I. **DEFINITIONS:**

A. Automated Medication Distribution Systems (AMDS)
   1. A secured device that stores and distributes applicable medications upon request and requires an electronic personnel identification system

B. Error in AMDS
   1. Any occurrence of a wrong drug, dose, quantity, dosage form or an expired date in a line item (each line counts as one error).

C. Error in Unit of use cart
   1. Any occurrence of a wrong drug, dose, quantity, dosage form or an expired date.
   a. Each dose counts as one error.

D. Hospital Coordinator
   1. Person responsible for adherence to the Tech-Check-Tech (T-C-T) program requirements.

E. Line Item
   1. A checking unit for AMDS restocking (example: a single product of a specific drug and dose, regardless of quantity).

F. Technician Checker
   1. An individual pharmacy technician who has completed the T-C-T validation process and is currently authorized to check another technician’s work.

G. Tech-Check-Tech (T-C-T)
   1. A program utilizing specifically trained and qualified pharmacy technicians to check AMDS medications and unit dose batches filled by another technician.

H. T-C-T Site Coordinator
   1. The pharmacist responsible for meeting the T-C-T program requirements listed in this document.

I. Unit Dose
   1. A physical quantity of drug product designed to be administered to a patient specifically labeled as to identify the drug name, strength, dosage amount and volume, if applicable. Unit of use can be obtained from the manufacturer of the drug, repackaged from an external repackager, or repackaged on-site through a batch repackaging process that includes a registered pharmacist as a check. Unit dose examples include oral solids individually packaged by a manufacturer or repackaged, oral liquids drawn up in a labeled oral syringe, injectable products, and pre-mixed IV products.
J. **Unit dose cassettes or envelopes**
   1. Are modes of delivering a hospital inpatient’s medication doses for a predefined period of time, usually 24 hours. Cassette drawers or envelopes are labeled with the patient’s name and location and are typically delivered to the patient care area by a pharmacy technician.

II. **PURPOSE:**
   A. The T-C-T program is a tool to allow the re-direction of pharmacists from a distributive task to cognitive tasks. It is designed to allow pharmacists to deploy out to the inpatient care floors, where they can provide clinical services. This will further improve patient safety because the pharmacist will be able to focus on assessing the accuracy and appropriateness of the medications ordered and educating staff and patients.
   B. Pharmacy Technicians have been shown to be more accurate at checking medications than pharmacists (99.89% vs 99.52%).
   C. To ensure quality patient care and reduce medication errors, the T-C-T program will include the following components:
      1. The program shall be under the direct supervision of a pharmacist.
      2. The pharmacy technician who performs the checking function has received specialized and advanced didactic and practical training.
      3. To ensure quality, there shall be ongoing evaluation of the technician checker.

III. **POLICY:**
   A. The overall operation of the program shall be the responsibility of the pharmacist-in-charge.
      1. There will be one pharmacist designated as **T-C-T Site Coordinator**.
   B. Specifically trained and qualified pharmacy technicians can check AMDS medications and unit dose batches filled by another pharmacy technician.
   C. Exceptions of TCT:
      1. A pharmacist must perform a daily review of patient profile containing pertinent clinical information about the patient (i.e. allergies, current medication, etc.).
      2. A pharmacist must check the preparation of all products extemporaneously packaged and IV admixtures prepared in the pharmacy.
      3. A list of high-risk medications that are exceptions to T-C-T (Attachment 1).
   D. Compounded or repackaged products must have been previously checked by a pharmacist, and then they may be used by a technician to fill unit dose distribution systems and floor and ward stock.

IV. **PROCEDURE:**
   A. The Pharmacist-in-Charge must review all records on an annual basis to assure compliance with this document.
   B. **Technician Eligibility**
      1. A technician working full or part time with three-year equivalent experience in unit dose filling.
   C. **Training**
      1. The pharmacy must use this T-C-T module to formalize didactic training and quality control.
      2. All technicians are required to undergo specialized and advanced training to participate in T-C-T. The goal of this training process is to have the technician checker become validated and accomplish all the necessary didactic objectives. The training process must include the following:
         a. Didactic lecture (or equivalent training with a self-learning packet)
b. Practical sessions (one-on-one training) that consists of observation of a pharmacist checking a unit dose medication batch and/or cart

c. Validation
   i. Initial validation
   ii. On-going QA audits performed quarterly for the first year then once every six months
      • If at any time a T-C-T technician loses his/her validation, that individual must be re-assigned to another task until he/she is retrained and revalidated.

3. The practical session will start with the trainee observing a technician checker performing either the unit dose batch or the AMDS stocking check process. Then the trainee performs the initial check with a registered pharmacist verifying all doses. During the final stages of the practical session, the technician will complete the validation process. The training process will include introducing artificial errors (see validation), into a live or simulated environment, to monitor the ability of the technician to catch errors. Artificial errors introduced into the live environment, which are not corrected by the technician, shall be removed. A pharmacist must maintain initial validation and documentation for each validated T-C-T technician as well as notify a technician checker of any errors found during audits.
   a. The Hospital Coordinator will create individualized training programs and will tailor the program to the patient population and medication distribution system. The training program may be changed periodically as appropriate.

4. It will be the responsibility of the hospital coordinator to ensure that all training is completed and documented.

D. Validation and QA Process

1. Initial Validation (and re-validation if needed)
   a. Unit of Use Batch:
      i. For initial validation, the technician checker must obtain a 99.8% accuracy rate in 1500 consecutive doses (divided in at least 5 separate audits).
      ii. The audit process will consist of a registered pharmacist checking the accuracy of a unit of use medication after the technician has checked them.
      iii. Any errors determined to be due to the improper checking by the technician checker will be documented and discussed with the technician.
      iv. In each audit, the pharmacist will artificially introduce at least three errors.
         • The pharmacist coordinating the audit will keep a record of the introduced errors to ensure that all are removed prior to distribution.
   b. Errors will include an occurrence of a wrong drug, dose, quantity, dosage form, or an expired medication.
   c. Each dose will count as one error.
      i. If the technician checker misses more than three errors in 1500 doses, they fail the validation.
   d. All audit results will be documented by the pharmacist and kept in the quality assurance file.

2. AMDS:
   a. For initial validation, the technician checker must obtain a 99.8% accuracy rate in 500 total line items (divided in at least 5 separate audits).
   b. The audit process will consist of a registered pharmacist checking the accuracy of the AMDS medications after the technician has checked them.
      i. Any errors determined to be due to the improper checking by the technician checker will be documented and discussed with the technician.
c. In each audit, the pharmacist will artificially introduce at least three errors.
   i. The pharmacist coordinating the audit will keep a record of the introduced errors to
      ensure that all are removed prior to distribution.

d. Errors will include an occurrence of a wrong drug, dose, quantity, dosage form or an
   expired medication.
e. Each dose will count as one error.
   i. If the technician checker misses more than one error in 500 doses, they fail the
      validation.
   f. All audit results will be documented by the pharmacist and kept in the quality assurance
      file.

3. A summary report of each pharmacy technician trained as a technician checker will be kept
   on file by the hospital coordinator.

E. Process
1. A pharmacy technician fills the medication for the unit dose or Automated Medication
   Distribution System restocking batch.
2. A validated technician checker may check the accuracy of unit dose batches or automated
   medication distribution system restocks. The technician checker reviews the medications for
   the correct drug, dose, dosage form, quantity and reviews the expiration date.
3. If a filling error is found, the technician checker records the error and the product is given
   back to the technician who originally filled it (if available) or another technician. The
   technician then corrects the error and technician checker checks the correction. A pharmacist
   or another validated technician checker must check any dose corrected/filled by a technician
   checker.
4. If a validated checker is not available, then all doses must be checked by a pharmacist.
5. This process continues until all doses have been checked.

F. Quality Assurance Process
1. The hospital coordinator shall maintain documentation of the quality assurance checks
   (audits). Audits should be conducted in the same manner as in the initial validation process.
2. The audits should occur at random and unannounced times.
3. The audit sample will be at least 300 doses for the unit of use batch and 100 line items for
   the AMDS batch.
4. To maintain validation, no more than one error can be made.
5. The audit reports should include:
   a. Each specific error encountered
   b. The total number of errors
   c. The total number of doses or line items checked
   d. The percent error rate.
6. Once the technician has successfully completed three consecutive monthly audits, specific
   audits for that technician may be reduced to quarterly for a period of one year. After a year,
   audits can be reduced to semiannually.
7. If a technician does not perform the T-C-T duties for more than six months, that technician
   must be revalidated.
8. If a validated technician checker fails any of the audits, the audit should be repeated in the
   same month.
   a. If the technician fails the re-audit, they should be reassigned to another duty and must be
      revalidated prior to checking any more doses.
V. TECH-CHECK-TECH TRAINING MODULE
A. Purpose
1. The purpose of the training module is to provide a template of the information necessary to meet the required didactic, process orientation training and quality control necessary to participate in the Tech-Check-Tech program.
2. This information is intended to be combined with one-on-one training in the automated batch, cart fill, and pre-made IV checking process.

B. Program Overview
1. Training the technician on the Tech-Check-Tech Requirements and Program (Attachment II)

C. Training – Checking
D. Upon completion of this portion of training, the pharmacy technician will be able to:
1. Identify the information required on the label of extemporaneous products packaged by the pharmacy.
2. Differentiate between the packaging, labeling, and product characteristics for various oral, injectable, and intravenous medications.
3. Identify expired or contaminated products.
4. Expiration dates must be checked on each dose of medication.
   a. If packaged (unit dose) from the manufacturer, this date must be on that packaging.
   b. Some drugs (suspensions) may separate out (precipitate) and cannot be re-suspended.
5. List the main product characteristics that need to be checked for each drug packaged by the pharmacy.
   a. Right Dose
   b. Right strength
   c. Right number of unit doses
   d. Right drug
   e. Right dosage form
   f. Right packaging
   g. Valid expiration date
6. Identify products requiring special handling or special storage conditions.
7. Identify the generic names associated with common brand names through the use common references.
8. State the appropriate size of common bulk items to be dispensed.

VI. REFERENCES:
A. California Board of Pharmacy. 2010 Lawbook for Pharmacy. Regulation1793.8: Technicians in Hospitals with Clinical Pharmacy Programs.
C. Ambrose P.J. Evaluating the accuracy of technicians and pharmacists in checking unit dose medication cassettes. Am J Health-Syst Pharm. 2002;59:1183-8
Attachment 1

High Alert Medication List:
A. Chemotherapy agents
B. Antithrombotics:
   1. Heparin
   2. Enoxaparin (Lovenox)
   3. Warfarin (Coumadin)
   4. Fondaparinux (Arixtra)
   5. Argatroban
   6. Alteplase
   7. Reteplase,
   8. Tenecteplase
   9. Eptifibatide
C. Insulins
D. Hypoglycemics
   1. Metformin (Glucophage)
   2. Glimepiride (Amaryl)
   3. Glipizide (Glucotrol)
   4. Glyburide (Diabeta)
   5. Pioglitazone (Actos)
   6. Rosiglitazone (Avandia)
E. Controlled Substances
F. Look Alike- Sound Alike Meds
Attachment II

A. Practice calculations
(Sample exam – the hospital coordinator should change the questions and examples on a periodic basis)
Please complete the following exercises.

1. Section 1
   1. 6 mg = ________________g
   2. 2 g = ________________mg
   3. 4000 g = ________________kg
   4. 10 mg = ________________g
   5. 20 cc = ________________ml
   6. 0.75 L = ________________ml
   7. 0.2 L = ________________ml
   8. 600 ml = ________________L
   9. 3 ml = ________________L
   10. 30 ml = ________________cc

2. Section 2
   Calculate the following dosages. Round your answer to the nearest tenth.
   1. Acetaminophen (Tylenol) elixir 160 mg/5 ml. Dose: 320mg
      How many ml?

   2. Albuterol liquid 2 mg/5 ml. Dose: 6 mg
      How many ml?

   3. Furosemide 10 mg/ml. Vial size: 10 ml
      Total vial strength?

   4. Dexamethasone 40 mg/10 ml
      Concentration per ml?

   5. Lidocaine 1% injection 10ml vial
      What is concentration in mg/ml?

   6. Midazolam 2 mg/2 ml
      What is the concentration per ml?

   7. Bumetanide injection 0.25 mg/ml. Dose: 2 mg
      How many ml?

   8. Carbamazepine 200 mg Dose: 1 tab PO 4 times per day
      How many tablets are needed for 24 hours?

   9. Metformin HCL 850 mg Dose: 1 tab PO BID PC
      How many tabs and when does the patient receive the doses?

10. Methylprednisolone 40 mg/1 vial. Dose: 40 mg IV q 4 hrs.
     How many vials are needed?
3. Answers

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<td>9. 0.003</td>
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<td>10. 30</td>
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B. Sample Test Questions

On the following pages are sample test questions than may be used to assess competency with the T-C-T module. The questions should be changed periodically.

1. History of the T-C-T Program

To verify competency, the following questions must be answered correctly. Please complete the quiz and turn into to your hospital coordinator.

1. True or False
The California Board of Pharmacy established a law that stated a pharmacy technician could check patient unit dose medications as long as the final check was by medical staff before it is dispensed.

2. True or False
The intent of the Tech-Check-Tech program is to free pharmacists from non-judgmental distributive functions so that their unique skills can be better utilized to improve the medication outcomes in hospitalized patients.

2. Requirements of the T-C-T Program

1. Multiple choice:
To participate in the T-C-T program, a hospital must follow these guidelines:
A. The nurse must check the patient profile daily.
B. Floor stock medications can be checked by a technician checker
C. The hospital must have a clinical pharmacy program in place.
D. A technician can be the hospital coordinator.

2. True or False
A part time technician can become a checker if they have one year’s equivalent experience in unit dose filling.

3. Multiple choice
All technicians must undergo the following training to participate:
A. Practical session
B. Didactic lecture
C. Validation
D. All of the above
3. **Elements of Checking**

1. **True or False**
   A medication that is to be used as a topical cream dose must be labeled with a “For External Use Only” sticker.

2. **True or False**
   A formulary is a system managed by the P&T Committee that limits duplication of drug supplies in the hospital.

3. **True or False**
   Oral medication, IV medication and topical medication must be physically separated in the cassette drawer.

4. **Multiple choice**
   IV medications that are not clear and colorless include the following:
   - A. Furosemide (Lasix) IV
   - B. Rifampin
   - C. Imipenem/Cilastatin (Primaxin)
   - D. B and C

5. **Multiple choice**
   Match the product with the correct special handling or storage requirement.
   - ______ Famotidine (Pepcid) IV  A. Needs refrigeration
   - ______ Ferrous Sulfate (Ferrlecit)  B. 24 hour stability
   - ______ Azithromycin (Zithromax)  C. Send in an amber bag

4. **Accuracy and Medication Errors**

1. Name four types of errors that are commonly experienced at your site.
   - 1)
   - 2)
   - 3)
   - 4)

2. **Multiple choice**
   All of the following are TRUE about the process of checking unite dose medications by a technician except:
   - A. If filling errors are found, the technician checker may correct them without further checking by anyone
   - B. The technician checker cannot check drawn up (extemporaneous) doses prepared by another technician.
   - C. A pharmacist must check all unit dose medications that a technician checker reviews during the validation process.

3. **Match the abbreviation with the correct term:**
   - _____ pr  A. oral  F. before meals
   - _____ prn  B. both ears  G. milligrams
   - _____ ng  C. nasogastric tube  H. rectal
   - _____ mcg  D. micrograms  I. nasojejunal tube
   - _____ pc  E. as needed  J. magnesium
5. Validation and QA Process

1. **True or False**
   Training for the T-C-T includes a validation process that requires a technician to check 3500 consecutive doses.

2. **True or False**
   After initial validation, weekly audits are to be conducted at random.

3. **Multiple choice**
   Which of the following are TRUE regarding the validation process?
   A. A pharmacist must check the accuracy of the technician checker during the validation process.
   B. Documentation of the technician checking errors must be completed by the nurse and discussed.
   C. An error of the wrong drug (2 doses) in a unit dose cart is counted as 2 checking errors.
   D. The technician filler artificially introduces at least 5 errors into an audit.
   E. A and C

6. **Answers to Test 1-5**

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