Automated Dispensing Process

Maintaining and Calibrating Sterile Compounding Equipment

“Class A” Prescription Balance

The National Bureau of Standards (NBS) requires pharmacies to have a “Class A” prescription balance on-site. This balance uses internal and external weights and has 2 pans; it is a torsion-type balance. A “Class A” balance can measure between 120 milligrams (mg) and 120 grams (g); the balance has a sensitivity of 6 mg, which means it only takes 6 mg of a substance to upset the balance’s equilibrium by 1 degree or shift the pointer 1 division.

Proper Weighing Technique with a “Class A” Prescription Balance

- Lock the balance and put a weighing paper on each pan.
- Place the substance to be weighed on the left pan and the desired total weight on the right pan.
- Unlock the balance then check the position of the indicator.
- Lock the beam and change the amount of substance as needed.
- You have an accurate measurement when the pointer swings an equal number of divisions to each side of the central position.
- Put the cover down to conduct your final measurement.
- You should measure your weights 3 times for accuracy:
  - when they are first on the pan
  - from their vacant positions in the weight box (without the added weight of the box)
  - when they rest on the pan alone without any added weight

Care must be taken with “Class A” prescription balances to ensure they continue to offer accurate measurements. Keep unused balances in the locked position and do not add weight or materials to the balance unless it is locked. Keep the cover down on the balance when it is not in use, and take care to keep it clean of dust, corrosive vapors, and moisture.
Analytical Balance

Analytical balances are newer technology offering the convenience of a digital readout. The sensitivity of this balance is 0.1 mg.

Weights

Most pharmacy weights, including those used with the “Class A” prescription balance, are made of polished metal or brass. Weights must be cared for and handled properly in order to maintain their integrity. Do not touch weights with your bare hands because body oil can increase the weight and/or hurry corrosion of the weight. Use plastic or plastic-tipped tweezers when working with weights to avoid oxidation of the metal. Weights must be clean when they are stored and kept in a rigid, compartmentalized, and covered box. Dropped or dented weights must be replaced.

Weight sets typically include cylindrical weights between 1 gm and 50 gm and fractional weights between 10 mg and 500 mg. Weights should be calibrated once a year to ensure their accuracy.

Mortar and Pestle

Mortar and pestles are used to grind powders together. These powders may be used in topical creams, ointments, capsules, or oral liquids, among other things. Mortars are bowls, which may be made from marble, glass, stone, clay, or hard wood. Pestles are cylindrical tools with rounded ends that are typically made from the same material as the mortar. You use the mortar and pestle by placing the substance you want to grind in the mortar and crushing, grinding, and mixing it with the pestle. You may also mix liquids or semi-soft dosage forms with a mortar and pestle; however, it is recommended that you use glass for such mixtures.

“Class A” balances have a sensitivity of 6 mg. The sensitivity of analytical balances is 0.1 mg.
Graduate

Graduates are used to measure liquids. Cylindrical graduates are uniform from top to bottom and are the most accurate type of graduate. Conical graduates have wide mouths and wide bases so you can stir liquids with glass rods. The accuracy of a conical graduate decreases as the diameter increases. Conical graduates range in size from 10 ml to 4000 ml. Graduates are typically marked “TD,” which stands for “to deliver.” This means the measurement of the graduate will compensate for any excess liquid that sticks to the graduate after the liquid is poured out.

Technique for Measuring Liquids

- Select the appropriate size graduate—ensure the liquid you are measuring is not less than 20 percent of the total volume of the graduate.
- Pour the substance down the middle of the graduate at a slow pace until the level of the liquid rises to the appropriate volume.
- Ensure that all of the liquid has settled in the graduate prior to taking your measurement.
- Measure the level of the liquid at your eye-level, then check the bottom of the meniscus (the surface of the liquid that bulges downward).
  - For a concave meniscus, the measurement should be taken at the lowest point of the curve.
- Pour the substance into its container—make sure the liquid is fully drained from the graduate.

Spatula

Spatulas may be made of hard rubber, plastic, or stainless steel—the type of spatula used depends on the substance you are transferring or mixing. You may use a spatula to mix or transfer solid ingredients like creams, powders, or ointments.

Ointment Slab

Ointment slabs offer hard, clean surfaces on which to mix compounds. They are typically made of ground glass plates, which provide a non-absorbable surface area. Pharmacies often use disposable parchment papers over
an ointment slab because they allow for multiple compounding without cleaning between substances.

### Automated Dispensing Systems

Preparation of medications may occur with the assistance of counting devices like automated dispensing machines. The medication should be inspected for quality. Any questions about the integrity of a medication should be directed to the pharmacist. While automated dispensing systems are designed to help reduce errors and more efficiently distribute medications, they do have points of human manipulation and special caution should be taken to prevent errors. Calibrations of automated dispensing systems are usually tailored to the patient’s needs within the pharmacy setting. Calibration of automated systems is part of specific on-the-job training, as there are many to choose from.

**Unit dose systems** are used mostly in hospitals. Medications are individually packaged. Appropriate labeling is necessary for all repackaged medications.

**Punch cards or blister packs** are systems used to dispense medication to patients. These cards can accommodate different dosing and are typically individualized for the patient. This provides accountability for dosing, improves documentation, and minimizes the opportunity for giving the wrong medication to the wrong patient.

If drugs are repackaged into smaller, ready-to-dispense quantities from larger bulk containers, the pharmacist must be on the premises to supervise the repackaging and labeling.

Medications must be placed in properly labeled, tight, light-resistant, child-resistant containers. The label must contain the name and address of the health department, the drug name, strength, dosage form (capsule, tablet, etc.), quantity, the name of the distributor/manufacturer, the lot number from the bulk container, and the expiration date. The expiration date is limited to 1 year from the date the product is repackaged or the distributor/manufacturer's expiration date, whichever is the shortest dating.
A log must be maintained documenting the repackaging of all drugs. This log must include the date of repackaging, the drug name, strength, dosage form, quantity per bottle, number of units repackaged, expiration date of the repackaged product, and the name of the pharmacist who supervised the repackaging.

Any repackaged drug, prescription or non-prescription, must be dispensed by the pharmacist with appropriate documentation and patient labeling. Precise records of all repackaging work must be maintained at the batch level and maintained for at least 1 year or longer.

Questions

1. How are “Class A” prescription balances used?
2. What are the differences between “Class A” prescription balances and analytical balances?
3. What are the advantages of using an automated dispensing system?