

# Color Coding Radiopharmaceuticals to Decrease the Possibility of Misadministration

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*Misadministration of a radiopharmaceutical is an ever present danger. We describe a color-coding procedure and the manufacture of a specially designed technologist's dose holder to provide a very effective and inexpensive method of decreasing the possibility of administration of the wrong radiopharmaceutical to a patient.*

The use of color coding to identify pharmaceuticals at the industrial and dispensing levels is widely practiced (1-6), but not extensively documented.

There is a need for a simple and effective identification system for radioactive pharmaceuticals at the dispensing level to prevent dose misadministration. This is particularly required because of the unique characteristics of these drugs and the operating procedures within a nuclear medicine department.

In the nuclear medicine department at our institution, we have devised an effective and inexpensive identification system based on color coding that greatly reduces incorrect administration of radiopharmaceuticals.

## Materials and Methods

Radiopharmaceuticals obtained from manufacturers have clearly labeled vials, lead shipping and storage containers. In addition, technetium-99m radiopharmaceuticals are prepared daily on site following generator elution and assay. The Tc-99m is added to vials of non-radioactive reagents (kits) during preparation. The glass vials of individual drugs are clearly labeled, but must be shielded for radiation safety purposes.

Each class of radiopharmaceuticals is given its own separate color designation. Unmarked lead vial shields are color coded, top and bottom, with tape (Professional Tape Co., Burr Ridge, IL). These shields contain the multidose stock solution from which unit doses will be drawn.

Prior to dose withdrawal, each syringe is labeled with a color-coded circular label (Avery Label Co., Azusa,

CA). The circular pressure-sensitive label on the syringe matches the circular label and tapes on the stock solution vial shield.

Likewise, the cylindrical syringe shield is also coded. This three-step, color matching system (stock vial, syringe, and syringe shield) requires that the technologist preparing the dose must check it three specific times prior to administration to the patient.

A specially designed rack containing 18 holes (6 rows with 3 holes per row) was built to hold the prepared unit doses. Each row of three holes is separated from the other five rows, and is assigned to a particular technologist or radiopharmacist.

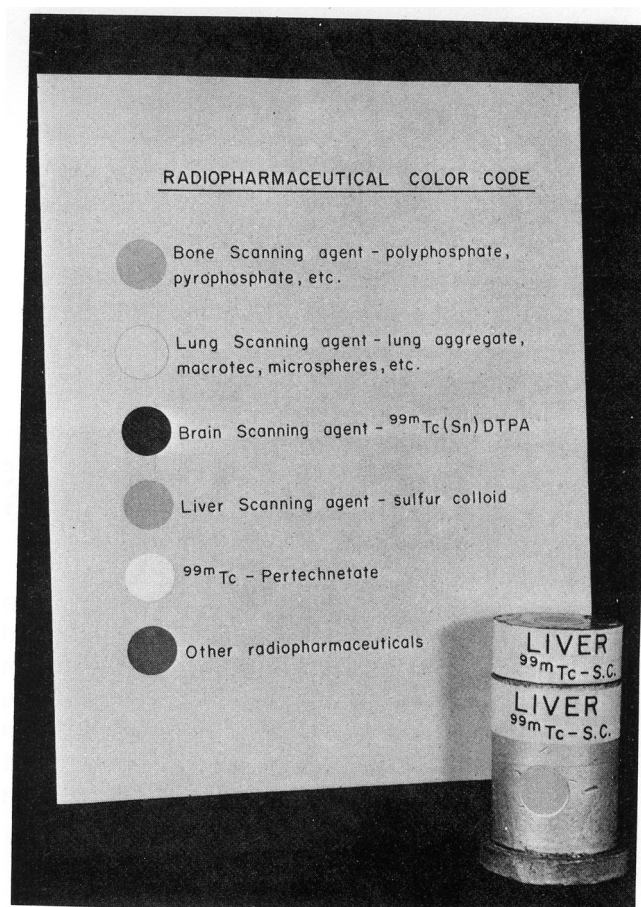
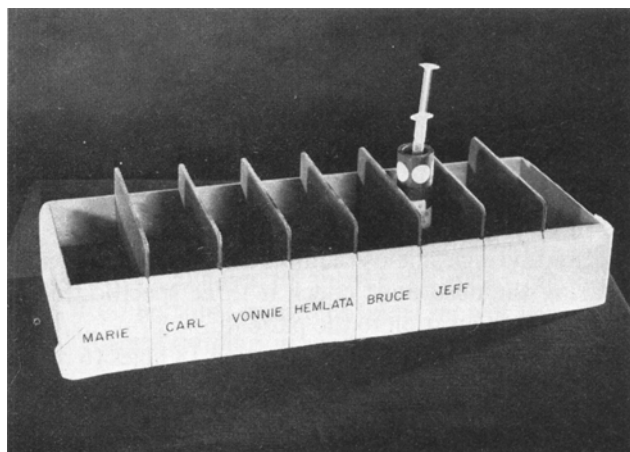


FIG. 1. Color-code chart and stock solution vial shield.

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It is our policy to dispose of *every* technetium-labeled compound in its multidose vial before generator elution the next morning or sooner. A separate dose handling record is prepared daily for each vial of technetium radiopharmaceutical in the department. Dose handling records identify the time, date, lot number, manufacturer, name of drug, radioassay, radioactivity concen-



**FIG. 2.** Color-coded syringe shield in its designated holder.

tration, name of patient, quantity and volume of drug administered, and volume of drug remaining in vial.

### Results and Discussion

Generally, radiopharmaceuticals are colorless and transparent, look alike on preparation, must be shielded to conform to good radiation safety procedures, and are dispensed from a designated area to which several technologists have and require simultaneous access. It is therefore imperative that there be a system in effect

to prevent dose mix-ups and subsequent misadministrations.

Figure 1 shows the color-code chart and the stock solution shield currently in use. The technologist performs several positive steps by selecting the correct colored tab, writing the patient's initials on the tab, attaching it to a syringe prior to withdrawing to dose, and matching the color with that of the location and color of the stock solution.

In many nuclear medicine departments in which several scanning rooms are being utilized simultaneously, it is quite common to observe several technologists drawing doses simultaneously then leaving their doses to get the patient. Assigning each technologist or radiopharmacist a specific syringe receptacle labeled with his or her name (Fig. 2) minimizes the possibility of another technologist picking up the wrong dose, even if two technologists are using the same radiopharmaceutical. Our system precludes any syringe being left unlabeled at any time.

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### References

1. Sloan IA, Steward DJ: Identification of syringe contents (Letter). *Anaesthesia* 31: 578, 1976
2. Carrie LES: Labelled adhesive tape for the identification of syringe contents. *Anaesthesia* 30: 786-787, 1975
3. Torres D: Color coding of intravenous medications (Letter). *J Am Coll Emer Phys* 6: 36, 1977
4. Lilly Research Laboratories: *Diabetes Mellitus, Seventh ed.* Eli Lilly and Co., Indianapolis, 1967, p 89
5. Crider HF: Color-coded labels for dispensing. *Hospital Topics* 47: 86-88, 1969
6. Biron P, Carignan R: Chromoconfusion: A new type of pill-pill "interaction" in cardiology. *Canadian Med Association J* 110: 1346-1347, 1974