During the past few years there has been a growing interest in the use of a “new” protocol called a “common canister protocol.” This protocol allows the use of a single metered-dose inhaler (MDI) medication for multiple patients. It should be noted that while this protocol was relatively unknown until recently, it is, in fact, not “new” as the idea was presented at the Open Forum of the 1995 AARC International Respiratory Congress by respiratory therapists of Holy Spirit Hospital in Camp Hill, PA.

Advantages of using a CCP

The basis for using a common canister protocol (CCP) is the desire to reduce the amount of wasted medication and the associated cost to the facility. Many facilities dispense an MDI canister to a patient who is ordered for treatments while admitted as an inpatient. These canisters, along with dry-powder inhalers (DPI), typically contain enough doses of medication for anywhere from 14–28 days. However, assuming the average length of stay for an inpatient is four to five days, what happens to the other 10–23 day supply of medication that remains in the canister? The answer depends on the facility itself. In some institutions, if the patient has discharge orders that include continuing the use of the medication at home, the partially used canister is sent to the pharmacy for re-labeling (to reflect the order for home therapy) and then given to the patient to take home. While this can be viewed as a service to the community, the cost of the medication is absorbed by the hospital. Some facilities do not want to burden the pharmacy with the extra work of checking and re-labeling the canisters, and there is also the potential for double-billing should the pharmacy bill for a re-labeled canister that was already charged to a patient upon initial dispensement.

In many institutions, MDI canisters are simply discarded either upon receipt of a physician’s order to discontinue the medication or upon the patient’s discharge. This results in a significant amount of wasted medication. For example, a 200-dose Combivent® MDI (Boehringer Ingelheim Corporation, Ridgefield, CT) given to a patient who uses two puffs four times a day will utilize 56 puffs in four days. If the MDI is then discarded, 144 puffs are wasted.

When considering the cost savings to a facility using a CCP, one must first realize that hospitals are being reimbursed for a large majority of admitted patients based on a flat-rate reimbursement system based on the patient’s diagnosis-related group under the prospective payment system. In short, this means a hospital receives a fixed payment no matter how many procedures or treatments are given and includes medications. Therefore, a hospital is not “reimbursed” for medications, per se.

The cost reduction realized by utilizing a CCP is related to several factors, but the largest single factor is the number of patients utilizing MDI or DPI therapy. The larger the number of patients on these medications, the more significant the savings realized. In addition, the type of medication is also a significant contributing factor in the amount of savings.

How much can a facility reduce the annual medication cost? At Grand View Hospital, a 250-bed community hospital in Sellersville, PA, the one-year actual cost reduction was approximately $75,000 for the fiscal year 2007–2008. A large percentage of this cost reduction resulted from switching the use of Advair DPI to Advair MDI (GlaxoSmithKline, Research Triangle Park, NC). The Advair DPI cannot be used for multiple patients, so the 850 DPIs dispensed to patients in 2007 were reduced to approximately 145 MDIs dispensed in 2008.
Considering the recent cost increase of the new hydrofluoroalkane (HFA) inhalers, the savings stand to increase the overall savings even more. For example, in 2007, an albuterol MDI cost approximately $11 per canister. The price for an albuterol HFA canister currently is approximately $27.50.

**Cross-contamination risk**

One of the biggest concerns with instituting a CCP is the risk of cross-contamination. A literature search of existing research finds several studies on the risk of canister contamination.1-5 Two early studies indicate that the cross-contamination rate may be as high as 5%.2,3 However, two more recent studies indicate no adverse effects of using the protocol.4,5

Both supporters and opponents of the common canister protocol cite these articles as evidence to support their argument. However, the sample sizes for all of these studies are small and, therefore, no clear consensus can be made.

The use of a valved holding chamber would logically reduce the contamination risk of the canister valve stem. The use of the chamber, however, does nothing to reduce the risk of cross-contamination from the surface areas of the MDI itself. It is imperative that the respiratory therapist always follow the CCP process for disinfecting the canister with alcohol before it is dispensed to another person. In addition, the individuals handling the canisters between patients must also follow proper handwashing techniques. Opponents of the CCP point to the nationwide statistics that show health care workers do not follow proper handwashing techniques. However, proponents state this argument could also be used to eliminate the use of many other devices, including pulse oximeters and stethoscopes.

**Dose counting**

In March of 2003, the U.S. Food and Drug Administration issued a guidance document that recommended that manufacturers of MDIs incorporate a dose counter in the MDI device.6 Many of the new HFA MDIs on the market now incorporate such a device that allows hospitals incorporating a CCP to track the remaining doses in the MDI between patients. This allows all of the usable doses in the MDI to be used. Unfortunately, a few MDI medications remain available that do not incorporate a dose counter, thereby requiring hospitals utilizing a CCP to track the doses for these MDIs via alternate methods. At Grand View Hospital, for example, stickers containing the numbers 1 to 100 and 101 to 200 were created and applied to the bag that the MDI is stored in. When the RT delivers the medication to the patient, two of the numbers are crossed off on the sticker.

**Is it for your facility?**

The benefits both in reducing the thousands of wasted doses of medication and the associated cost savings realized with this decrease in waste are significant and ongoing. Although there are studies supporting the cost realization and relatively small risk of cross-contamination from using a CCP, many have been sponsored by spacer manufacturers, contain small sample sizes, and are more than five years old. In lieu of the lack of evidence-based literature, hospitals that implement a CCP should perform their own surveillance study to ensure it is safe and ethical for use at their institution. This process is easy to perform and allows for interdepartmental teamwork involving the pharmacy, respiratory care department, and infection control. Any departments that perform this surveillance are encouraged to publish their results.

Although the available literature indicates at least a small risk of cross-contamination when using a CCP, this risk appears tied more to health care workers following the protocol guidelines for both handwashing and disinfection of the canister than to the protocol itself. To reduce this risk, proper education of staff in these areas is essential. To further reduce the risk of cross-contamination, facilities should dispense one canister for use by a single patient until the patient is discharged or the medication is discontinued before disinfecting it and redistributing it for use by another patient.

**EDITOR’S NOTE**

Thomas Lamphere is not affiliated with any of the companies or products mentioned in this article.

**REFERENCES**

1. Filippelli A, Gregory G. Multiple patient metered-dose inhaler (MDI) program. Abstract presentation at the December 1997 American Society of Health-System Pharmacists (ASHP) Midyear Meeting in Atlanta, GA.
2. Dunlew CL, Rau JL, Roman SB. Surveillance of reservoir cross-contamination with multiple patient MDI use. Abstract presentation at the December 1997 ASHP Midyear Meeting in Atlanta, GA.
3. Hinson D, Rau JL. Incidence of contamination of metered-dose inhaler canisters when used with multiple patients using spacer devices. Abstract presentation at the December 1997 ASHP Midyear Meeting in Atlanta, GA.
5. Wojciechowski WV, Maddox HC, Moseley AL. Analysis of cross-contamination of metered dose inhalers when using the Respironics OptiChamber under the common canister protocol. OPEN FORUM abstract presentation at the 2004 AARC International Respiratory Congress in New Orleans, LA.