



ASK THE EXPERT

By Scott Sutton, PhD

What are the Risks of Reusing Metered-Dose Inhalers?

A Given the rapidly rising cost of health care in US hospitals, a variety of cost-saving initiatives may be under consideration. One of these strategies involves the reuse of metered-dose inhalers (MDIs), commonly referred to as the common canister protocol (CCP). This practice employs a protocol in which the MDI mouthpiece is wiped with 70% isopropyl alcohol and then inserted into a patient-specific spacer with a one-way valve before delivering the drug to the patient.¹ Significant annual cost savings are likely if the CCP is adopted, as shared MDIs allow patients to be charged per puff of medication. The sharing of a common canister provides cost savings for the hospital and minimizes wasting medication, as the MDI and canister stays with the respiratory therapist and only a spacer remains with the patient. Reusing MDIs prevents waste that occurs when a multidose inhaler is used only a few times by a single patient and then must be discarded.

However, the limited safety evidence available at this time impedes any definitive conclusion on the safety of this practice. The Association for Professionals in Infection Control and Epidemiology (APIC) plans to release guidelines on reusing MDIs after the completion of clinical studies that are expected to conclude this year.² Until the APIC guidelines are drafted, should hospitals consider reusing MDIs?

To understand the potential benefits and risks of utilizing the CCP, the available clinical safety data must be fully evaluated (see **SIDEBAR**). It is also important to note that all involved—including the proponents of the CCP—caution that strict compliance to safety protocols is critical to preventing contamination of MDIs. In the busy hospital setting, even simple, proven contamination-prevention methods, such as hand washing, are frequently overlooked. A recent study showed hand-washing compliance at approximately 25% among clinical staff.³ This poor compliance is not likely due to lack of guidance, as most hospitals have policies and procedures and a staff training program in place,⁴ and many have a professional infection control officer on staff. Simply put, compliance with infection control procedures is demonstrably difficult to maintain.

While there is little doubt that sharing MDIs can reduce costs, this is not necessarily the most critical consideration facing the hospital. A recent study by the CDC estimated that the cost of hospital-acquired infections in 2007 was approximately \$35.7 to \$45 billion.⁵ Data indicate that on average, hospital-acquired infec-

tions have resulted in an increase of 19.2 days in the hospital and increased costs of \$43,000 per patient.⁶ Moreover, with shrinking reimbursements for care for nosocomial infections, cost savings from employing the CCP can vanish quickly should infection occur.⁷

Given the inconclusive clinical study data currently available, it may be prudent from a microbiology perspective to adopt a conservative approach to reuse of MDIs. Because patient safety is clearly the first priority, the benefits of reusing MDIs may not outweigh the potential hazards. Considering the difficulty many

hospitals experience when maintaining compliance with other proven infection-control procedures—such as hand washing—reusing MDIs appears premature without further data ensuring safety. The eagerly awaited APIC guidelines on reusing MDIs will likely provide additional guidance on this topic. ■

Scott Sutton, PhD, is the principal of Microbiology Network, Inc. This article is a statement of Dr. Sutton's opinions, and should not be considered policy or procedure of USP.

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SIDEBAR

Clinical Studies on the Reuse of MDIs

An extensive review of the literature found only limited published studies on the safety of reusing MDIs. Additional research into the safety of the CCP is required.

- ▶ Cohen and Smetzer⁷ provide an excellent review of reported studies on cross-contamination and the issues associated with the reuse of inhalers. Unfortunately, most of the studies they are forced to rely upon were presented as posters or abstracts at conferences from 1997-2007, and few of these studies can be found in the peer-reviewed literature in 2014.
- ▶ A pilot study on 20 patients describes culturing 28 MDIs with findings of microorganisms in 10 of them (this study was not performed in a hospital, nor were the MDIs shared).⁸
- ▶ Another study looked at spacers used in nebulizers by 62 asthmatic children and found contamination in 35.5% of the reservoirs and in 25.8% of the masks.⁹ The authors concluded that bacterial contamination is a common concern in spacer devices.
- ▶ An original article promoting the practice of shared MDIs highlights the lack of available data evaluating the CCP at this time.¹⁰ The authors state that they found 10 published studies on contamination of inhalers, only one of which showed contamination by microorganisms. However, a closer look at the referenced works shows that of the 10 cited, nine are available only as abstracts and/or were presented at conferences as posters or oral presentations.
- ▶ A letter to the editor describes a preliminary study to disinfect inhalers. Contamination was found in 22 of 40 devices, all of which were disinfected following swabbing with IPA.¹¹