint Commision Journal on Quality and Patient Safety, 32:463–469, August 2006.*

2. *McDonald CJ. Computerization can create safety hazards: a bar-coding near miss. Annals of Internal Medicine, 2006, 144:510–516.*

3. *National Quality Forum (NQF) Safe Practices for Better Health Care: http://www.qualityforum.org/projects/completed/safe_practices/*

4. *Poon EG et al. Medication dispensing errors and potential adverse drug events before and after. Annals of Internal Medicine, 2006, 145:426–434.*

Communication During Patient Hand-Overs

▶ STATEMENT OF PROBLEM AND IMPACT:

During an episode of disease or period of care, a patient can potentially be treated by a number of health-care practitioners and specialists in multiple settings, including primary care, specialized outpatient care, emergency care, surgical care, intensive care, and rehabilitation. Additionally, patients will often move between areas of diagnosis, treatment, and care on a regular basis and may encounter three shifts of staff each day—introducing a safety risk to the patient at each interval. The hand-over (or hand-off) communication between units and between and amongst care teams might not include all the essential information, or information may be misunderstood. These gaps in communication can cause serious breakdowns in the continuity of care, inappropriate treatment, and potential harm to the patient.

Breakdown in communication was the leading root cause of sentinel events reported to the Joint Commission in the United States of America between 1995 and 2006 (1) and one USA malpractice insurance agency's single most common root cause factor leading to claims resulting from patient transfer (2). Of the 25 000 to 30 000 preventable adverse events that led to permanent disability in Australia, 11% were due to communication issues, in contrast to 6% due to inadequate skill levels of practitioners (3).

Hand-over communication relates to the process of passing patient-specific information from one caregiver to another, from one team of caregivers to the next, or from caregivers to the patient and family for the purpose of ensuring patient care continuity and safety (4). Hand-over communication also relates to the transfer of information from one type of health-care organization to another, or from the health-care organization to the patient's home. Information shared usually consists of the patient's current condition, recent changes in condition, ongoing treatment and possible changes or complications that might occur. Patient care hand-overs occur in many settings across the continuum of care, including admission from primary care, physician sign-out to a covering physician, nursing change-of-shift reporting, nursing report on patient transfer between units or facilities, anaesthesiology reports to post-anaesthesia recovery room staff, emergency department communication with staff at a receiving facility during a patient's transfer, and discharge of the patient back home or to another facility.

▶ ASSOCIATED ISSUES:

Problems with patient hand-overs are an international concern: Australia (5) and the United Kingdom of Great Britain and Northern Ireland (6) have recently reviewed this issue, and developed risk reduction recommendations. While there are at present no best practices for improving hand-over communication, various strategies have been implemented and are being studied. One study of physician hand-overs concluded that precise, unambiguous, face-to-face communication was the best way to ensure effective hand-overs (7). However, experts in the field of patient safety agree that solutions involving the redesign of systems of care delivery will be the most effective in improving hand-over communication (8). Improved system design will enhance the ability of providers to communicate effectively by taking advantage of knowledge about human factors (how human beings make errors), building redundancies into the processes of care, creating forcing functions, and reducing the steps in the processes and thus reducing the opportunities for error.

In part, hand-over problems are rooted in the way that health-care providers are educated or not educated (in team training and communication skills), lack of good role models, and a health-care system that promotes and

rewards autonomy and individual performance. The culture of medicine, which historically has not placed significant emphasis on involving patients and families in the delivery of care, is another root cause. In addition, while specialization of health-care practitioners can improve medical treatment, specialization of care also means more people and units are involved in the patient's care, which can complicate communication. Another problem contributing to poor communication is that staff composition may not reflect the demographics of the community being served (9). Also, language problems resulting from a heavy reliance on health-care professionals from other countries can also lead to communication difficulties.

Lessons on how to improve hand-overs are being learned from other high-risk industries such the aviation and nuclear power industries. One such lesson is the need for a common language for communicating critical information. Incorporating situational briefing techniques such as the SBAR (Situation, Background, Assessment, and Recommendation) process can provide a standard communication framework for patient care hand-overs (10-11). Simply providing opportunities for providers of care to ask and resolve questions can improve the effectiveness of hand-over communications (12). Streamlining and standardizing change-of-shift reporting can enhance critical thinking, as well as minimize time spent away from the patient (13). Read-back is another effective technique used in hand-overs, where the receiver of information writes down the information and then "reads it back" to the provider of the information to obtain confirmation that it was understood correctly. Technologies such as electronic patient sign-outs have been shown to reduce preventable adverse event rates (14). Collaborative (multidisciplinary) rounds are being used effectively to improve communication and hand-over of important information relating to the patient's care (15).

Involving patients and families in the process of care is increasingly being recognized as an important aspect of care delivery. The patient and family are the only constant and are thus in a position to play a critical role in ensuring continuity of care (16). Hospital discharge is a critical stage where communicating information to patients and families becomes vital (17-19). Engaging patients is sometimes made more difficult due to low health literacy. The term health literacy has been defined as the capacity of individuals to obtain, process and understand the basic health information and services needed to make appropriate health decisions (20). In the United States, it is estimated that at least 50% of adults have low health literacy (21). Teach-back is a technique used by caregivers to ensure that the patient has understood the information provided (22). Teach-back involves asking the patient to describe what he or she has just heard to assess their comprehension.

▶ SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Ensure that health-care organizations implement a standardized approach to hand-over communication between staff, change of shift and between different patient care units in the course of a patient transfer. Suggested elements of this approach include:

   ► *Use of the SBAR (Situation, Background, Assessment, and Recommendation) technique.*

   ► *Allocation of sufficient time for communicating important information and for staff to ask and respond to questions without interruptions wherever possible (repeat-back and read-back steps should be included in the hand-over process).*

   ► *Provision of information regarding the patient's status, medications, treatment plans, advance directives, and any significant status changes.*

   ► *Limitation of the exchange of information to that which is necessary to providing safe care to the patient.*

2. Ensure that health-care organizations implement systems which ensure—at the time of hospital discharge—that the patient and the next health-care provider are given key information regarding discharge diagnoses, treatment plans, medications, and test results.

3. Incorporate training on effective hand-over communication into the educational curricula and continuing professional development for health-care professionals.

4. Encourage communication between organizations that are providing care to the same patient in parallel (for example, traditional and non-traditional providers).

▶ LOOKING FORWARD:

► Where available, explore technologies and methods that can improve hand-over effectiveness, such as electronic medical records, electronic prescribing systems and automated medication reconciliation, to streamline information access and exchange.

► Establish procedures to ensure that processes which use electronic technology are interactive and effective and allow time for questions or updates regarding the care of the patient.

▶ APPLICABILITY:

► All health-care organizations and health-care settings.

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

- ▶ Provide information to patients about their medical conditions and treatment care plan in a way that is understandable to them.
- ▶ Make patients aware of their prescribed medications, doses, and required time between medications.
- ▶ Inform patients who the responsible provider of care is during each shift and who to contact if they have a concern about the safety or quality of care.
- ▶ Provide patients with the opportunity to read their own medical record as a patient safety strategy.
- ▶ Create opportunities for patients and family members to address any medical care questions or concerns with their health-care providers.
- ▶ Inform patients and family members of the next steps in their care, so they can if necessary communicate this to the care provider on the next shift, or so they are prepared to be transferred from one setting to the next, or to their home.
- ▶ Involve patients and family members in decisions about their care at the level of involvement that they choose.

▶ STRENGTH OF EVIDENCE:

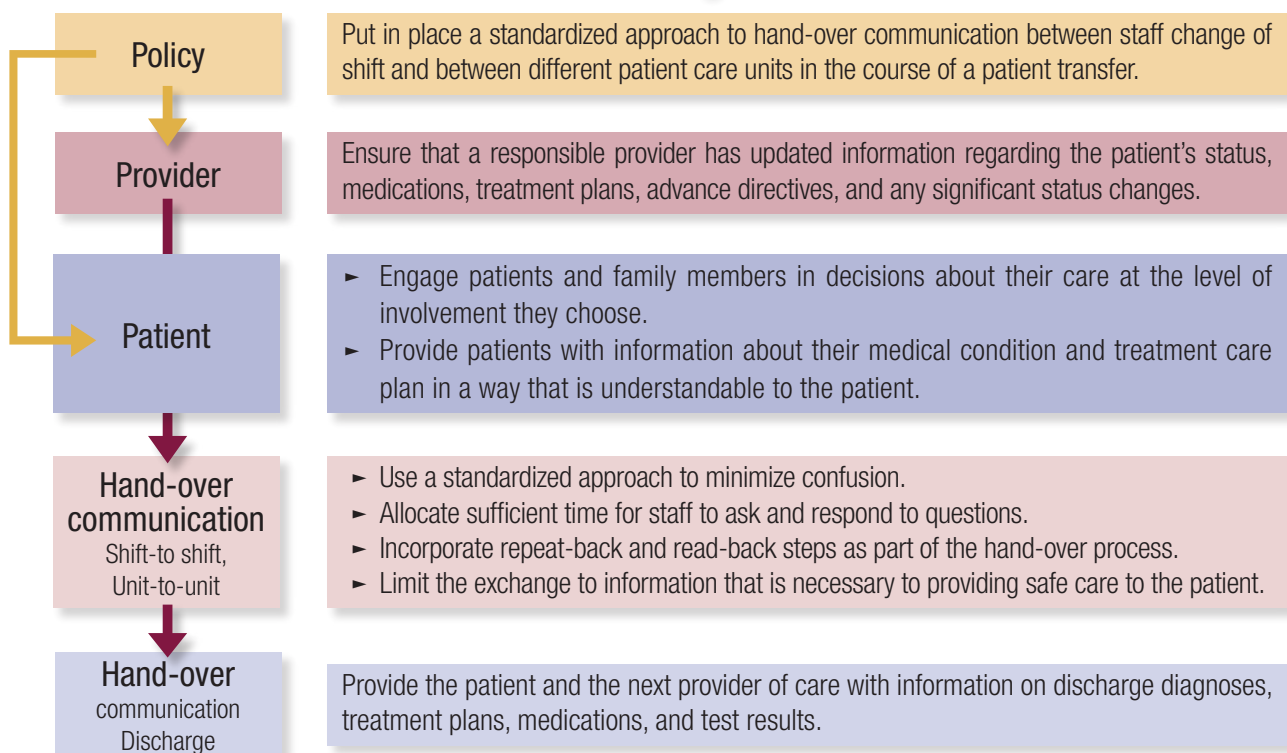- ▶ Expert opinion/consensus and several descriptive studies.

▶ POTENTIAL BARRIERS:

- ▶ Resistance of caregivers to change behaviours.
- ▶ Time pressures from patient care needs and other responsibilities.
- ▶ Training and time cost of implementing new hand-over processes.
- ▶ Cultural and language differences among patient population and workforce.
- ▶ Low health literacy.
- ▶ Lack of financial resources and staffing shortages.
- ▶ Lack of knowledge about how to improve systems.
- ▶ Failure of leadership to require implementation of new systems and behaviours.
- ▶ Lack of information technology infrastructure and interoperability.
- ▶ 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:

- ▶ Delays in patient care due to increased hand-over time.

EXAMPLE OF
Communication During Patient Hand-Overs

Policy	Put in place a standardized approach to hand-over communication between staff change of shift and between different patient care units in the course of a patient transfer.
Provider	Ensure that a responsible provider has updated information regarding the patient's status, medications, treatment plans, advance directives, and any significant status changes.
Patient	▶ Engage patients and family members in decisions about their care at the level of involvement they choose. ▶ Provide patients with information about their medical condition and treatment care plan in a way that is understandable to the patient.
Hand-over communication Shift-to shift, Unit-to-unit	▶ Use a standardized approach to minimize confusion. ▶ Allocate sufficient time for staff to ask and respond to questions. ▶ Incorporate repeat-back and read-back steps as part of the hand-over process. ▶ Limit the exchange to information that is necessary to providing safe care to the patient.
Hand-over communication Discharge	Provide the patient and the next provider of care with information on discharge diagnoses, treatment plans, medications, and test results.

This example is not necessarily appropriate for all health-care settings.

► REFERENCES:

1. Root causes of sentinel events, all categories. Oakbrook, IL: Joint Commission, 2006 (http://www.jointcommission.org/NR/rdon-lyres/FA465646-5F5F-4543-AC8F-E8AF6571E372/0/root_cause_se.jpg, accessed 12 June 2006).

2. Andrews C, Millar S. Don't fumble the handoff. MAG Mutual Healthcare Risk Manager, 2005, 11(28):1–2. http://www.magmutual.com/mmic/articles/2005_11_28.pdf.

3. Zinn C. 14,000 preventable deaths in Australia. BMJ, 1995, 310:1487.

4. 2006 National Patient Safety Goal FAQs. Oakbrook Terrace, IL: Joint Commission, 2006 (http://www.jointcommission.org/NR/rdonlyres/25E48E23-6946-43E4-916C-65E116960FD5/0/06_npsg_faq2.pdf, accessed 11 June 2006).

5. Clinical handover and patient safety literature review report. Australian Council for Safety and Quality in Health Care, March 2005 (http://www.safetyandquality.org/clinhovrlitrev.pdf, accessed xx Month 2007).

6. Safe handover: safe patients—guidance on clinical handover for clinicians and managers. Hospital at Night Risk Assessment Guide. London, National Patient Safety Agency, 2004 (http://www.npsa.nhs.uk/site/media/documents/1037_Handover.pdf, accessed 12 June 2006).

7. Solet DJ et al. Lost in translation: challenges and opportunities during physician-to-physician communication during patient handoffs. Academic Medicine, 205, 80:1094–1099.

8. WHO Collaborating Centre International Steering Committee, 11–12 June 2006 meeting.

9. National Standards for Culturally and Linguistically Appropriate Services in Health Care. Washington, DC: United States Department of Health and Human Services, Office of Minority Health, March 2001 (http://www.omhrc.gov/assets/pdf/checked/finalreport.pdf, accessed 12 June 2006).

10. SBAR technique for communication: a situational briefing model. Cambridge, MA, Institute for Healthcare Improvement (http://www.ihi.org/IHI/Topics/PatientSafety/SafetyGeneral/Tools/SBARTechniqueforCommunicationASituationalBriefingModel.htm, accessed 12 June 2006).

11. SBAR: a shared mental model for improving communication between clinicians. 2006, 32(3):167-175. http://www.jcipatientsafety.org/docViewer.aspx.

12. Strategies to improve hand-off communication: implementing a process to resolve questions. Joint Commission Perspectives on Patient Safety, 2005, 5 (7):11-11(1). http://www.jcipatientsafety.org/show.asp?durki=10742&site=184&return=10737.

13. Hansten R. Streamline change-of-shift report. Nursing Management, 2003, 34(8):58–59.

14. Peterson LA et al. Using a computerized sign-out program to improve continuity of inpatient care and prevent adverse events. Joint Commission Journal on Quality Improvement, 1998, 24(2):77–87.

15. Joint Commission International Center for Patient Safety Communications Expert Panel, October 2006 meeting.

16. WHO Collaborating Centre International Steering Committee. 11–12 June 2006 meeting. Also London Declaration, Patients for Patient Safety, WHO World Alliance for Patient Safety, 29 March 2006. http://www.who.int/patientsafety/information_centre/London_Declaration_May06.pdf.

17. Coleman EA. The care transitions intervention: results of a randomized controlled trial. et al. Archives of Internal Medicine, 2006,166:1822–1828. http://www.psnet.ahrq.gov/resource.aspx?resourceID=4408.

18. Roy CL et al. Patient safety concerns arising from test results that return after hospital discharge. Annals of Internal Medicine, 2005,143:121–128. http://www.psnet.ahrq.gov/resource.aspx?resourceID=2400.

19. Forster AJ. The incidence and severity of adverse events affecting patients after discharge from the hospital. Annals of Internal Medicine, 2003,138:161–167. http://www.psnet.ahrq.gov/resource.aspx?resourceID=1080.

20. The ABCs of health literacy. Chicago, American Medical Association (http://www.ama-assn.org/ama1/pub/upload/mm/15/health_literacy.doc, accessed 11 June 2006).

21. Seldon, CR et al.Current bibliographies in medicine 2000-1: Health Literary. Bethesda, MD, National Library of Medicine. http://www.nlm.nih.gov/archive//20061214/pubs/cbm/hliteracy.html.

22. Schillinger D et al. Closing the loop: physician communications with diabetic patients who have low health literacy. Archives of Internal Medicine, 2003, 163(1):83–90.
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=12523921&dopt=Abstract.

► OTHER SELECTED RESOURCES:

1. Australian Council for Safety and Quality in Health Care, Passing the Baton of Care—the patient relay, "National Principles for Clinical Handover" April 2005. Link: www.safetyandquality.gov.au.

2. Canadian Patient Safety Institute, Your healthcare: be involved. Edmonton, AB. Link: http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/page/Your+Health+Care+–+Be+Involved.

3. Joint Commission, 2006 Critical Access Hospital and Hospital National Patient Safety Goals. Oakbrook Terrace, IL, 2006. Link: www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/06_npsg_cah.htm.

4. National Quality Forum (NQF) Safe Practices for Better Health Care: http://www.qualityforum.org/projects/completed/safe_practices/

Performance of Correct Procedure at Correct Body Site

▶ STATEMENT OF PROBLEM AND IMPACT:

Wrong site procedures—including wrong side, wrong organ, wrong site, wrong implant, and wrong person—are an infrequent, though not "rare" event as evidenced by a steady increase in the number of reported cases. For example, in the United States of America 88 cases were reported to the Joint Commission in 2005, and several other reporting bodies have noted numerous cases annually as well.

Considered preventable occurrences, these cases are largely the result of miscommunication and unavailable or incorrect information. Detailed analyses of these cases indicate that a major contributing factor to error is the lack of a standardized pre-operative process and likely a degree of staff automaticity (checking without thinking) in the approaches to the preoperative check routines.

In the 1980s, the American Academy of Orthopaedics and the Canadian Orthopaedic Association identified wrong site surgery as a problem and introduced programmes for marking the surgical site as a preventive measure. Since the Joint Commission began reviewing sentinel events and their root cause analyses in the United States more than a decade ago, wrong site surgery has now become the most frequently reported category of sentinel events. Two Sentinel Event Alert newsletters have been published on this topic—one in 1998 and another in 2001 (1,2). In 2003 the Joint Commission's National Patient Safety Goals addressed this topic with three specific requirements (3). However, in light of continuing reports of wrong site, wrong procedure, and wrong person surgery (4,5), the Joint Commission has hosted a Wrong Site Surgery Summit, in collaboration with more than 30 other professional groups in the United States of America. The Joint Commission further pursued broad consensus on the valid-

ity and preventability of the problem, the fundamental principles through which prevention might be achieved, and specific recommendations, which together now form a "Universal Protocol" for preventing wrong site surgery—this includes all procedures performed in all types of procedure areas.

More than 50 professional associations and organizations have since endorsed this Universal Protocol. A public comment period generated more than 3 000 responses from surgeons, nurses, and other health-care professionals, overwhelmingly supporting the Universal Protocol. To further emphasize the importance of prevention, the Association of Perioperative Registered Nurses sponsored a National Time Out Day. In the United Kingdom of Great Britain and Northern Ireland, the National Patient Safety Agency (NPSA) and Royal College of Surgeons produced a similar patient safety alert on correct site surgery, which was endorsed by 6 health-care practitioner organizations and one health-care forum (6).

▶ ASSOCIATED ISSUES:

Monitoring the effect of initiating the Joint Commission Universal Protocol demonstrates that there is still an increase (not a decrease) in the number of reported cases for wrong site surgery in the United States. This may simply be a reflection of improved reporting, but the fact remains that the incidence and frequency of this problem has not decreased since the initiation of the Universal Protocol. Further analysis and recommendations oriented towards health-care system organization, overall processes of care in the surgical areas, and better understanding the cultures of health-care providers (and their respective organi-

zations) are warranted. Specific attention is also needed to evaluate the involvement of surgeons and other team members. The problem will require a combination of system organization commitment and modification of individual behaviours to improve the outcomes.

The principles for this Solution should apply to all areas where interventions are performed and, if used, the strategy should be performed uniformly in all procedural areas at all times in order to provide consistency and increased compliance.

▶ SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Establish the performance of correct surgery at the correct body site as a health-care facility safety priority that requires leadership and the active engagement of all frontline practitioners and other health-care workers.

2. Ensure that health-care organizations have in place protocols that:

   ➤ *Provide for verification—at the preprocedure stage—of the intended patient, procedure, site, and, as applicable, any implant or prosthesis.*

   ➤ *Require the individual performing the procedure to unambiguously mark the operative site with the patient's involvement, to correctly identify the intended site of incision or insertion.*

   ➤ *Require the performance of a "time-out"[1] with all involved staff immediately before starting the procedure (and the related anaesthetic). The time-out is to establish agreement on the positioning of the intended patient on the procedure table, procedure, site, and, as applicable, any implant or prosthesis.*

      1 - "Time out" is a specifically allocated period where no clinical activity is taking place. During this time, all team members independently verify the impending clinical action.

▶ LOOKING FORWARD:

Member States should consider:

▶ Monitoring the ongoing frequency and incidence of wrong site procedures as part of voluntary reporting systems.

▶ Using any incident reports to promote multidisciplinary collaborations to promote systems-based change in all procedure areas.

▶ STRENGTH OF EVIDENCE:

▶ Analyses from the Joint Commission Sentinel Event database and the American Academy of Orthopaedic Surgeons database.

▶ Expert consensus.

▶ APPLICABILITY:

▶ Hospitals, ambulatory care facilities, and office-based surgical facilities.

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

▶ Involve patients at all points in the preoperative verification process to reconfirm with the procedure staff their understanding for the planned procedure.

▶ Involve patients in the surgical site marking process, whenever possible.

▶ Discuss these issues during the informed consent process and confirm decisions at the time of signature for the consent.

▶ POTENTIAL BARRIERS:

▶ Lack of surgeon "agreement" to the standardized approach and difficulty to change the culture.

▶ Failure to recognize risks in procedural settings other than the operating room.

▶ Reluctance of nurses and other staff to question the surgeon when a possible error is identified.

▶ Inadequate human resources and knowledge for facilitating processes to be challenged.

▶ "Automatic" behavior during the time-out process ("going through the motions" but without meaningful communication).

▶ Insufficient generally accepted research, data, and economic rationale regarding cost-benefit analysis or return on investment (ROI) for implementing these recommendations.
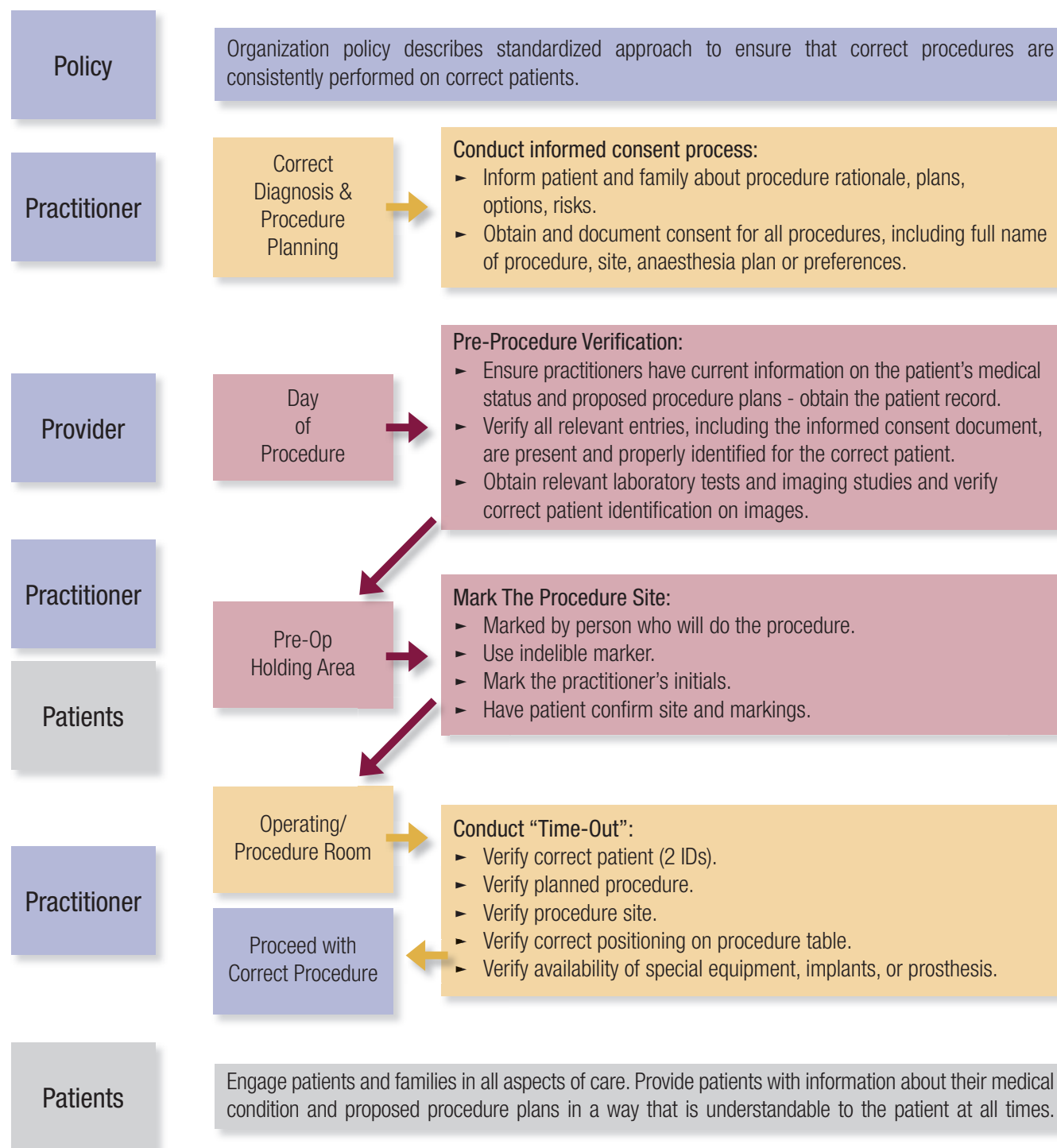
▶ RISKS FOR UNINTENDED CONSEQUENCES:

▶ Inconsistent interpretation of an "X" marking to "operate here" versus "do not operate here".

▶ Inconsistency of Universal Protocol procedures among several hospitals within a geographic area, staffed

by the same surgeons operating at more than one of the hospitals.

▶ Permanent tattooing of immature skin (premature infants).

▶ Perception of increased workload by staff and decreased efficiencies.

EXAMPLE OF
Performance of Correct Procedure at Correct Body Site

Policy

Organization policy describes standardized approach to ensure that correct procedures are consistently performed on correct patients.

Practitioner

Correct Diagnosis & Procedure Planning

Conduct informed consent process:
▶ Inform patient and family about procedure rationale, plans, options, risks.
▶ Obtain and document consent for all procedures, including full name of procedure, site, anaesthesia plan or preferences.

Provider

Day of Procedure

Pre-Procedure Verification:
▶ Ensure practitioners have current information on the patient's medical status and proposed procedure plans - obtain the patient record.
▶ Verify all relevant entries, including the informed consent document, are present and properly identified for the correct patient.
▶ Obtain relevant laboratory tests and imaging studies and verify correct patient identification on images.

Practitioner

Patients

Pre-Op Holding Area

Mark The Procedure Site:
▶ Marked by person who will do the procedure.
▶ Use indelible marker.
▶ Mark the practitioner's initials.
▶ Have patient confirm site and markings.

Practitioner

Operating/ Procedure Room

Proceed with Correct Procedure

Conduct "Time-Out":
▶ Verify correct patient (2 IDs).
▶ Verify planned procedure.
▶ Verify procedure site.
▶ Verify correct positioning on procedure table.
▶ Verify availability of special equipment, implants, or prosthesis.

Patients

Engage patients and families in all aspects of care. Provide patients with information about their medical condition and proposed procedure plans in a way that is understandable to the patient at all times.

This example is not necessarily appropriate for all health-care settings.

► REFERENCES:

1. *Lessons learned: wrong site surgery. Sentinel Event Alert, Issue 6, 28 August 1998. Joint Commission. http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_6.htm.*

2. *A follow-up review of wrong site surgery. Sentinel Event Alert, Issue 24, 5 December 2001. Joint Commission. http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_24.htm.*

3. *2003 National Patient Safety Goals. Oakbrook Terrace, IL: Joint Commission, 2003 (http://www.acha.org/info_resources/jcaho2_02.pdf, accessed 12 June 2006).*

4. *Statement on ensuring correct patient, correct site, and correct procedure surgery. Bulletin of the American College of Surgeons, 87:12, December 2002. http://www.facs.org/fellows_info/statements/st-41.html.*

5. *AAOS launches 2003 public service ad campaign. AAOS Bulletin, February 2003. American Academy of Orthopaedic Surgeons' "Sign Your Site" initiative.*

6. *Correct site surgery alert. London: National Patient Safety Agency, 2 March 2005.*

► OTHER SELECTED RESOURCES:

1. *National Quality Forum (NQF) Safe Practices for Better Health Care, Link: http://www.qualityforum.org/projects/completed/safe_practices/*

2. *NPSA Alert, Link: http://www.npsa.nhs.uk/site/media/documents/883_CSS%20PSA06%20FINAL.pdf*

3. *The Universal Protocol Tool, Link: http://www.jcipatientsafety.org/show.asp?durki=10815&site=149&return=9334.*

Control of Concentrated Electrolyte Solutions

▶ STATEMENT OF PROBLEM AND IMPACT:

Concentrated potassium chloride has been identified as a high-risk medication by organizations in Australia, Canada, and the United Kingdom of Great Britain and Northern Ireland (UK) (1-8). In the United States of America, ten patient deaths from misadministration of concentrated potassium chloride (KCl) solution were reported to the Joint Commission in just the first two years of its sentinel event reporting programme: 1996–1997 (1). In Canada, 23 incidents involving KCl mis-administration occurred between 1993 and 1996 (2). There are also reports of accidental death from the inadvertent administration of concentrated saline solution (3).

While all drugs, biologics, vaccines, and contrast media have a defined risk profile, concentrated electrolyte solutions for injection are especially dangerous. Reports of death and serious injury/disability related to the inappropriate administration of these drugs have been continuous and dramatic. Most of the time, it is not clinically possible to reverse the effects of concentrated electrolytes when not administered properly (e.g. not properly diluted, confused with another drug, etc.), and hence, patient death is usually the observed outcome. In short, these agents are deadly when not prepared and administered properly.

It is especially critical that the availability, access, prescribing, ordering, preparation, distribution, labeling, verification, administration, and monitoring of these agents be planned in such a way that possible adverse events can be avoided, and, hopefully, be eliminated. Standardizing the dosing, units of measure, and terminology are critical elements of safe use of concentrated electrolyte solutions. Moreover, mix-ups of specific concentrated electrolyte solutions must be avoided (e.g. confusing sodium chloride with potassium chloride). These efforts require special attention, appropriate expertise, inter- professional collaboration, processes of verification, and several forcing functions that would ensure safe use.

▶ ASSOCIATED ISSUES:

Removal of concentrated electrolyte solutions, specifically potassium chloride, from patient care units has had a marked positive impact on the reduction of death and disabling injury associated with these agents. Several forcing functions are inherently implemented when these agents are removed from patient care units; namely, the drug must be prescribed and ordered; it must be properly prepared (e.g. diluted), packaged, and labeled; and it must be administered with appropriate care and expertise. By not having these products on the patient care unit, they cannot simply be reached for, drawn up, and injected.

While some might suggest that such procedures impede rapid-action to meet patient care needs in case of emergency, it is important to know that plans and procedures for such eventualities can be put in place to make concentrated electrolytes safely available in such cases. Collaborative efforts in this regard between physicians, nurses, and pharmacists are recommended. Institutional and cultural change may be required to ensure that fail-safe systems are in place in order to avoid death or disabling injury associated with the inappropriate use of concentrated electrolyte solutions.

Although concentrated KCl is the most common medication implicated in electrolyte administration errors, potassium phosphate concentrate and hypertonic (>0.9%) saline also have lethal consequences if improperly administered. Until recent concerns prompted revised practices, it was common to find concentrated electrolyte solutions in the unit/clinic stock located in close proximity to other less hazardous, similarly packaged and labeled solutions. This situation, coupled with the practice of having ward or clinic staff prepare the intravenous solution, increased the possibility of inadvertent administration of concentrated electrolytes, leading to fatalities in some cases. Fortunately, such catastrophic errors can be eliminated by adopting simple precautionary measures.

▶ SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Ensure that health-care organizations have systems and processes in place wherein:

   a. The promotion of safe practices with potassium chloride and other concentrated electrolyte solutions is a priority and where effective organization risk assessments address these solutions.

   b. Potassium chloride is treated as a controlled substance, including requirements that restrict ordering and establish storage and documentation requirements.

   c. Ideally, removal of concentrated electrolyte solutions from all nursing units is accomplished, and these solutions are only stored in specialized pharmacy preparation areas or in a locked area. Potassium vials, if stored in a specialized patient care area, must be labeled individually with a visible florescent warning label that states MUST BE DILUTED.

   d. When a pharmacist or pharmacy preparation area is not available to store and prepare these solutions, only a trained and qualified individual (physician, nurse, pharmacy technician) prepares the solutions.

   e. After solution preparation, there is independent verification of the electrolyte solution by a second trained and qualified individual. The organization should establish a checklist that is used for the independent verification. Checklist items should include concentration calculations, infusion pump rates, and correct line attachments.

   f. The prepared solution is labeled with a HIGH RISK WARNING label prior to administration.

   g. An infusion pump is used to administer concentrated solutions. If an infusion pump is not available, other infusion devices, such as buretrol administration tubing (tubing with an inline receptacle that limits the volume that will flow into the patient), may be considered for use, but infusions of concentrated solutions must be monitored frequently.

   h. An organizational safety infrastructure supports the training of qualified individuals through policies, procedures, best practices, and annual recertification.

   i. Physician orders include the rates of infusion for these solutions.

▶ LOOKING FORWARD:

Member states recommend that:

1. Concentrated electrolyte solutions be purchased by the health-care organization only in standardized and limited drug concentrations.

2. The health-care organization purchases and uses only premixed parenteral solutions.

3. The organization petitions the drug manufacturing industry to utilize HIGH RISK WARNING labels on all concentrated electrolyte solutions.

4. Regulatory agencies and drug manufacturers should be engaged to improve the safety of manufacturing these types of concentrated electrolyte solutions.

▶ STRENGTH OF EVIDENCE:

▶ Expert consensus.

▶ APPLICABILITY:

▶ Hospitals, ambulatory care facilities, ambulatory surgical centers, dialysis centers, and any other facilities that use and administer concentrated electrolyte solutions.

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

▶ Ask what medications are being given and why they are being given.

▶ Learn to recognize that potassium chloride solutions and other high concentration electrolyte solutions may create dangerous situations. Ask for clarification regarding their need and route of administration if they are to be given.

▶ Ensure positive identification before receiving medication.

▶ POTENTIAL BARRIERS:

▶ Some organizations have limited pharmacy services.

▶ Perceived need to have electrolyte concentrates immediately available—especially for urgent or emergent situations.

▶ Economics (current low cost of pharmaceutical production of concentrated products—having pre-mixed KCL bags will increase cost).

▶ Lack of technology required for safe administration (e.g. infusion devices).

▶ Lack of staff awareness of the risk.

▶ 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:

▶ Unacceptable delays in obtaining needed electrolyte solutions from the pharmacy.

▶ Gradual stockpiling of unused solutions on the nursing units for future use.

▶ REFERENCES:

1. Medication error prevention—potassium chloride. Sentinel Event Alert, Issue 1, 27 February 1998. Joint Commission. http://www.joint-commission.org/SentinelEvents/SentinelEventAlert/sea_1.htm.

2. Alert on potassium chloride solutions. National Patient Safety Agency (United Kingdom), 23 July 2002.

3. DiPaulo M et al. Accidental death due to erroneous intravenous infusion of hypertonic saline solution for hemodialysis. International Journal of Artificial Organs, 2004, 27(9):810–812.

4. High-alert medications and patient safety. Sentinel Event Alert, Issue 11, 19 November 1999. Joint Commission. http://www.joint-commission.org/SentinelEvents/SentinelEventAlert/sea_11.htm.

5. Intravenous potassium chloride can be fatal if given inappropriately. Safety and Quality Council (Australia) Medication Alert, October 2003.

6. Update on the implementation of recommended safety controls for potassium chloride in the NHS. National Patient Safety Agency (United Kingdom), 6 November 2003.

7. More on potassium chloride. ISMP Canada Safety Bulletin, 3(11), November 2003.

8. Concentrated potassium chloride: a recurring danger. ISMP Canada Safety Bulletin, 4(3), March 2004.

▶ OTHER SELECTED RESOURCES:

1. American Iatrogenic Association. Fatal errors: hospitals learn lessons the hard way, 1997.

2. Brown TR. Institutional pharmacy practice, 4th ed. Bethesda, MD, American Society of Health-System Pharmacists, 2006

3. External Patient Safety Review. Calgary Health Region. June 2004.

4. ISMP Canada potassium chloride safety recommendations summary: http://www.hqca.ca/pages/news_pages/FINAL_ISMP.pdf

5. Joint Commission Sentinel Event Alert, High-Alert Medications and Patient Safety, November 19, 1999, Issue 11: http://www.joint-commission.org/SentinelEvents/SentinelEventAlert/sea_11.htm

6. Manasse HR, Thompson KK. Medication safety: a guide for health care facilities. Bethesda, MD, American Society of Health-System Pharmacists, 2005

7. Medication Safety Recommendations from the Institute of Medicine's To Err Is Human: Building a Safer Health System: http://www.nap.edu/catalog.php?record_id=9728

8. Medication Safety Taskforce of the Australian Council for Safety and Quality in Healthcare. Intravenous potassium chloride can be fatal of given inappropriately. October 2003.

9. NPSA Alert on potassium chloride concentrate solutions: http://www.npsa.nhs.uk/site/media/documents/486_riskalertpsa01.pdf

10. National Quality Forum Never Events: http://www.quality-forum.org/pdf/news/txSREReportAppeals10-15-06.pdf

11. Stevenson T. The National Patient Safety Agency. Archives of Disease in Childhood, 90: 2005.

12. Tisdale JE, Miller DA. Drug-induced diseases: prevention, detection and management. Bethesda, MD, American Society of Health-System Pharmacists, 2005

13. Wright v. Abbott Lab, Inc. Nurse's act intervenes to preclude manufacturer liability. 10th Circuit. 6 August 2001.

14. United States Department of Defense. Patient Safety Program, Patient Safety Center Alert. Concentrated electrolyte solutions and high dose epinephrine. 21 November 2003.

Assuring Medication Accuracy at Transitions in Care

Patient Safety Solutions
| volume 1, solution 6 | May 2007

▶ STATEMENT OF PROBLEM AND IMPACT:

Errors are common as medications are procured, prescribed, dispensed, administered, and monitored but, they occur most frequently during the prescribing and administering actions (1). The impact is significant, as medication errors harm an estimated 1.5 million people and kill several thousand each year in the United States of America (USA) , costing the nation at least US$ 3.5 billion annually (1). Other industrialized countries around the world have also found that medication adverse events are a leading cause of injury and death within their health-care systems (2,3).

In some countries, up to 67% of patients' prescription medication histories have one or more errors (4), and up to 46% of medication errors occur when new orders are written at patient admission or discharge (5). Medication reconciliation is a process designed to prevent medication errors at patient transition points (6). It includes:

- ▶ *Creating the most complete and accurate list possible or "Best Possible Medication History" (BPMH) of all medications the patient is currently taking—also called the "home" medication list.*
- ▶ *Comparing the list against the admission, transfer, and/or discharge orders when writing medication orders; identifying and bringing any discrepancies to the attention of the prescribing health professional; and, if appropriate, making changes to the orders while ensuring the changes are documented.*
- ▶ *Updating the list as new orders are written to reflect all of the patient's current medications.*
- ▶ *Communicating the list to the next provider of care whenever the patient is transferred or discharged and providing the list to the patient at the time of discharge.*

Effectively engaging the patient and family in medication reconciliation is a key strategy for targeting and preventing prescribing and administration errors, and thereby reducing patient harm.

For example, upon implementing a patient-centered medication reconciliation programme, three hospitals in Massachusetts, USA, experienced an average 85% reduction in related medication errors over a 10-month period (7). Hundreds of health-care provider teams are spreading and sustaining the implementation of this strategy by participating in the *100K Lives*, USA (5) and *Safer Healthcare Now!*, Canada (8) campaigns.

▶ ASSOCIATED ISSUES:

There are many challenges to successfully implementing such programmes in all settings where medications are used. Successful implementation requires leadership support; active physician, nursing, and pharmacist involvement; effective implementation teams; and collaborative learning sessions (9). The Massachusetts Coalition for Prevention of Medical Errors, Institute for Healthcare Improvement, and *Safer Healthcare Now!* web sites (listed in the References) now offer sample resources for implementing a medication reconciliation programme. Another critical factor upon which medication reconciliation depends is the appropriateness of the medications prescribed in relation to the patient's illness and underlying conditions. While prescribing practices, including the risks of poly-pharmacy, extend beyond the scope of this solution, the medication reconciliation process provides opportunities to reconsider the appropriateness of a patient's medications over time as the patient's condition may change or as other prescribers become involved.

▶ SUGGESTED ACTIONS

The following strategies should be considered by WHO Member States.

1. Ensure that health-care organizations put in place standardized systems to collect and document information about all current medications

for each patient and provide the resulting medication list to the receiving caregiver(s) at each care transition point (admission, transfer, discharge, outpatient visit). Suggested information to be collected includes:

- *Prescription and non-prescription (over-the-counter) medications, vitamins, nutritional supplements, potentially interactive food items, herbal preparations, and recreational drugs.*
- *The dose, frequency, route, and timing of last dose, as appropriate. Whenever possible, validate the home medication list with the patient and determine the patient's actual level of compliance with prescribed dosing.*
- *The source(s) of the patient's medications. As appropriate, involve the patient's community pharmacist(s) or primary care provider(s) in collecting and validating the home medication information.*

2. Ensure that health-care organizations have clear policies and procedures in place that require:

- *That the patient's current medication list be displayed in a consistent, highly visible location (for example, the patient's chart) so that it is easily accessible to clinicians who are writing drug orders.*
- *The use of the home medication list as a reference when ordering medications at the time of treatment in a clinic or emergency unit or upon admission to an inpatient service.*
- *The reconciliation of medications (i.e. comparison of the patient's medication list with the medications being ordered to identify omissions, duplications, inconsistencies between the patient's medications and clinical conditions, dosing errors, and potential interactions) within specified time frames (e.g. within 24 hours of admission; shorter time frames for high-risk drugs, potentially serious dosage variances, and/or upcoming administration times).*
- *A process for updating the list, as new orders are written, to reflect all of the patient's current medications, including any self-administered medications brought into the organization by the patient.*
- *A process for ensuring that, at discharge, the patient's medication list is updated to include all medications the patient is to be taking following discharge, including new and continuing medications, and previously discontinued "home" medications that are to be resumed. The list should be communicated to the next provider(s) of care and also be provided to the patient as part of the discharge instructions. Medications not to be continued should ideally be discarded by patients.*
- *Clear assignment of roles and responsibilities for all steps in the medication reconciliation process to qualified individuals, within a context of shared accountability. Those may include the patient's pri-*

mary care provider, other physicians, nurses, pharmacists, and other clinicians. The qualifications of the responsible individuals should be determined by the health-care organization within the limits of applicable law and regulation.

- *Access to relevant information and to pharmacist advice at each step in the reconciliation process, to the extent available.*

3. Incorporate training on procedures for reconciling medications into the educational curricula, orientation, and continuing professional development for health-care professionals.

▶ LOOKING FORWARD

1. Develop a standardized card/form for the patient to carry that details the patient's current list of medications.
2. Consider use of technological support and electronic medical records to facilitate the medication reconciliation process.

▶ STRENGTH OF EVIDENCE:

- Multiple uncontrolled comparison studies report decreased medication error rates after successfully implementing medication reconciliation programmes (10-12).

▶ APPLICABILITY:

- All types of health-care organizations.

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

- To be optimally effective, the medication reconciliation process must involve patients and their families—encourage patients to participate and provide them with the tools to do so.
- Educate patients about safe medication use and provide access to reliable, relevant, and understandable information about their medications.
- The patient is in the best position to be aware of all the medications prescribed by multiple caregivers. Consider asking patients to put all their medications in a bag and bring it with them whenever going to the hospital or a doctor visit.
- Encourage patients, family, and caregivers to keep and maintain an accurate list of all medications, including prescription and nonprescription medications, herbal and nutritional supplements, immunization history, and any allergic or adverse medication reactions. These medication lists should be updated and reviewed with the patient/family/caregiver at each care encounter.
- Teach patients about the risks of medications, both individually and in combination, with particular attention to patients on multiple medications prescribed by multiple caregivers.

- Encourage patients and families to use a single pharmacy, not only as the provider of medications but as a source of information about the medications.
- Consider community support systems to assist patients in verifying medication lists in the home.
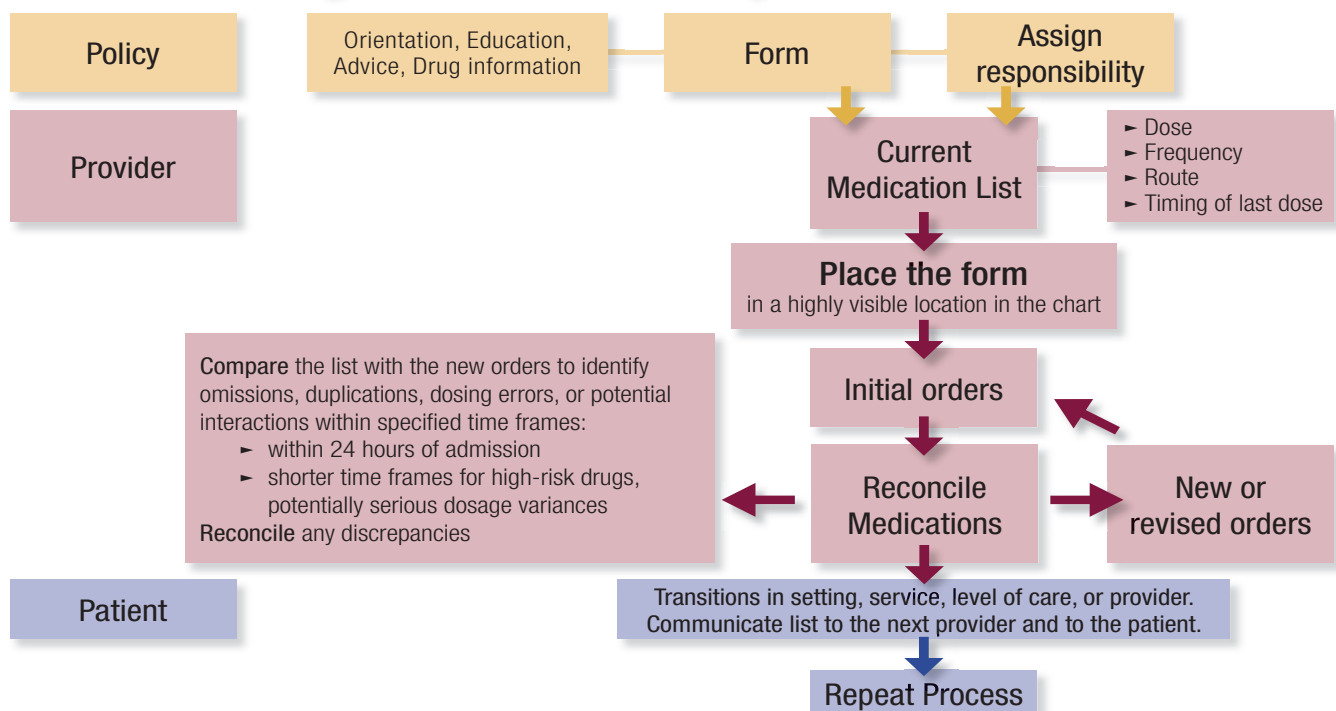

▶ POTENTIAL BARRIERS:

- Time commitment for policy development, staff education, and form development.
- Insufficient staffing and perception of insufficient staffing.
- Inefficient implementation by adding duties rather than redesigning workflow patterns.
- Assigning duties to individuals who have not been determined competent for those duties.
- Time commitment for reconciling medications at each patient encounter. After training, estimates are: 10 minutes on admission, 30–45 minutes on transfer from the coronary care unit, and 10 minutes at discharge (10).

- Lack of health-care professional buy-in including physicians, nurses, and pharmacists.
- Lack of leadership buy-in and support.
- Lack of understanding of the complexity.
- Lack of availability of electronic health records in most countries.
- Limitations imposed by third party payers on availability and reimbursement for medications.
- 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:

- Additional time at each patient encounter for medication reconciliation.
- Incorrect prescription of medications resulting from potentially inaccurate list provided by patient.

EXAMPLE OF
Assuring Medication Accuracy at Transitions in Care

Policy

Orientation, Education, Advice, Drug information — Form — Assign responsibility

Provider

Current Medication List
- ▶ Dose
- ▶ Frequency
- ▶ Route
- ▶ Timing of last dose

Place the form in a highly visible location in the chart

Initial orders

Compare the list with the new orders to identify omissions, duplications, dosing errors, or potential interactions within specified time frames:
- ▶ within 24 hours of admission
- ▶ shorter time frames for high-risk drugs, potentially serious dosage variances

Reconcile any discrepancies

Reconcile Medications → New or revised orders

Patient

Transitions in setting, service, level of care, or provider. Communicate list to the next provider and to the patient.

Repeat Process

This example is not necessarily appropriate for all health-care settings.

► REFERENCES:

1. *Preventing medication errors. Washington, DC, Institute of Medicine, 2006.*

2. *Baker GR, Norton PG. The Canadian Adverse Events Study: the incidence of adverse events among hospitalized patients in Canada. Canadian Medical Association Journal, 2004, 170(11):1678–1686.*

3. *A safer place for patients: learning to improve patient safety. London, National Audit Office, 2005 (http://www.nao.org.uk/pn/05-06/0506456.htm, accessed 11 June 2006).*

4. *Sullivan C et al. Medication reconciliation in the acute care setting: opportunity and challenge for nursing. Journal of Nursing Care Quality, 2005, 20(2):95–98.*

5. *Reconcile medications at all transition points. IHI Patient Safety Medication Systems Changes. Cambridge, MA, Institute for Healthcare Improvement (http://www.ihi.org/IHI/Topics/PatientSafety/MedicationSystems/Changes/Reconcile+Medications+at+All+Transition+Points.htm, accessed 11 June 2006).*

6. *The case for medication reconciliation. Nursing Management, 2005, 36(9):22.*

7. *Massachusetts Coalition for the Prevention of Medical Errors (www.macoalition.org/initiatives.shtml, accessed 11 June 2006).*

8. *Safer Healthcare Now! (http://www.saferhealthcarenow.ca/Default.aspx?folderId=82&contentId=124, accessed 11 June 2006).*

9. *Rogers G et al. Reconciling medications at admission: safer practice recommendations and implementation strategies. Joint Commission Journal on Quality and Safety, 2006. 32(1):37–50.*

10. *Rozich JD et al. Standardization as a mechanism to improve safety in health care. Joint Commission Journal on Quality and Safety, 2004. 30(1):5–14.*

11. *Gebhart F. Setting up a medication reconciliation system. Drug Topics, 2005, 149(2) (Health-System Edition supplement):1–2.*

12. *Pronovost P et al. Medication reconciliation: a practical tool to reduce the risk of medication errors. Journal of Critical Care, 2003, 18(4):201–205.*

► OTHER SELECTED RESOURCES:

1. *Building a case for medication reconciliation. ISMP Medication Safety Alert, 10 (8), 21 April 2005. Link: http://www.ismp.org/Newsletters/acutecare/articles/20050421.asp.*

2. *CCHSA Patient/Client Safety Goals & Required Organizational Practices. Frequently Asked Questions. Ottawa, ON, Canadian Council on Health Services Accreditation, 6 June 2005. Link: http://www.cchsa.ca/pdf/patientsafetyFAQJune062005.pdf.*

3. *CCHSA Patient Safety Goals and Required Organizational Practices. Ottawa, ON, Canadian Council on Health Services Accreditation, December 2004. Link: http://www.cchsa.ca/pdf/PSCommunique2.pdf.*

4. *Cornish PL et al. Unintended medication discrepancies at the time of hospital admission. Archives of Internal Medicine, 2005,165:424–429.*

5. *Forster AJ et al. Adverse events among medical patients after discharge from hospital. Canadian Medical Association Journal, 2004, 170(3):345–349.*

6. *Ketchum K, Grass CA, Padwojski A. Medication reconciliation. AJN 2005, 105(11):78–85.*

7. *Medication errors involving reconciliation failures. USP Patient Safety CAPSLink, October 2005. Link: http://www.magnetmail.net/actions/email_web_version.cfm?recipient_id=17651743&message_id=130435&user_id=USP.*

8. *Medication reconciliation—in the hospital and beyond. ISMP Canada Safety Bulletin, 9 June 2006, 6(3). Link: http://www.ismp-canada.org/download/ISMPCSB2006-03MedRec.pdf.*

9. *2006 National Patient Safety Goals. Oakbrook Terrace, IL: Joint Commission Link: http://www.jointcommission.org/PatientSafety/NationalPatientSafetyGoals/06_npsg_cah.htm.*

10. *National Quality Forum (NQF) Safe Practices for Better Health Care: http://www.qualityforum.org/projects/completed/safe_practices/*

11. *Nickerson A et al. Drug-therapy problems, inconsistencies and omissions identified during a medication reconciliation and seamless care service. Healthcare Quarterly, 2005, 8:65–72.*

12. *Nickerson A et al. Inconsistencies and omissions identified during a medication reconciliation and seamless care service. Healthcare Quarterly, 2005, 8 (Special Edition): 65–72.*

13. *Ong S et al. Drug-related problems on hospital admission: relationship to medication information transfer. Annals of Pharmacotherapy, 40(3): 408–413.*

14. *Safer Healthcare Now! Medication Reconciliation Getting Started Kit. Link: http://www.saferhealthcarenow.ca/Default.aspx?folderId=82&contentId=124.*

15. *Seamless Care Task Force of the Canadian Pharmacists Association and the Canadian Society of Hospital Pharmacists. Statement on Seamless Care. Ottawa (ON): Canadian Society of Hospital Pharmacists, 2004.*

16. *Tam VC et al. Frequency, type and clinical importance of medication history errors at admission to hospital: a systematic review. Canadian Medical Association Journal, 2005,173:510–515.*

17. *Using medication reconciliation to prevent errors. Sentinel Event Alert, Issue 35, 23 January 2006. Joint Commission. Link: http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_35.htm.*

18. *Vira T, Colquhoun M, Etchells EE. Reconcilable differences: correcting medication errors at hospital admission and discharge, Quality & Safety in Health Care, 2006, 000:1–6.*
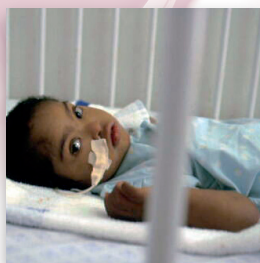
Avoiding Catheter and Tubing Mis-Connections

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| volume 1, solution 7 | May 2007

▶ STATEMENT OF PROBLEM AND IMPACT:

Tubing, catheters, and syringes are a fundamental aspect of daily health care provision for the delivery of medications and fluids to patients. The design of these devices is such that it is possible to inadvertently connect the wrong syringes and tubing and then deliver medication or fluids through an unintended and therefore wrong route. This is due to the multiple devices used for different routes of administration being able to connect to each other. The best solution lies with introducing design features that prevent misconnections and prompt the user to take the correct action.

Other causes or contributing factors include:

▶ *Luer connectors. Used almost universally in a variety of medical applications to link medical devices, including fluid delivery (via the enteral, intravascular, spinal, and epidural routes) and insufflation of gas (in balloon catheters, endotracheal cuffs, and automatic blood pressure devices), they have been found to enable functionally dissimilar tubes or catheters to be connected.*

▶ *Routine use of tubes or catheters for unintended purposes. This includes using intravenous (IV) extension tubing for epidurals, irrigation, drains, and central lines or to extend enteric feeding tubes.*

▶ *Positioning of functionally dissimilar tubes used in patient care in close proximity to one another. For example, use of an enteral feeding tube near a central intravenous catheter and tubing.*

▶ *Movement of the patient from one setting or service to another.*

▶ *Staff fatigue associated with working consecutive shifts.*

Tubing and catheter misconnections can lead to wrong route medication errors and result in serious injury or death to the patient. Though these errors are highly preventable and can often be easily averted, multiple reports of patient injury and death from such wrong route medication errors indicate that they occur with relative frequency (1-7). This includes erroneous administration routes for aerosols.

In the United States of America (USA), nine cases of tubing misconnections involving seven adults and two infants have been reported to the Joint Commission's Sentinel Event database, resulting in eight deaths and one permanent loss of function (8). Similar incidents have been reported to other agencies, including the ECRI Institute, the United States Food and Drug Administration, the Institute for Safe Medication Practices (ISMP), and the United States Pharmacopeia (USP). Data from these groups reveal that misconnection errors occur with significant frequency and, in a number of instances, lead to deadly consequences (9,10).

The most common types of tubes and catheters involved in the cases reported to the Joint Commission are central venous catheters, peripheral IV catheters, nasogastric feeding tubes, percutaneous enteric feeding tubes, peritoneal dialysis catheters, tracheostomy cuff inflation tubes, and automatic blood pressure cuff insufflator tubes. Examples include specific misconnections involving an enteric tube feeding into an IV catheter (four cases); a blood pressure insufflator tube connected to an IV catheter (two cases); and the injection of intravenous fluid into a tracheostomy cuff inflation tube (one case).

In the United Kingdom, between 2001 and 2004, there were three reports of death, and from 1997 to 2004 there were four reports of harm or near misses following wrong route errors when oral liquid medicines, feeds, and flushes were administered intravenously (11). A review of the National Reporting and Learning System in the United Kingdom identi-

fied 32 reported incidents in which oral liquid medicines were administered by the intravenous route, seven incidents in which epidural medication was administered via the intravenous route, and six incidents in which intravenous medication was administered via the epidural route from 1 January 2005 to 31 May 2006.

▶ ASSOCIATED ISSUES:

While various approaches to preventing catheter misconnection and wrong route administration have been suggested, meticulous attention to detail when administering medications and feedings (i.e. the right route of administration) and when connecting devices to patients (i.e. using the right connection/tubing) is a basic first step. By implementing preventive measures—many of them simple and inexpensive—wrong route administration errors can be effectively eliminated.

▶ SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Ensure that health-care organizations have systems and procedures in place which:

   ▶ *Emphasize to non-clinical staff, patients, and families that devices should never be connected or disconnected by them. Help should always be requested from clinical staff.*

   ▶ *Require the labeling of high-risk catheters (e.g. arterial, epidural, intrathecal). Use of catheters with injection ports for these applications is to be avoided.*

   ▶ *Require that caregivers trace all lines from their origin to the connection port to verify attachments before making any connections or reconnections, or administering medications, solutions, or other products.*

   ▶ *Include a standardized line reconciliation process as part of handover communications. This should involve rechecking tubing connections and tracing all patient tubes and catheters to their sources upon the patient's arrival in a new setting or service and at staff shift changes.*

   ▶ *Bar the use of standard Luer-connection syringes to administer oral medications or enteric feedings.*

   ▶ *Provide for acceptance testing and risk assessment (failure mode and effects analysis, etc.) to identify the potential for misconnections when purchasing new catheters and tubing.*

2. Incorporate training on the hazards of misconnecting tubing and devices into the orientation and continuing professional development of practitioners and health-care workers.

3. Promote the purchasing of tubes and catheters that are designed to enhance safety and to prevent misconnections with other devices or tubes.

▶ LOOKING FORWARD:

1. Physical barriers (e.g. incompatibility by design) should be created to eliminate the possibility of interconnectivity between functionally dissimilar medical tubes and catheters to the extent feasible.

2. Specific labeling of device ports is advocated to avoid connecting intravenous tubing to catheter cuffs or balloons (3).

3. The use of different, dedicated infusion pumps for specific applications such as epidural infusions has also been proposed (12).

4. Using only oral/enteral syringes to administer oral/enteral medications and avoiding the use of adapters and three-way taps are part of several draft proposals from the United Kingdom's National Patient Safety Agency to prevent wrong route errors (13).

5. A combined preventive strategy of performing risk assessments to identify existing misconnection hazards, encouraging manufacturers to design dissimilar catheters and tubes to be physically impossible to connect ("incompatibility by design"), acquisition of equipment whose design makes misconnections unlikely, and policy implementation to minimize misconnection occurrences has been advocated (14,15).

6. The colour-coding of tubing and connections should be standardized. The European standardization body has studied the colour-coding of tubing and connectors in certain applications and has recommended exploring alternatives to Luer connectors in selected applications (16).

7. Industry-based standards and engineering design for medical tubes and catheters that are organ-specific or need-specific and do not interconnect should be established and promoted.

▶ STRENGTH OF EVIDENCE:

▶ Expert consensus.

► APPLICABILITY:

► Wherever patients are treated, including hospitals, mental health facilities, community settings, ambulatory clinics, long-term care facilities, clinics, practices, home-care agencies.

► OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

► Encourage patients and families to ask questions about medications given parenterally or via feeding tubes, to assure proper medication delivery.

► Educate patients, families, and caregivers on the proper use of parenteral sites and feeding tubes in the home care setting and provide instruction on the precautions to take to prevent wrong route errors.

► POTENTIAL BARRIERS:

► Staff acceptance of the concept of wrong route error prevention.

► Staff acceptance of never modifying incompatible connectors to allow connections.

► Cost of converting to non-connectable delivery systems.

► Inability to create an approach or standardization of systems.

► Difficulties with a consistent or reliable supply chain for some countries.

► 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:

► Possible treatment delays to obtain compatible equipment if compatible connections are not available.

► SELECTED REFERENCES AND RESOURCES:

1.   Tunneled intrathecal catheter mistaken as central venous line access. ISMP Canada Safety Bulletin, 30 October 2005. http://www.ismp-canada.org/download/ISMPCSB2005-08Intrathecal.pdf.

2.   Problems persist with life-threatening tubing misconnections. ISMP Medication Safety Alert, 17 June 2004. http://www.ismp.org/newsletters/acutecare/articles/20040617.asp?ptr=y.

3.   Wichman K, Hyland S. Medication safety alerts. Inflation ports: risk for medication errors. Canadian Journal of Hospital Pharmacy, 2004, 57(5):299–301. http://www.ismp-canada.org/download/cjhp0411.pdf.

4.   Ramsay SJ et al. The dangers of trying to make ends meet: accidental intravenous administration of enteral feed. Anaesthesia and Intensive Care, 2003, 31:324–327.

5.   Pope M. A mix-up of tubes. American Journal of Nursing, 2002; 102(4):23.

6.   Wrong route errors. Safety First, Massachusetts Coalition for the Prevention of Healthcare Errors, June 1999 (http://www.macoalition.org/documents/SafetyFirst1.pdf, accessed 10 June 2006).

7.   Tubing misconnections—a persistent and potentially deadly occurrence. Sentinel Event Alert, April 2006. Joint Commission. http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_36.htm.

8.   Vecchione A. JCAHO warns of tubing errors. Health-System Edition, 22 May 2006 (http://mediwire.healingwell.com/main/Default.aspx?P=Content&ArticleID=326253, accessed 10 June 2006).

9.   Cousins DH, Upton DR. Medication errors: oral paracetamol liquid administered intravenously: time for hospitals to issue oral syringes to clinical areas? Pharmacy in Practice, 2001, 7:221.

10.   Cousins DH, Upton DR. Medication errors: increased funding can cut risks. Pharmacy in Practice, 1997, 7:597–598

11.   Building a safer NHS for patients: improving medication safety. London, Department of Health, 2004 (http://www.dh.gov.uk/en/Publicationsandstatistics/ Publications/PublicationsPolicyAndGuidance/DH_4071443 accessed 10 June 2006).

12.   Koczmara C. Reports of epidural infusion errors. CACCN Dynamics, 2004, 15(4):8. http://www.ismp-canada.org/download/CACCN-Winter04.pdf.

13.   Preventing wrong route errors with oral/enteral medications, feeds and flushes. National Patient Safety Agency Patient Safety Alert, Draft responses to 1st consult, January–March 2006. http://www.saferhealthcare.org.uk/NR/rdonlyres/3F9F3FB2-89B6-4633-ACE9-A51EC2023EBC/0/NPSAdraftpatientsafetyalertonoralconnectorsforstakeholderconsultation.pdf.

14.   Preventing misconnections of lines and cables. Health Devices, 2006, 35(3):81–95.

15.   Common connectors pose a threat to safe practice, Texas Board of Nursing Bulletin, April 2006.

16.   Moore R. Making the right connections. Medical Device Technology, 2003, 14(2):26–27.

Single Use of Injection Devices

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| volume 1, solution 8 | May 2007

▶ STATEMENT OF PROBLEM AND IMPACT:

One of the biggest global concerns is the spread of the human immunodeficiency virus (HIV), the hepatitis B virus (HBV), and the hepatitis C virus (HCV) due to the reuse of injection devices. This problem is worldwide, affecting developed countries as well as developing countries, and many studies have demonstrated the extent and the severity of the problem.

According to the United States Centers for Disease Control and Prevention, four of the largest outbreaks of hepatitis in the United States were traced back to health-care workers in doctor's offices reusing needles and employing other unsafe procedures (1). Outbreaks of HBV and HCV in the states of New York, Oklahoma, and Nebraska between 2000 and 2002 infected more than 300 people. The infections stemmed from "unsafe injection practices, primarily reuse of syringes and needles or contamination of multiple-dose medication vials" (1).

A mathematical model developed by the World Health Organization suggests that in developing and transitional countries in 2000, the reuse of injection devices accounted for an estimated 22 million new cases of HBV infection (about one third of the total), 2 million cases of HCV infection (about 40% of the total), and about a quarter-million cases of HIV infection (about 5% of the total) for the whole world. These infections acquired in 2000 alone are expected to lead to an estimated nine million years of life lost, and disability, between 2000 and 2030 (2). In addition, all those who inject drugs and may at some time share needles, syringes, or other paraphernalia are at risk of bloodborne infections. There were an estimated 13.2 million people who injected drugs around the world at the end of 2003, with 10.3 million of them living in developing countries (3).

While there is significant variation between countries, WHO estimates that in sub-Saharan Africa, approximately 18% of injections are given with reused syringes or needles that have not been sterilized. However, unsafe medical injections are believed to occur most frequently in South Asia, the Eastern Mediterranean, and the Western Pacific regions. Together, these account for 88% of all injections administered with reused, unsterilized equipment (4). The severe consequences of needle reuse also underscored the need to reinforce fundamental infection control techniques among health-care workers (2).

Three papers published in 2003 contended that the AIDS epidemic in Africa was fueled by unsafe medical practices, including injections and blood transfusions using unsterile needles (5-7). As part of the $15 billion Global AIDS Initiative, the United States Senate recently heard debate in a public forum regarding evidence of unsafe medical practice being implicated in the spread of HIV. As a result, the Senate accepted an amendment designed to help stop the transmission of HIV/AIDS in Africa through unsafe medical injections and unscreened blood transfusions. The Senate directed the United States federal Government to spend at least US$75 million on injection and blood safety programmes in Africa.

These facts emphasize the need for immediate and decisive action to prevent the unsafe re-use of injection devices. A safe injection should not harm the patient, expose the health-care worker to any avoidable risks, or result in waste that is dangerous to the community. The widespread publication and distribution of solutions to address this global problem is urgently required to reduce the risk to patients due to poor medical care.

► ASSOCIATED ISSUES:

Reasons contributing to the reuse of injection equipment are complex and involve combinations of socio-cultural, economic and structural factors which include:

- ► Inaccurate patient beliefs

  - ➤ *Some patients believe that injected medications are more effective than those administered orally.*

  - ➤ *Family members believe that needle sharing among family members carries the same risk as casual contacts. Patients also view needle sharing with neighbours as being good neighbourly practice.*

  - ➤ *Patients believe they will not become infected simply because it has not yet happened. (It may take years for bloodborne pathogens such as HIV, HBV, or HCV to significantly affect patient populations before the risk is acknowledged.)*

- ► Practitioners' and health-care workers' beliefs and actions

  - ➤ *Practitioners and health-care workers are unable to help patients understand that oral medications are effective.*

  - ➤ *Practitioners and health-care workers fear that patients will not complete the prescribed oral medication regimen.*

  - ➤ *There is insufficient training for practitioners and health-care workers in infection control practices due to the lack of resources.*

  - ➤ *Health-care workers often fail to adhere to infection control practices and interventions.*

- ► Limited resources

  - ➤ *There are equipment shortages.*

  - ➤ *There are insufficient funds for adequate supplies.*

  - ➤ *There are inadequate disposal options. For example, open burning creates toxic emissions and waste scatter. Incineration reduces toxic emissions and waste scatter but is expensive, and burial sites may allow exposure to waste.*

► SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Promote the single use of injection devices as a health-care facility safety priority that requires leadership and the active engagement of all frontline health-care workers.

2. Develop ongoing training programmes and information resources for health-care workers that address:

   - ➤ *Infection control principles, safe injection practices, and sharps waste management.*

   - ➤ *The effectiveness of non-injectable medications.*

   - ➤ *The education of patients and their families about alternatives to using injectable medications (e.g. oral medication).*

   - ➤ *New injection technologies (e.g. "needle-less" systems).*

3. Evaluate and measure the effectiveness of health-care worker training on injection safety.

4. Provide patients and their families with education regarding:

   - ➤ *Treatment modalities that are as effective as injections in order to reduce injection use.*

   - ➤ *Transmission of bloodborne pathogens.*

   - ➤ *Injection safety practices.*

5. Identify and implement safe waste management practices that meet the needs of individual health-care organizations.

6. Promote safe practices as a planned and budgeted activity that includes the procurement of equipment. Specifically consider implementation of "needle-less" systems.

► LOOKING FORWARD:

1. Consider participating in the WHO Safe Injection Global Network (SIGN), which assembles all major stakeholders to promote and sustain injection safety worldwide. Through the network, WHO provides advice and a series of policy, management, and advocacy tools to help countries access safe, affordable equipment, and promote the training of health staff and the rational use of injections.

2. Urge donors and lenders who finance injectable products to also finance appropriate quantities of injection devices and the cost of sharps waste management.

► STRENGTH OF EVIDENCE:

- ► Expert opinion, consensus and case reports.

► APPLICABILITY:

- ► All facilities and health-care settings where injections are given (e.g. hospitals, ambulatory care, long-term care, ambulatory surgery centers, psychiatric facilities, office-based practices, and home care).

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

▶ Patients and their families should receive education on the principles of infection control and different modalities for treatment.

▶ Educate patients to directly observe and encourage providers to immediately dispose of injection devices within accepted standards of practice and into appropriate sharp instrument waste receptacles after their use.

▶ Assist patients and families in the safe disposal of needles if injectable medications must be used in the home setting—reinforce that the safest number of times to use a needle is once.

▶ POTENTIAL BARRIERS:

▶ Cultures and beliefs.

▶ Cost of solutions.

▶ Practicality of solutions.

▶ Financial incentives for the injection providers when giving injections.

▶ Ongoing needs for generally accepted research, data, and economic rationale regarding cost-benefit analysis or return on investment (ROI) for implementing these recommendations.

▶ RISKS FOR UNINTENDED CONSEQUENCES:

▶ Increased cost related to change in equipment.

▶ Patients may not receive care (i.e. immunizations) due to the lack of sterile equipment.

▶ Some patients may not seek care if injections are not given as part of standard treatment because there is an expectation by the patient to receive an injection from the providers.

▶ REFERENCES:

1. *Transmission of Hepatitis B and C Viruses in Outpatient Settings – New York, Oklahoma, and Nebraska, 2000-2002, MMWR, September 26, 2003 / 52(38); 901-906.*

2. *Testimony of Dr YvanHutin, project leader for the Safe Injection Global Network at the Senate Committee hearing, Examining Solutions To the Problem of Health Care Transmission of HIV/AIDS in Africa, Focusing on Injection Safety, Blood Safety, Safe Obstetrical Delivery Practices, and Quality Assurance in Medical Care, July 31, 2003.*

3. *World Health Organization, Biregional strategy for harm reduction, 2005 -2009 : HIV and injecting drug. 2005.*

4. *Addo-Yobo, E. et al., Oral amoxicillin versus injectable penicillin for severe pneumonia in children aged 3 to 59 months: a randomized multicentre equivalency study, Lancet 2004; 364: 1141-48.*

5. *HIV infections in sub-Saharan Africa not explained by sexual or vertical transmission, David Gisselquist PhD, Richard Rothenberg MD,MPH,John Potterat BA and Ernest Drucker PHD, International Journal of STD & AIDS 2003; 13: 657-666*

6. *Let it be sexual: how health care transmission of AIDS in Africa was ignored, David Gisselquist PhD, Stephen F Minkin BA,John J Potterat BA, Richard B Rothenberg MD MPH and Francois Vachon MD, International Journal of STD & AIDS 2003;14:144 – 147.*

7. *Gisselquist, D., et al. Mounting anomalies in the epidemiology of HIV in Africa. International Journal of STD & Aids 2003; 14: 144-147.*

Improved Hand Hygiene to Prevent Health Care-Associated Infections

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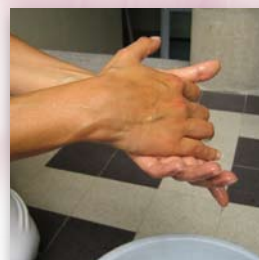
▶ STATEMENT OF THE PROBLEM AND IMPACT:

It is estimated that at any one time, more than 1.4 million people worldwide are suffering from infections acquired in hospitals (1,2). Health care-associated infections (HAI) occur worldwide and affect both developed and developing countries. In developed countries, between 5% and 10% of patients acquire one or more infections and 15%–40% of patients admitted to critical care are thought to be affected (3). In resource-poor settings, rates of infection can exceed 20% (4), but available data are scanty and more research is urgently needed to assess the burden of disease in developing and transitional countries.

In the United States of America (USA), one in every 136 patients becomes severely ill as a result of acquiring an infection in hospital (5). This is equivalent to 2 million cases per year, incurring additional costs of US$ 4.5–5.7 billion and about 90 000 deaths. In England, 100 000 cases of HAI are estimated to cost the NHS a minimum of £1 billion per year (6) with more than 5000 attributable deaths annually (7). In Mexico, the estimate is 450 000 infections, causing 35 deaths per 100 000 neonatal admissions, with a fatality rate of between 4% and 56% (8).

▶ BACKGROUND AND ISSUES:

There is substantial evidence that hand antisepsis reduces the incidence of HAI (9–24). Hand hygiene is therefore a fundamental action for ensuring patient safety, which should occur in a timely and effective manner in the process of care. However, unacceptably low compliance with hand hygiene is universal in health care (25). This contributes to the transmission of microbes capable of causing avoidable HAIs. Better adherence to hand hygiene guidelines and policies has been shown to reduce the spread of HAI (26–32). The key targets for action are not only health-care workers but also policy-makers and organizational leaders and managers (33).

Published research suggests that multimodal, multidisciplinary strategies that focus on system change (11,14,18,20–25), offer the greatest chance of success in terms of hand hygiene improvement and infection reduction.

The objective of any hand hygiene solution is therefore to build or strengthen capacity so that hand hygiene improvement is seen as and becomes an integrated component of a broader HAI prevention strategy.

▶ SUGGESTED ACTIONS:

The following strategies should be considered by WHO Member States.

1. Promote hand hygiene adherence as a health care facility priority; this requires leadership and administrative support and financial resources.

2. Adopt at country, region, and facility levels the nine recommendations of the WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft), in particular the implementation of multidisciplinary, multimodal hand hygiene improvement strategies within health care facilities that incorporate:

   a. Provision of readily accessible alcohol-based handrubs at the point of patient care .

   b. Access to a safe continuous water supply at all taps/faucets and the necessary facilities to perform hand hygiene.

   c. Education of health-care workers on correct hand hygiene techniques.

   d. Display of promotional hand hygiene reminders in the workplace.

   e. Measurement of hand hygiene compliance through observational monitoring and feedback of performance to health-care workers.

3. Where alcohol-based handrubs are not available or are too costly, consider local production of handrubs using the formula described in the *WHO Recommended Hand Antisepsis Formulation: Guide to Local Production*.

Definition: **Point of care** *- refers to a hand hygiene product (e.g. alcohol-based handrub) which is easily accessible to staff by being as close as possible (as resources permit) to where patient contact is taking place.*

Point of care products should be within an arms reach of care/treatment delivery.

This enables staff to quickly and easily fulfil the five moments for hand hygiene which have been developed from the WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft) (http://www.who.int/gpsc/tools/en/)

The product must be capable of being used at the required moment, without leaving the zone of activity.

Point of care is usually achieved through staff-carried handrubs (pocket bottles) or handrubs fixed to the patients bed or bedside table (or around this area). Handrubs affixed to trolleys or placed on a dressing or medicine tray which are then taken into the zone of activity also fulfil this definition.

▶ LOOKING FORWARD:

1. Consider measuring the financial and economic aspects of health care–associated infections to assist in demonstrating their impacts.

2. Inform and educate patients about the importance of hand hygiene and their role in supporting improvements.

▶ APPLICABILITY:

▶ All healthcare facilities, where patient care and/or treatment is provided.

▶ OPPORTUNITIES FOR PATIENT AND FAMILY INVOLVEMENT:

▶ Raise the awareness of patients and their families/visitors of the risks to health when lapses in timely and appropriate hand hygiene occur.

▶ Produce information for patients and their families that highlights the importance of better hand hygiene.

▶ Encourage staff to clean their hands in the presence of the patient prior to touching the patient, invite patients to ask staff if they have cleaned their hands prior to treatment, if culturally appropriate.

▶ Educate patients on correct hand hygiene technique and indications to ensure they are aware of the correct moments for hand hygiene.

▶ STRENGTH OF EVIDENCE:

▶ Based on experimental, clinical, and epidemiological studies, theoretical rationale, and a consensus of experts.

▶ POTENTIAL BARRIERS TO IMPLEMENTATION:

Barriers exist on a number of levels from national political commitment through to the individual health-care worker. Implementation is also influenced by levels of resources, general approaches to quality, and perception. The potential barriers are outlined in the Table 1:

Table 1 – Potential Barriers to Implementation

	Political	Institutional/managerial	Individual/behavioural
Financial	▶ Competing health priorities ▶ Failure to develop a business case to demonstrate (macro-) economic benefits	▶ Costs of infrastructure ▶ Costs of alcohol-based handrub ▶ Failure to convince managers and leaders of (micro-) economic benefits ▶ Inability to manufacture alcohol-based handrub ▶ Staffing shortages ▶ Facility design	▶ No financial incentive to modify performance (continuous education)
Quality	▶ Lack of commitment ▶ Lack of infrastructure ▶ No commitment to education (pre-service and in-service)	▶ Lack of commitment ▶ Existing culture not supportive ▶ Failure to convince managers and leaders of health benefits ▶ Time for staff training ▶ Lack of time for compliance monitoring	▶ Lack of health-care worker buy-in ▶ Campaigns are not at right target ▶ Lack of patient participation and empowerment ▶ Existing culture is not supportive
Perception	▶ Lack of awareness of the burden of disease ▶ Perception that hand hygiene is no longer a problem	▶ Existing organizational culture not supportive	▶ Lack of institutional leaders buy-in ▶ Lack of awareness of the issues ▶ Perception that hand hygiene is no longer a problem ▶ Low belief in the value of hand hygiene in terms of impacting on patient outcome

▶ RISKS FOR UNINTENDED CONSEQUENCES:

▶ Heightened patient and carer anxiety if messages are miscommunicated.

▶ Safety issues associated with ingestion of the alcohol-based handrub for paediatric patient populations, substance abuse patients, or those who are confused.

▶ Although very low risk, flammability issues and fire hazards associated with alcohol-based handrub. The benefits of utilizing this type of handrub far exceed the minimal risk.

▶ REFERENCES:

1. Tikhomirov E. WHO Programme for the control of hospital infections. Chemiotherapia, 1987, 3:148–151.

2. Vincent JL. Nosocomial infections in adult intensive-care units. Lancet, 2003, 361:2068–2077.

3. Lazzari S, Allegranzi B, Concia E. Making hospitals safer: the need for a global strategy for infection control in healthcare settings. World Hospitals and Health Services, 2004, 32, 34, 36–42.

4. Pittet D Infection control and quality health care in the new millenium, American Journal of Infection Control, 2005, 33(5):258–267

5. Starfield B. Is US health really the best in the world? Journal of the American Medical Association, 2000, 284:483–485.

6. The Socio-economic burden of hospital acquired infection. Public Health Laboratory Service, 1999.

7. Mayor S. Hospital acquired infections kill 5000 patients a year in England. BMJ, 2000, 321:1370.

8. Zaidi AK et al. Hospital acquired neonatal infections in developing countries. Lancet, 2005, 365:1175–1188.

9. Casewell M, Phillips I. Hands as route of transmission for Klebsiella species. BMJ, 1977. 2:1315–1317.

10. Doebbeling BN et al. Comparative efficacy of alternative hand-washing agents in reducing nosocomial infections in intensive care units. New England Journal of Medicine, 1992, 327:88–93.

11. Webster J, Faoagali JL, Cartwright D. Elimination of methicillin-resistant Staphylococcus aureus from a neonatal intensive care unit after hand washing with triclosan. Journal of Paedicatrics and Child Health,1994, 30:59–64.

12. Zafar AB et al. Use of 0.3% triclosan (Bacti-Stat) to eradicate an outbreak of methicillin-resistant Staphylococcus aureus in a neonatal nursery. American Journal of Infection Control, 1995, 23:200–208.

13. Pittet D et al. Effectiveness of a hospital-wide programme to improve compliance with hand hygiene. Infection Control Programme. Lancet, 2000, 356:1307–1312.

14. Larson EL, et al. An organizational climate intervention associated with increased handwashing and decreased nosocomial infections. Behavioral Medicine, 2000, 26:14–22.

15. Conly JM et al. Handwashing practices in an intensive care unit: the effects of an educational program and its relationship to infection rates. American Journal of Infection Control, 1989, 17:330–339.

16. Simmons B et al. The role of handwashing in prevention of endemic intensive care unit infections. Infection Control and Hospital Epidemiology, 1990, 11:589–594.

17. MacDonald A et al. Performance feedback of hand hygiene, using alcohol gel as the skin decontaminant, reduces the number of inpatients newly affected by MRSA and antibiotic costs. Journal of Hospital Infection, 2004, 56:56–63.

18. Swoboda SM et al. Electronic monitoring and voice prompts improve hand hygiene and decrease nosocomial infections in an intermediate care unit. Critical Care Medicine, 2004, 32:358–363.

19. Hilburn J et al. Use of alcohol hand sanitizer as an infection control strategy in an acute care facility. American Journal of Infection Control, 2003, 31:109–116.

20. Lam BC, Lee J, Lau YL. Hand hygiene practices in a neonatal intensive care unit: a multimodal intervention and impact on nosocomial infection. Pediatrics, 2004, 114:e565–571.

21. Won SP et al. Handwashing program for the prevention of nosocomial infections in a neonatal intensive care unit. Infection Control and Hospital Epidemiology, 2004, 25:742–746.

22. Zerr DM et al. Decreasing hospital-associated rotavirus infection: a multidisciplinary hand hygiene campaign in a children's hospital. Pediatric Infectious Disease Journal, 2005, 24:397–403.

23. Rosenthal VD, Guzman S, Safdar N. Reduction in nosocomial infection with improved hand hygiene in intensive care units of a tertiary care hospital in Argentina. American Journal of Infection Control, 2005, 33:392–397.

24. Johnson PD et al. Efficacy of an alcohol/chlorhexidine hand hygiene program in a hospital with high rates of nosocomial methicillin-resistant Staphylococcus aureus (MRSA) infection. Medical Journal of Australia, 2005, 183:9–14.

25. Pittet D, Boyce JM. Revolutionizing hand hygiene in health-care settings: guidelines revisited. Lancet Infectious Diseases, 2003, 3:269–270.

26. Harrison WA et al. Bacterial transfer and cross-contamination potential associated with paper-towel dispensing. *American Journal of Infection Control*, 2003, 31:387–391.

27. Barker J, Vipond IB, Bloomfield SF. Effects of cleaning and disinfection in reducing the spread of Norovirus contamination via environmental surfaces. *Journal of Hospital Infection*, 2004, 58:42–49.

28. El Shafie SS, Alishaq M, Leni Garcia M. Investigation of an outbreak of multidrug-resistant Acinetobacter baumannii in trauma intensive care unit. *Journal of Hospital Infection*, 2004, 56:101–105.

29. Sartor C et al. Nosocomial Serratia marcescens infections associated with extrinsic contamination of a liquid nonmedicated soap. *Infection Control and Hospital Epidemiology*, 2000, 21:196–199.

30. Duckro AN et al. Transfer of vancomycin-resistant Enterococci via health care worker hands. *Archives of Internal Medicine*, 2005, 165:302–307.

31. Passaro DJ et al. Postoperative Serratia marcescens wound infections traced to an out-of-hospital source. *Journal of Infectious Diseases*, 1997, 175:992–995.

32. Chang HJ et al. An epidemic of Malassezia pachydermatis in an intensive care nursery associated with colonization of health care workers' pet dogs. *New England Journal of Medicine*, 1998, 338:706–711.

33. WHO Guidelines on Hand Hygiene in Health Care (Advanced Draft) 2006.

▶ OTHER SELECTED RESOURCES:

1. AAOS online fact sheet: Twelve steps to a safer hospital stay: www.orthoinfo.aaos.org/

2. AHRQ Publication No. 01-0040a: www.ahrq.gov/consumer/

3. Centers for Disease Control and Prevention: http://www.cdc.gov/cleanhands/

4. The First Global Patient Safety Challenge: http://www.who.int/gpsc/en/index.html

5. The Joint Commission Speak Up Safety Initiative: www.jcaho.org/general+public/gp+speak+up/infection_control_brochure.pdf

6. National Patient Safety Agency: cleanyourhands campaign: www.npsa.nhs.uk/cleanyourhands

7. National Quality Forum (NQF) Safe Practices for Better Health Care: http://www.qualityforum.org/projects/completed/safe_practices/

8. NPSF Preventing Infections in the Hospital: www.npsf.org/html/prevent_infections.html

9. Partners in Your Care: www.med.upenn.edu/mcguckin/handwashing/

10. Swiss Noso: http://www.swiss-noso.ch/

11. United States Guidelines on Hand Hygiene: http://www.cdc.gov/handhygiene/

12. University Hospitals Geneva Hand Hygiene Improvement web site: http://www.hopisafe.ch/

13. World Alliance for Patient Safety: http://www.who.int/patientsafety/en/