REDUCING ABBREVIATIONS IN MEDICATION ORDERS: AN ACTION PLAN AND RESOURCE GUIDE

GNYHA MEDICATION SAFETY WORKGROUP

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GNYHA Medication Errors Workgroup
Action Plan and Resource Guide:
Reducing Abbreviations in Medication Orders

I. Goal: Reducing Medication Errors

This guide provides resources and ideas to help health care facilities reduce the use of abbreviations in medication orders and, as a result, decrease the likelihood of a medication error reaching the patient. The guide supplies general information on medication errors and provides guidance on how to implement a pilot project to reduce the use of abbreviations. It is expected that any institution using this guide will need to adapt the strategies outlined below to fit the specific needs of its operation. The pilot project employs rapid-cycle methodology that emphasizes practical interventions and quick implementation of process changes. *As designed, the project can move through the data-gathering and beta-testing stages to hospital-wide implementation within 16 weeks.*

II. Promoting Patient Safety: Reducing Use of Abbreviations

The GNYHA Medication Errors Workgroup was established to promote quality initiatives and develop programs for the prevention of medication errors. Its membership includes pharmacists, physicians, nurses, and quality improvement managers. In November 2000, GNYHA conducted a survey on medication errors and developed a report, including recommendations for several projects to reduce medication errors, that was subsequently reviewed by the GNYHA Board of Governors. From the recommendations in the report, the Medication Errors Workgroup selected error-prone abbreviations for its first project.

The goal of this project is to reduce the use of error-prone abbreviations and confusing dose designations written on medication orders and, as a result, decrease associated medication errors. Medication abbreviations and confusing dose designations include only a portion of the errors that can be made during the prescribing phase of the medication process. As noted by the Institute of Medicine, the best-practice solution for this type of error is implementation of computerized physician order entry (CPOE). For institutions not yet ready to implement CPOE, this resource guide describes methods for reducing the use of abbreviations and confusing dose designations either as a single project or in coordination with a larger project to reduce errors made during the prescribing process.

> *Errors made at the time of prescribing have long been recognized as a leading cause of medication errors with some studies revealing that as many as 49% of preventable errors occur at this time.*
> *(Bates et al., JAMA, 1995)*

Reduction of medication abbreviations and confusing dose designations has long been held as a best-practice standard in the health care industry, as noted by the organizations below.

A. Recommendations by the Institute for Safe Medication Practices

For more than 25 years, the Institute for Safe Medication Practices (ISMP) has advocated against abbreviations and dangerous dose expressions and for the use of leading zeros. Both ISMP and The National Coordinating Council for Medication Error Reporting and Prevention (NCCMERP)

have made recommendations to correct error-prone aspects of prescription writing and published tables of hazardous abbreviations. (See Attachments 1 and 2.)

B. JCAHO Sentinel Event Alert on Medication Errors Relating to Potentially Hazardous Abbreviations

In September 2001, the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) issued a Sentinel Event Alert on *Medication Errors Relating to Potentially Hazardous Abbreviations*. (See Attachment 3 or the JCAHO Web site, **www.jcaho.org**, for a copy of the Alert.) In the Alert, JCAHO notes the long-standing recommendations of ISMP and urges that health care providers take action to improve the accuracy of medication ordering. Specifically, JCAHO recommends that health care facilities:

- Develop a list of unacceptable abbreviations and symbols that is shared with all prescribers.
- Develop a policy to ensure that medical staff refer to the list and take steps to ensure compliance.
- Establish a policy that if an unacceptable abbreviation is used, the prescription order is verified with the prescriber before it is filled.

Health care facilities should expect JCAHO to address this Sentinel Event Alert when assessing compliance with standards IM.3, IM.7.10, MS.8.2.3, and TX.3.5.2 in the *Comprehensive Accreditation Manual for Hospitals.* In October 2001, the JCAHO issued a moratorium on scoring compliance with recommendations contained in Sentinel Event Alerts while it reassesses its Sentinel Event Alert process. The JCAHO will assess for consultative purposes, however, an organization's knowledge of its Sentinel Event Alerts and its plans to implement recommendations contained in those Alerts.

C. Reducing Medication Errors to Fulfill Strategic Goals

Reducing medication errors not only helps to improve patient safety and meet regulatory requirements but can also support an institution's strategic goals.

- **Reduce costs**. Studies estimate the cost of a preventable adverse drug event for a teaching hospital to be $4,685, not including the costs of rework and litigation or the costs to the patient post-discharge. (David W. Bates et al., The Costs of Adverse Drug Events in Hospitalized Patients*, JAMA 277:307-311, 1997)*
- **Address patient safety and satisfaction**. The number one fear expressed by patients when going into the hospital is receiving the wrong medication. (*American Society of Health-System Pharmacists Newsletter,* October 1999)

III. Using Rapid-Cycle Change

The GNYHA Medication Errors Workgroup supports the use of the Institute for Healthcare Improvement's (IHI) Model for Improvement, a method for rapid-cycle change and evaluation. Rapid-cycle change requires "strong leadership, effective processes, and appropriate choice of intervention." In particular, successful teams were able to "define, clearly state and relentlessly pursue their aims, and then choose practical interventions and move quickly into changing a process." (*The Joint Commission Journal on Quality Improvement,* June 2000) These teams did not spend months collecting data before beginning a change. Successful teams enlisted the help of a key physician leader and concentrated on changing processes rather than people.

Reasons for Failure

- *Lack of supportive leadership*
- *Poor team leadership*
- *Bad design of intervention*
- *Lack of involvement of all stakeholders*
- *Concentration on data collection*
- *Difficulty defining measures and collecting data*
- *Focus on error rather than the underlying system failures*
- *Resistance of physicians or nurses*
- *Conflicting time demands for team members*

(The Joint Commission Journal on Quality Improvement)

The rapid-cycle change process works as follows:

- Identify problem.
- Define a goal for improvement in specific and quantifiable terms (e.g., reduce the use of abbreviations by 80%).
- Collect baseline data to document the problem.
- Design system changes to address the problem.
- Implement changes in a limited environment for a short period of time (e.g., in one unit for two weeks).
- Measure results and evaluate success or failure of the program. If necessary, redesign process and test again.
- Repeat process until the team is satisfied with the changes and results.
- Implement changes unit by unit and/or throughout the institution.

In order to be successful with the rapid-cycle methodology, the team must not become preoccupied with exhaustive data collection. Health care professionals often feel it is necessary to document the extent of the problem before changing a process. The IHI, however, recommends that the documentation process be as short as possible and the redesign of processes occur concurrently with data collection.

IV. The Role of Leadership and the Quality Improvement Program

As noted by the IHI, consistent and determined leadership is the primary determinant of a team's success in defining and carrying out its mission. The team must also be interdisciplinary, including representatives from nursing and pharmacy as well as physician leadership. The exact composition of the task force will vary by institution but should include:

- Physician Leadership
- Pharmacy Director

- Staff Pharmacists
- Nursing Leadership
- Quality Assessment Representative
- Risk Manager
- Staff Education Representative
- Liaison to Pharmacy and Therapeutics Committee

To retain information gathered under this project as privileged information (i.e., not subject to disclosure in a law suit), this project should be conducted under the auspices of its existing quality or performance improvement activities. While there is no absolute guarantee of confidentiality, operating this project as part of a quality or performance improvement program will help extend the protection of privilege to any findings that are generated.

V. Selecting the Target: Documenting the Use of Abbreviations

Defining and documenting the use of abbreviations will help create effective process change. Since the team may already have a good idea about top candidates for error-prone abbreviations, the process of baseline data collection can occur concurrently with developing ideas for process change. Several possible methods for data collection are described below.

A. Document the Use of Error-prone Abbreviations and Dose Expressions

Sample a set of medication orders. Review prospectively a sample of medication orders to ascertain current use of error-prone abbreviations and dose expressions. The following are suggestions for brief data-gathering techniques:

- Review all new orders received by the pharmacy department during a one-week period.
- Review all new orders received by the pharmacy department between a certain time period (e.g., 8:00 a.m. – 12:00 noon) daily for two weeks.
- Review all new orders on selected units, over a certain period of time (e.g., one or two weeks).

Gather data from sample. From each error-prone medication order, gather data elements that will assist with the goals of the project and plans for measurement. Some suggested data elements include:

- Type of abbreviation or dose expression used.
- Unit, floor, or department.
- Clinician name.
- Time elapsed while pharmacist clarified medication order.
- Time delay in administering the medication to the patient (i.e., increase in turn-around time from when the order is written until it is administered to the patient). In order to use this data element it is necessary to have available the turn-around time for normal processing of medication orders.
- Error, if any, and patient outcome.

Calculate frequency of abbreviations. Utilizing the data obtained above, determine which abbreviations or dose expressions occur most frequently at the institution. Calculate a frequency rate by dividing the number of orders with abbreviations by the number of total orders in the sample. Also consider calculating an annual frequency rate and try ranking the abbreviations by frequency of occurrence. These baseline data can be used to measure impact of the pilot program throughout testing and implementation.

Try benchmarking results with other data-gathering methods. In addition to prospectively reviewing medication orders, try employing other methods to identify the extent of the problem with use of abbreviations and dose designations:

- Review a specified number of discharged patient charts. Note the total number of medication orders and the percentage of the total that includes error-prone abbreviations or dose designations.
- Survey nurse managers (or other appropriate staff, e.g., pharmacists) to identify the abbreviations that they see used most often and are the greatest source of concern.
- Ask pharmacists to use a "fishbone" diagram to track the sources and types of medication errors. See Attachment 8 for a sample fishbone diagram that can be adapted.

B. Identify Medication Errors Resulting from Abbreviations

The goal of this process is to identify medication errors that reach the patient and were caused by the use of abbreviations or dose expressions. Conduct a retrospective review of forms or databases on which medication errors are documented, such as:

- Pharmacy intervention forms or databases
- Incident report forms or databases (e.g., NYPORTS database)
- Medication error reporting forms or databases
- Sentinel event documentation forms

Gather the following information from each medication error, based on the goals of the project and plans for measurement:

- Type of abbreviation or dose expression used
- Unit, floor, or department
- Clinician name
- Classification of patient outcome using NCCMERP taxonomy of medication errors:
    - Category A – No error.
    - Category B – An error occurred but did not reach the patient.
    - Category C – An error occurred that reached the patient (was administered or not administered), but did not cause patient harm.
    - Category D – An error occurred that reached the patient and required monitoring to confirm that it resulted in no harm to the patient and/or required intervention to preclude harm.
    - Category E – An error occurred that may have contributed to or resulted in temporary harm to the patient and required intervention.
    - Category F – An error occurred that may have contributed to or resulted in temporary harm to the patient and required initial or prolonged hospitalization.

- Category G – An error occurred that may have contributed to or resulted in permanent patient harm.
- Category H – An error occurred that required intervention necessary to sustain life.
- Category I – An error occurred that may have contributed to or resulted in the patient's death.

This information on actual medication errors can help determine which abbreviations or dose designations should be targeted by the institution. Use this information to calculate a frequency rate for medication errors resulting from use of abbreviations or confusing dose designations as noted below:

- Number of errors per year divided by total number of doses dispensed by the pharmacy per year.
- Number of errors per year divided by total number of new medication orders per year.

VI. Implementing Process Change and Reducing Use of Abbreviations

Every hospital will need to develop organization-specific process changes and educational interventions to reduce the use of abbreviations in medication orders. The goal for process change should be to target the underlying system as opposed to penalizing specific physicians, nurses, etc. That said, physicians, nurses, pharmacists, and unit staff will need to be educated about reducing the use of medication abbreviations and will need ongoing training to achieve the necessary changes.

This section outlines some interventions and process change strategies that can be adapted to fit the specific needs of your institution. These strategies are organized around the recommendations included in the JCAHO's Sentinel Event Alert on *Medication Errors Relating to Potentially Hazardous Abbreviations* (see Attachment 3). While the JCAHO has issued a moratorium on scoring Sentinel Event Alert recommendations, an organization should expect JCAHO surveyors to ask about these recommendations and any steps being taken to implement them within its institution.

JCAHO Recommendation: Develop a list of unacceptable abbreviations and symbols that is shared with all prescribers.

Develop the list of unacceptable abbreviations.
Review the list of dangerous abbreviations and dose designations prepared by ISMP and NCCMERP (see Attachments 1 and 2). Compare these lists with information from your institution including frequently used abbreviations, abbreviations that contribute to a known medication error, and medication abbreviations that cause hospital staff (i.e., pharmacists and nurses) the most concern. (See Section V for more detailed information on gathering this type of data.) Then develop a list of abbreviations that will not be allowed on medication orders and have it approved by the pharmacy and therapeutics committee. To help secure physician buy-in, consider presenting this list to the medical board for review and approval.

Since the full list of unacceptable abbreviations may include 20 or more items, consider developing a subset of abbreviations that will be targeted in education and process change efforts. Concentrating

education efforts on four or five critical abbreviations may be more successful than tackling the whole list of 20 or 30. Once physicians, nurses, and pharmacists become accustomed to the first set of unacceptable abbreviations, then the task force can select another subset of abbreviations to use in its next wave of education and training.

Educate staff.
After the team has identified the list of unacceptable abbreviations and dose designations, it must be shared with physicians, nurses, and pharmacists through educational sessions, grand rounds, staff meetings, newsletter articles, memorandums, posters, etc. Again, as noted above, institutions should develop a comprehensive list of unacceptable abbreviations but may want to direct education efforts at a few abbreviations that seem particularly dangerous or are used frequently.

Review preprinted forms.
Preprinted forms can be a source of dangerous abbreviations and dose designations. Conversely, these preprinted forms can also help limit the use of abbreviations when used correctly.

- **Check hospital forms for dangerous abbreviations**. In conjunction with representatives from the medical records department, review standard order sets, pharmacy labels, nursing medication administration records, and other relevant preprinted forms for use of dangerous abbreviations or dose expressions. Revise and reprint these documents where necessary and make sure to remove old versions from circulation.
- **Create preprinted orders for medications with error-prone abbreviations**. Once the team has identified the medications that are susceptible to error-prone abbreviations and dose designations, use that information to create preprinted orders for those medications (e.g., insulin dosing regimens, chemotherapy order forms, etc.).

JCAHO Recommendation: Develop a policy to ensure that medical staff refer to the list and take steps to ensure compliance.

Review policies and procedures.
While policies and procedures alone will not change long-standing prescribing habits, they need to reflect the hospital's best-practice recommendations to prevent medication errors. These procedures can also be used as a training tool and handout. To establish a policy and procedure for standardizing the format for writing medication orders, consider including the following elements:

- All orders must be printed or written legibly.
- All doses must be noted in metric units.
- Use a list of unacceptable abbreviations.
- Prohibit use of leading or trailing zeros.
- Require a physician ID number and/or beeper number to be present and legible with the signature.
- "PRN" medications must include indication and parameters.
- Standardize the format for writing pediatric and chemotherapy orders.

Also see attachments 6 and 7 for guidelines and a model policy on medication orders.

Alert clinicians about inappropriate use of abbreviations.

It is critical to compliance efforts that there is a mechanism in place to alert clinicians to ongoing use of inappropriate abbreviations. This feedback mechanism must, however, be balanced with the need to retain privilege protection of any information about potential errors or inappropriate prescribing practices. Therefore, as the task force develops suggestions to follow up on this issue, make sure to discuss plans with in-house legal counsel. Two possible follow-up mechanisms are:

- A "Dear Clinician" letter to inform physicians, nurse practitioners, and others about the use of abbreviations. Attach examples of that clinician's medication orders with unacceptable abbreviations to the letter and have the letter signed by the Chief Medical Officer, the Pharmacy and Therapeutics Committee Chair, or other member of hospital leadership. (See Attachment 4 for an example.)
- A report on individual clinician prescribing practices prepared by the pharmacy department. This information could be shared with the department chair or manager for oral discussion of prescribing practices or it could be used as part of a formal performance appraisal or credentialing process.

Again, if your institution opts to employ individual feedback mechanisms, make sure to review the process with your institution's in-house legal counsel.

Train residents.

Conduct an educational session on safe order-writing practices during medical and surgical residents' orientation programs. As noted above, consider adding medication ordering as one of the standards on the resident performance appraisal form.

Track compliance rates by floor or unit.

Track compliance by floor or unit and compare compliance rates. Share this information within the institution via medical or nursing staff meetings, grand rounds, or other similar forums. As always, bear in mind that information might be seen by or shared with someone outside the quality improvement process, so make sure that the task force is comfortable with the type of information being shared.

> ***JCAHO Recommendation: Establish a policy that if an unacceptable abbreviation is used, the prescription order is verified with the prescriber prior to its being filled.***

Institute an immediate feedback loop.

If physicians receive quick feedback about errors involving medication orders, they will be more likely to follow best practices going forward. Consider the two-step process below:

- After the physician has completed a medication order, the nurse or unit secretary is required to review the order for legibility and targeted abbreviations before it can be sent to the pharmacy. If the nurse or unit secretary notes an error or discrepancy, it must be clarified with the physician.
- Once the order is sent to the pharmacy, if the pharmacist notes an error or discrepancy, the pharmacist should immediately contact the physician for clarification.

Use a follow-up mechanism for other staff.
Review medication administration records to determine whether error-prone abbreviations and dose designations are being used by nurses and unit secretaries who transcribe medication orders. Consider sending feedback letters or using another educational tool with nurses and unit secretaries who continue to use unacceptable abbreviations or other error-prone transcribing practices.

VII. Ongoing Quality Initiatives from GNYHA

The GNYHA Medication Error Workgroup will continue its efforts to promote quality initiatives and develop programs for the prevention of medication errors. GNYHA plans to use this resource guide format to advance additional error reduction strategies and would appreciate any feedback its members can provide on both the format of the guide as well as your experience implementing the program. Please contact Elizabeth Shlom or Susan Stuard at GNYHA with any comments or suggestions.

VIII. Pilot Project Steps and Timeline

Activity	Who	When	Tasks
Select task force members	Project Leader	Start of project	• Set meeting date • Disseminate pilot program information
Hold kick-off meeting	Task Force	Week 1	• Review and develop support for project goals • Design baseline data-gathering process and collection tool
Collect baseline data	Pharmacy Representative or other designated person	Weeks 2 - 3	• Collect baseline data • Analyze data and prepare for presentation to task force
Review baseline data and select abbreviations	Task Force	Week 4	• Identify medication ordering problem areas • Select abbreviations to target (see attached abbreviation suggestions) • Design education and process interventions • Select floor or unit for pilot
Pilot program on one floor or unit	Task Force	Weeks 5 - 9	• Educate staff • Monitor process • Collect medication orders data from pilot area
Evaluate outcomes from initial roll-out	Task Force	Week 10	• Compare baseline data to pilot data • Implement adjustment to program if needed
Roll-out program throughout institution	Task Force and other hospital personnel as needed	Weeks 11 - 16	• Educate staff • Share findings from pilot • Monitor program implementation • Continue to collect medication orders data
Assess progress of program	Task Force	By Week 16 or before	• Analyze and review program data • Present findings to Performance Improvement Committee and other groups as appropriate (e.g., Grand Rounds)
Develop oversight mechanism for ongoing compliance	Task Force	Week 17 and ongoing	• Designate person, group, or department to monitor use of abbreviations and suggest intervention if required. • Establish reporting relationship for monitoring (e.g., reports to P&T or Performance Improvement committees)

Attachment 1
ISMP Medication Safety Alert! May 2, 2001

Do not use these dangerous abbreviations or dose designations			
Abbreviation/ Dose Expression	**Intended Meaning**	**Misinterpretation**	**Correction**
Apothecary symbols	dram minim	Misunderstood or misread (symbol for dram misread for “3” and minim misread as “mL”).	Use the metric system.
AU	aurio uterque (each ear)	Mistaken for OU (oculo uterque—each eye).	Don’t use this abbreviation.
D/C	discharge discontinue	Premature discontinuation of medications when D/C (intended to mean “discharge”) has been misinterpreted as “discontinued” when followed by a list of drugs.	Use “discharge” and “discontinue.”
Drug names ARA-A AZT CPZ DPT HCl HCT HCTZ MgSO4 MSO4 MTX TAC ZnSO4 Stemmed names “Nitro” drip “Norflox”	 Vidarabine zidovudine (RETROVIR) COMPAZINE (prochlorperazine) DEMEROL-PHENERGAN-THORAZINE hydrochloric acid hydrocortisone hydrochlorothiazide magnesium sulfate morphine sulfate methotrexate triamcinolone zinc sulfate nitroglycerin infusion norfloxacin	 cytarabine (ARA-C) azathioprine chlorpromazine diphtheria-pertussis-tetanus (vaccine) potassium chloride (The “H” is misinterpreted as “K.”) hydrochlorothiazide hydrocortisone (seen as HCT250 mg) morphine sulfate magnesium sulfate mitoxantrone tetracaine, ADRENALIN, cocaine morphine sulfate sodium nitroprusside infusion NORFLEX (orphenadrine)	Use the complete spelling for drug names.
ug	microgram	Mistaken for “mg” when handwritten.	Use “mcg.”
o.d. or OD	once daily	Misinterpreted as “right eye” (OD—oculus dexter) and administration of oral medications in the eye.	Use “daily.”
TIW or tiw	three times a week	Mistaken as “three times a day.”	Don’t use this abbreviation.
per os	orally	The “os” can be mistaken for “left eye.”	Use “PO,” “by mouth,” or “orally.”
q.d. or QD	every day	Mistaken as q.i.d., especially if the period after the “q” or the tail of the “q” is misunderstood as an “i.”	Use “daily” or “every day.”
qn	nightly or at bedtime	Misinterpreted as “qh” (every hour).	Use “nightly.”
qhs	nightly at bedtime	Misread as every hour.	Use “nightly.”
q6PM, etc.	every evening at 6	Misread as every six hours.	Use 6 PM “nightly.”

	PM		
q.o.d. or QOD	every other day	Misinterpreted as “q.d.” (daily) or “q.i.d”. (four times daily) if the “o” is poorly written.	Use “every other day.”
sub q	subcutaneous	The “q” has been mistaken for “every” (e.g., one heparin dose ordered “sub q 2 hours before surgery” misunderstood as every 2 hours before surgery).	Use “subcut.” or write “subcutaneous.”
SC	subcutaneous	Mistaken for SL (sublingual).	Use “subcut.” or write “subcutaneous.”
U or u	unit	Read as a zero (0) or a four (4), causing a 10-fold overdose or greater (4U seen as “40” or 4u seen as “44”).	“Unit” has no acceptable abbreviation. Use “unit.”
IU	international unit	Misread as IV (intravenous).	Use “units.”
cc	cubic centimeters	Misread as “U” (units).	Use “mL.”
x3d	for three days	Mistaken for “three doses.”	Use “for three days.”
BT	bedtime	Mistaken as “BID” (twice daily).	Use “hs.”
ss	sliding scale (insulin) or ½ (apothecary)	Mistaken for “55.”	Spell out “sliding scale.” Use “one-half” or use “½.”
> and <	greater than and less than	Mistakenly used opposite of intended.	Use “greater than” or “less than.”
/ (slash mark)	separates two doses or indicates “per”	Misunderstood as the number 1 (“25 unit/10 units” read as “110” units).	Do not use a slash mark to separate doses. Use “per.”
Name letters and dose numbers run together (e.g., Inderal40 mg)	Inderal 40 mg	Misread as Inderal 140 mg.	Always use space between drug name, dose, and unit of measure.
Zero after decimal point (1.0)	1 mg	Misread as 10 mg if the decimal point is not seen.	Do not use terminal zeros for doses expressed in whole numbers.
No zero before decimal dose (.5 mg)	0.5 mg	Misread as 5 mg.	Always use zero before a decimal when the dose is less than a whole unit.

Source: Institute for Safe Medication Practices, “Please don’t sleep through this wake-up call,” *ISMP Medical Safety Alert!* (May 2, 2001**).** **www.ismp.org/msaarticles/wakeupcall.html**

Attachment 2
NCCMERP Recommendations to Correct Error-Prone Aspects of Prescription Writing

Dangerous Abbreviations

Abbrev-iation	Intended meaning	Common Error
U	Units	Mistaken as a zero or a four (4), resulting in overdose. Also mistaken for "cc" (cubic centimeters) when poorly written.
µg	Micrograms	Mistaken for "mg" (milligrams), resulting in an overdose.
Q.D.	Latin abbreviation for every day	The period after the "Q" has sometimes been mistaken for an " I, " and the drug has been given "QID" (four times daily) rather than daily.
Q.O.D.	Latin abbreviation for every other day	Misinterpreted as "QD" (daily) or "QID" (four times daily). If the "O" is poorly written, it looks like a period or "I."
SC or SQ	Subcutaneous	Mistaken as "SL" (sublingual) when poorly written.
T I W	Three times a week	Misinterpreted as "three times a day" or "twice a week."
D/C	Discharge; also discontinue	Patient's medications have been prematurely discontinued when D/C, (intended to mean "discharge") was misinterpreted as "discontinue," because it was followed by a list of drugs.
HS	Half strength	Misinterpreted as the Latin abbreviation "HS" (hour of sleep).
cc	Cubic centimeters	Mistaken as "U" (units) when poorly written.
AU, AS, AD	Latin abbreviation for both ears; left ear; right ear	Misinterpreted as the Latin abbreviation "OU" (both eyes), "OS" (left eye), "OD" (right eye).

Source: National Coordinating Council for Medication Error Reporting and Prevention, *Recommendations to Correct Error-Prone Aspects of Prescription Writing* Adopted, Sept. 4, 1996. **www.nccmerp.org/rec_960904.htm**

Attachment 3
JCAHO Sentinel Event Alert September 2001
Medication Errors Related to Potentially Dangerous Abbreviations

Issue 23, September 2001

Published for Joint Commission accredited organizations and interested health care professionals, Sentinel Event Alert *identifies specific sentinel events, describes their common underlying causes, and suggests steps to prevent occurrences in the future.*

During the on-site survey of accredited organizations, JCAHO surveyors assess the organization's familiarity with and use of Sentinel Event Alert information. Accredited organizations are expected to:

- *Review and consider relevant information, if appropriate to the organization's services, from each* Sentinel Event Alert.
- *Consider information in an alert when designing or redesigning relevant processes.*
- *Evaluate systems in light of information in an alert.*
- *Consider standard-specific concerns.*
- *Implement relevant suggestions or reasonable alternatives or provide a reasonable explanation for not implementing relevant changes. Failure to do*

Medication errors related to potentially dangerous abbreviations

One of the major causes of medication errors is the ongoing use of potentially dangerous abbreviations and dose expressions. Underlying factors contributing to many of these errors are illegible or confusing handwriting by clinicians and the failure of health care providers to communicate clearly with one another. Because medication safety and the identification, prevention and timely reporting of medication errors are of primary importance to the Joint Commission, this issue of *Sentinel Event Alert* specifically addresses medication errors related to the use of dangerous abbreviations and dose expressions used in prescribing medications.

Despite repeated warnings for more than 25 years by the Institute for Safe Medication Practices (ISMP)--and other organizations--about the dangers associated with using certain abbreviations when communicating medication information, the practice of using these dangerous abbreviations continues, increasing the potential for patient harm. "Symbols and abbreviations are frequently used to save time and effort when writing prescriptions and documenting in patient charts," says Darryl S. Rich, Pharm.D., M.B.A., FASHP, associate director, Surveyor Development and Management, JCAHO. "However, some symbols and abbreviations have the potential for misinterpretation or confusion."

Examples of especially problematic abbreviations include "U" for "units" and "µg" for "micrograms." When "U" is handwritten, it can often look like a zero. There are numerous case reports where the root cause of sentinel events related to insulin dosage has been the interpretation of a "U" as a zero. Using the abbreviation "µg" instead of "mcg" has also been the source of errors because when handwritten, the symbol "µ" can look like an "m". The use of trailing zeros (e.g., 2.0 vs. 2) or use of a leading decimal point without a leading zero (e.g. .2 instead of 0.2) are other dangerous order writing practices. The decimal point is sometimes not seen when orders are handwritten using trailing zeros or no leading zeros. Misinterpretation of such orders could lead to a 10-fold dosing error. "To minimize the potential for error and to maximize patient safety, prescribers need to avoid such specifically dangerous abbreviations and phrases," Dr. Rich says.

ISMP issues wake-up call

Following the tragic death of an infant due to the misinterpretation of a prescription for morphine, ISMP recently issued a wake-up call to health care institutions reminding them of the dangers of utilizing certain

changes. Failure to do so will result in a type I recommendation.

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dangerous abbreviations and dose expressions. [1] "ISMP and others have advocated abandoning the use of these abbreviations and expressions for almost three decades," says Michael Cohen, D.Sc., M.S., FASHP, president, ISMP. "ISMP has also stressed that it is equally important to avoid these dangerous abbreviations and dose expressions in other communications such as computer-generated labels, Medication Administration Records (MARs), labels for drug storage bins/shelves, preprinted orders and protocols, and pharmacy and prescriber order entry screens." A table of dangerous abbreviations and dose expressions most often associated with misinterpretation and patient harm (as reported to the USP-ISMP Medication Errors Reporting Program) may be obtained from the ISMP website at www.ismp.org.

In addition, NCC MERP (National Coordinating Council for Medication Error Reporting and Prevention) in 1996 issued "Recommendations to Correct Error-Prone Aspects of Prescription Writing"[2] and U.S. Pharmacopeia in 1997 issued "Recommendations for Prescription Writing,"[3] which discuss ways organizations can avoid medication errors and minimize risks to patients.

Risk reduction strategies

Though new technologies such as computerized order entry systems are being introduced into health care, it is estimated that currently less than 5 percent of U.S. physicians utilize these systems and write their prescriptions electronically. The related costs and training issues are most often cited as reasons why organizations do not adopt these new technologies. However, by moving toward electronic prescribing systems, organizations can most certainly minimize medication errors, including those related to poor handwriting, thus drastically reducing the risks to patients and the costs associated with drug-related morbidity and mortality. [4] Realizing that most health care organizations will not be able to implement this new, costly technology in the near term, JCAHO has identified some cost efficient and effective risk reduction strategies that any health care organization can adopt:

- Develop a list of unacceptable abbreviations and symbols that is shared with all prescribers.
- Develop a policy to ensure that medical staff refer to the list, and take steps to ensure compliance.
- Establish a policy that if an unacceptable abbreviation is used, the prescription order is verified with the prescriber prior to its being filled.

Examples of correct and incorrect use of decimal points and zeros:

Correct	***Incorrect***
2. or 2	*2.0*
0.2	*.2*

Recommendations

The Joint Commission requires that medication orders have "the degree of accuracy, completeness, and discrimination necessary for their intended use" (JCAHO standard IM.3 in all manuals). Standard IM.3 also requires the use of standardized abbreviations, acronyms and symbols. Use of confusing and dangerous abbreviations is not consistent with the intent of this standard. Furthermore, hospitals are to assess/review orders in the medical record for "presence, timeliness, legibility, and authentication," and see that "action is taken to improve the quality and

timeliness of documentation that impacts patient care" (IM.7.10 in the *Comprehensive Accreditation Manual for Hospitals*). This should be done as part of the quarterly medical record review that hospitals undertake for record completeness and authentication. As part of the review, standard IM.7.10 clearly requires that legibility be addressed as well as completeness and authentication.

In addition, MS.8.2.3 (*Comprehensive Accreditation Manual for Hospitals*) requires that data regarding "accurate, timely and legible completion of patient's medical records" be specifically addressed in the privileging and credentialing program, and that this data must not only be aggregate data, but how specific physicians do compared to the norm. Failure to do so can result in multiple Type I recommendations, even if not part of a Medication Use Evaluation or Performance Improvement program. Multiple JCAHO standards require legibility of physician orders and that hospitals take appropriate action to improve the legibility of physician orders. Finally, standard TX.3.5.2 (*Comprehensive Accreditation Manual for Hospitals*) requires pharmacists to review all medication orders and to contact the prescriber, if questions arise. In order to achieve compliance with these standards, strategies to reduce the inappropriate use of dangerous abbreviations need to be taken, such as those identified in this alert's risk reduction strategies.

References

[1] *ISMP Medication Safety Alert!*, May 2, 2001, www.ismp.org.

[2] "Recommendations to Correct Error-Prone Aspects of Prescription Writing," NCC MERP Council Recommendation, adopted Sept. 4, 1996, at www.nccmerp.org (under Council Recommendations).

[3] "Recommendations for Prescription Writing, " USP Quality Review, No. 57, Jan. 1997, www.usp.org (search keyword "abbreviations").

[4] *Electronic Prescribing Can Reduce Medication Errors*, white paper from the Institute for Safe Medication Practices, www.ismp.org.
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Setting the Standard for Quality in Health Care
Joint Commission on Accreditation of Healthcare Organizations
Sentinel Event Hotline (630) 792-3700

Source: Joint Commission on the Accreditation of Health Care Organization Web site **www.jcaho.org**

Attachment 4
SAMPLE "Dear Clinician" Letter

Source: Children's Hospitals and Clinics and Fairview Southdale Hospital, Minneapolis, MN

Dear____:

In an effort to improve the safety of our patients at _________________ Hospital, we are providing this direct feedback to you, the prescriber of medication orders. Historical evidence supports the idea that certain order-writing practices or habits have led to very serious consequences, while the inclusion of certain information can help prevent errors.

The attached order that you wrote contains one or more of the following problem(s) (checked boxes). A corresponding recommendation for improvement is provided.

Please accept these recommendations in the spirit in which they are given, with the safety of our patients at heart. For your reference, we have enclosed a copy of a recent special issue of the *Medication Safety Alert* published by the Institute for Safe Medication Practices that addresses these issues in more detail. If you have any questions please contact us.

Thank you,

_________________, M.D.

attachments

Potentially Error-Prone Practice	Examples	Preferred Practice
❑ "Units" was not written out.	Regular Insulin 5 u The "u" can be misinterpreted as cc, 4, 6, or 0.	Regular Insulin 5 units
❑ A trailing zero was used.	Ativan 1.0 mg This can be misread as 10 mg.	Ativan 1 mg
❑ A leading zero was not used.	Morphine .5 mg This can result in a 10 fold overdose of medication.	Morphine 0.5 mg
❑ The medication was ordered by quantity rather than strength.	Tylenol 2 tabs Fer-In-Sol 1 cc These products are available in varying sizes and strengths.	Tylenol 650 mg Fer-In-Sol 125 mg Use micrograms, mg, or g whenever possible.
❑ An unacceptable abbreviation was used for the amount of the medication, i.e. the dosage was not specified in metric unit.	Abbreviations such as µg, gm, cc, tsp., or tbsp can be misread for something else.	Use micrograms, mg, g, or mL whenever possible.
❑ An abbreviation or symbol was used instead of the drug name.	$MgSO_4$, MS, MSO_4 AZT Such abbreviations can be confused with the same or similar abbreviations for other drugs.	Spell out the drug name: Magnesium Sulfate, Morphine Aztreonam, Zidovudine, Azathioprine
❑ The following medical abbreviation was used: ❑ QD ❑ QOD ❑ QID	QD qd QOD qod QID qid These are often misinterpreted for each other or for qid.	Q day, daily, four times daily, every other day (BID, TID, q16h, q24h acceptable)
❑ The order was missing an essential element (i.e., strength, route, etc.).	Digoxin 0.125mg daily	Digoxin 0.125mg p.o. daily

For use of high-risk, error-prone medications in **pediatric patients** (aminophylline, amphotericin B, aminoglycosides, digoxin, fosphenytoin, midazolam, morphine elixir, neuromuscular blocking agents, cancer chemotherapeutic agents, etc.):		
❑ The mg/kg dose and the calculated dose were not both included: ❑ Only the calculated dose was given ❑ Only the mg/kg dose was given	Gentamicin 30mg q12H Aminophylline loading dose 5mg/kg x1	Gentamicin 2.5mg/kg/dose Dose 30 mg IV q12h Aminophylline loading dose 5mg/kg IV Dose 10mg IV Patient weight 2kg
❑ The order was difficult to read/illegible.		Print orders or use pre-printed orders
❑ The signature was illegible.		Also print your name if your signature is illegible; include your pager number

Source: Mark Thomas, M.S., R.Ph., Director of Pharmacy, Children's Hospitals and Clinics, Minneapolis, MN; and Steven Meisel, Pharm.D., Fairview Southdale Hospital, Minneapolis, MN.

Attachment 5
Examples of Medication Errors – Background Training Material

Examples of serious medication errors that have occurred and have been reported to ISMP or the US Pharmacopeia:

1. Misinterpretation of "naked" decimal points. A 9-month-old baby girl dies after the baby's physician prescribed "morphine .5mg IV" and the unit secretary transcribed the order by hand onto a medication administration record (MAR) as "5 mg." An experienced nurse followed the directions on the MAR and gave the baby 5mg of IV morphine initially and another 5 mg dose two hours later, leading to the fatality.
2. The abbreviation "IU"(international units) has been misread as "IV" (intravenous). For example, there have been reports of orders for Bicillin 600,000 IU initially seen as 600,000 units IV. In another case, an order for Vitamin E 400 IU daily was misinterpreted as an order for Vitamin K 400 mg IV.
3. Many insulin errors result from the use of abbreviations in written orders. The abbreviation "U" for "units" has often been misread as a zero, resulting in serious, tenfold overdoses, and the abbreviation "IU" for "international units" can be misread as "1 (as an ending digit of a number) unit." Examples of problems that have been reported when abbreviations are used in insulin orders:
    - A home health nurse administered 41 units of regular insulin to a patient after reading a written order for "Regular insulin 4 IU" in a chart at the patient's house. Fortunately the patient was not harmed. A student nurse, aware that the correct order was for 4 units because she had checked the master chart at the home health care office, questioned the amount after the dose had already been given.
    - In another case, a nurse read an order for "Insulin SC NPH 15U AM + 6 units PM" as insulin SC NPH 15 units in the morning and 46 units in the evening. When she called the physician to question the high evening dose, the physician, without thinking, said that that was correct. After the dose was given, the patient became hypoglycemic but recovered with appropriate treatment.
    - A pharmacist received an order for Humulin U (insulin zinc suspension extended, Ultralente). The pharmacist, who was accustomed to seeing orders for Humulin N (isothane insulin suspension, NPH), processed the order as Humulin N. However, he realized the error before the medication was dispensed.
4. A patient who was hospitalized for surgery was relocated to an obstetrics unit because the surgery unit was full. A telephone order for Azactam one gram every eight hours was called in by the physician and the nurse transcribed it as "AZT 1 gram IV every 8 hours." When the order was received in the pharmacy, the pharmacist assumed that "AZT" stood for zidovudine, which is commonly abbreviated as AZT. However, the dose was questioned. The physician was called, and he reduced the dose to "AZT 500mg every 8 hours" but didn't verify the drug name. The pharmacist again questioned the dose and after a 15-hour delay from the time of the order's inception, the prescriber clarified that the medication ordered was aztreonam and not zidovudine.

Source: ISMP and the US Pharmacopeia.

Attachment 6
Standardized "Medication Ordering" Guidelines:
Decreasing Medication-Error Risks by Improving the Written Order

The first step in preventing a medication error involves the written order. Illegible, incomplete, and ambiguous orders will lead to errors. Over the years, practitioners have all developed shortcuts when writing medication orders. The time for individual change is now.

1. Order must be printed OR written legibly.

2. Orders on carbons must be written hard enough to produce a legible carbon copy.

3. Physician I.D. number must be written after/below physician signature.

4. Orders must be complete and include:
   - Drug (generic name preferred)
   - Dose
   - Route
   - Frequency

5. PRN medication orders must include indication and hold/start parameters (e.g., hold if, give if).

6. Orders must not include medication abbreviations (e.g., AZT or MSO4 are unacceptable).

7. Orders must *use metric* units (micrograms, mg, millimoles, milliequivalents) for dosage units:
   - *Do not* use package units (2 amps).
   - *Do not* use volume units (10 ml) without the medication dose component included.
   - *Do not* use apothecary units (5 grains, 2 drams).

8. Orders must NOT include "qd," "u," or "ug" as abbreviations:
   - Write "daily" instead of "qd."
   - Write "units" not "u."
   - Write "micrograms" not "ug."

9. Orders must adhere to the following decimal guidelines:
   - Do not use decimals *after* whole numbers (1**.**0 can look like 10, i.e."ten"),
   - Use "0" *before* decimal fractions (write "0**.**1," not "**.**1" which can look like 1, i.e. "one"),

10. Pediatric and chemotherapy dosing must be written as (dose/wt x wt) or (dose/BSA x BSA).

Source: Victor G. Freeman, MD/MPP, Medical Director for Quality, Inova Health System.

Attachment 7
Model Policy for Medication Order Writing

DRAFT
Hospital
ADMINISTRATIVE POLICY

MEDICATION ORDER WRITING	**Policy #**

Effective Date:

Purpose: To decrease the risk of medication errors and to decrease rework due to incomplete, unclear, or illegible medication orders or orders in which the prescriber identity is unclear.

Policy:

A. All orders for medications shall be either written in the patient's chart by the prescriber or dictated to a member of the hospital staff authorized to transcribe medication orders. Verbal or telephone orders shall be transcribed to the patient's chart as soon as practical.

B. A complete order MUST contain the following elements:

- Date and time written.
- Medication name (preferably generic name and not abbreviated).
- Medication dose, in metric units when applicable.
- Medication strength or concentration when applicable.
- Route of administration.
- Frequency and/or interval.
- Prescriber's signature, printed name, and hospital identification number.

C. When appropriate, orders SHOULD contain the following additional information:

- Parameters for administration (e.g., "for systolic blood pressure greater than 180mm Hg"), including start and stop times for PRN medication orders.
- Rate of administration.
- Fluid volume and type for IV medications.
- Admission orders should document the patient's medication allergies and special patient/drug related information including height, weight, and age.
- Medication orders should be grouped together on the order sheet. Mixing medication orders, laboratory orders, general care orders, etc., increases the risk of the medication order being overlooked by pharmacists and nurses.

D. Rules for decimals:

- ALWAYS put a leading zero before a decimal point,
  CORRECT: 0.1mg.
  INCORRECT: .1mg.
- NEVER put a decimal after a whole number,
  CORRECT: 1mg
  INCORRECT: "1.0mg" (can look like "10mg.")

E. The following medication orders are NOT acceptable:

- "Continue medications from home."
- "Medication orders that do not include a practitioner's hospital identification number."
- "Discontinue above order."
- "Hold (medication name)" without a specified time or action.
- Other non-specific medication orders, e.g. "Increase sliding scale insulin by 2 units."
- "Continue/renew previous medications/TPN."

Effective Date:

F. In the following circumstances, medication orders must be verified with the prescriber prior to being filled:

- Orders are illegible.
- Orders using abbreviations on hospital list of unacceptable abbreviations
- Orders with missing or illegible practitioner identification (name and hospital identification number).
- Orders where the prescribed dosage is potentially incorrect.
- Orders where the medication prescribed is contraindicated per package insert or medical staff established maximum doses or policies.

G. Verbal/telephone orders: can be dictated to an authorized person, who shall record the order on the patient's medical record as soon as practical. The name of the pPractitioner giving the order *and the practitioner's hospital identification number* shall be clearly stated.

- All verbal orders shall be verified, signed, and authenticated within 72 hours.
- Authorized person receiving the verbal order should repeat the order aloud for the prescriber's verification and request the prescriber to spell the medication name if necessary.
- Verbal orders shall contain all the elements of a complete medication order as defined in section B.

Approved by:

____
____________, Vice President,
Administrator, _________ Hospital

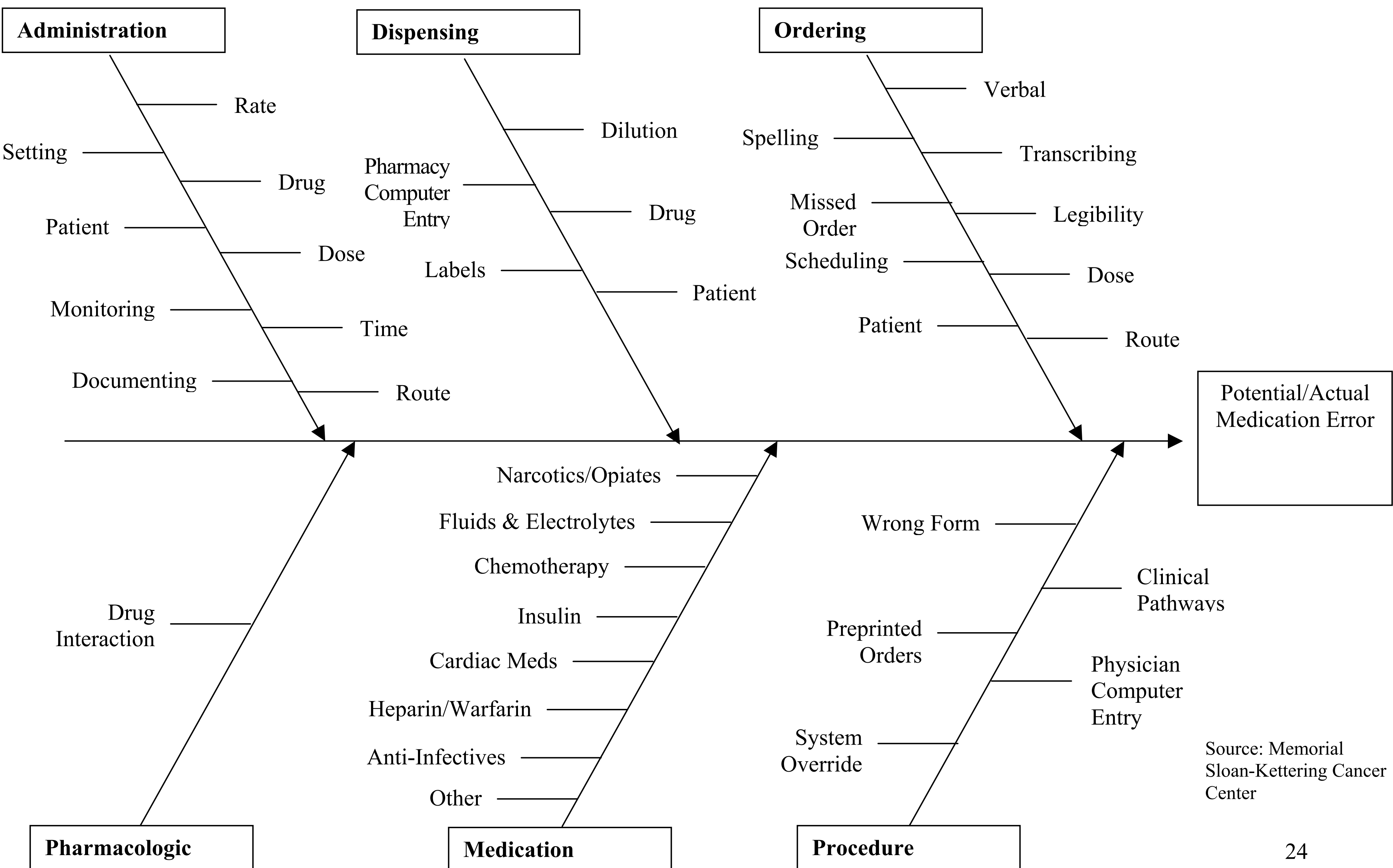
____
Dr. ___________, President of Medical Staff
____________ Hospital

Draft. 7/06/01

Source: Victor G. Freeman, MD/MPP, Medical Director for Quality, Inova Health System.

Attachment 8
Fishbone Diagram for Tracking Medication Errors

AREA: ______________________________



Source: Memorial Sloan-Kettering Cancer Center