that the contamination rate was probably less than 4 per 1,000.

Although the *actual* rate and prevalence of contaminated MDVs cannot be determined, several factors should be considered when making recommendations for discarding opened vials: 1) intrinsic contamination of unopened vials—each vial should be inspected for cracks, defective seals, or turbidity before use; 2) frequency and technique with which MDVs are entered—careful aseptic technique should be followed each time the MDV is used. Vials that are so entered and especially those containing expensive medications used frequently in a specific location can probably be used entirely.

MDVs that are carelessly punctured and not reused for an indefinite period should be discarded, eg, some emergency room MDVs or MDVs on cardiac resuscitation carts; 3) location of MDVs—operating rooms and intensive care units have patients who are considerably more vulnerable to nosocomial bacteremia; therefore, MDVs in these areas should be discarded relatively soon after initial use, thus reducing the potential for contamination; and 4) the activity of the bacteriostatic agent against various bacteria—a study by Young et al[7] showed that growth and replication of certain bacteria is unlikely when they are in prolonged contact with adequate and active bacteriostatic agents found in MDVs.

The final recommendation for control measures is still a matter of judgment. As with other infection control problems, the cost, feasibility, and eventual effectiveness of the measure must be weighed against the benefits to be derived from it.

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There is no specified length of time that a multidose vial (MDV) can be considered safe. Microbial contamination may occur with the first entry, rendering the product unsafe for any further use. Curiously, clinical infections resulting from use of contaminated medications from MDVs appear to be rare. However, instances undoubtedly occur that are unrecognized and unreported. Recently, the potential hazards were realized in two separate outbreaks of group A streptococcal abscesses in infants and children who received diphtheria-tetanus-pertussis (DTP) vaccine from MDVs that had been contaminated.[1] Challenge studies conducted at the Centers for Disease Control (CDC) indicated that a case strain of streptococcus could survive 15 days at 4°C in DTP vaccine.

Nonetheless, the CDC Guidelines on Infection Control contain the statement that "unless an expiration date is stated on the product label or package insert, it is not known if multiple-use containers, once entered, should be discarded after a specific or arbitrary length of time."[2] The US Pharmacopeial Convention also has regarded "any time limit put on the use of a MDV after its first opening as strictly arbitrary."[3]

The extent of the potential problem of microbial contamination of MDVs has not been fully investigated, and more detailed information is needed for the establishment of safe practices in health-care facilities. Several groups have performed prevalence surveys to determine the rate of contamination of in-use MDVs in hospital settings.[4-6] In these studies, none of 1,908 MDVs cultured was positive. Therefore, we can be 95% confident that the actual chance of contamination was no more than 0.2%.[7]

A laboratory study to characterize the effects of microbial contamination found marked differences in the growth supporting properties of eight different medications for single strains of 13 potential pathogens.[8] The presence or absence of antimicrobial preservatives in the medications did not correlate with microbial survival. A hospital study of the usage patterns of MDVs indicated that the cost per dose from MDVs may be greater than expected because of unused and wasted medication.[5] However, 28 of 50 medications in that study were only available in MDVs. In our hospital, the period which opened MDVs were available for use varied markedly between nursing units and between specific products.[4] Many physicians insisted on opening new vials for each patient and each injection. In some areas, such as intensive care units and operating rooms, a discard-after-use policy was already in effect.

On the basis of existing information, then, the potential hazard posed by MDVs appears to be of a low order of magnitude. Expensive or frequently used medications probably need not be discarded until the expiration date. Infrequently used MDVs, such as those on resuscitation carts, that are entered hastily without due attention to asepsis should be discarded after a single use. Increased surveillance and documentation of infections are needed, and special attention should be directed to MDVs, such as those containing insulin or lidocaine, that tend to be in use for prolonged periods.

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Protocols for Hip and Knee Prosthetic Surgeries

To the Editor:

We are in the process of upgrading our protocol for hip and knee prosthetic surgeries.

One of our surgeons asked me to obtain samples of policies and procedures for appropriate care of a patient admitted for prosthetic surgery from time of admission to discharge.

This would include proper placement of this patient pre and post surgery, use of the laminar flow room, space suits during surgery, etc.

Any assistance you can provide will be appreciated.

Jean Rowe, RN
Yuma Regional Medical Center
Yuma, Arizona

The preceding letter was referred to Harold Laufman, MD, for a reply.

Ms. Rowe would have to solicit the policies and procedures manuals from a number of hospitals in order to get protocol on preparatory care of prosthetic surgery patients. There are no standards that are acceptable to all.

Different orthopedic surgeons have different ideas on how to prepare their patients and what to require of the operating room environment. An interesting observation is that such uniformly good results can be obtained with such divergent rituals.

Harold Laufman, MD
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Protective Garments in the Bacteriology Department

To the Editor:

As the Infection Control Coordinator of a large hospital, I am writing for any material or information on a problem we are encountering.

Our Bacteriology Department has requested the hospital to furnish a scrub dress or a surgical type gown to wear in the Bacteriology Department since the employees are continually in contact with many microorganisms.

The policy for the Bacteriology Department is to wear a uniform and lab coat while in the department. This coat is to be removed before leaving the area. Even with this precaution, personnel feel that the lab coat is not sufficient protection and that they are carrying organisms home with them.

The head of the laboratory is our pathologist and Chairman of the Infection Committee. He agrees wholeheartedly with the department concerning the scrub dress or gown.

I would appreciate your opinion and any information in regard to infection control in this matter.

Eleanor V. Domm, RN, BS
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The preceding letter was referred to Dieter H.M. Gröschel, MD, for his reply.

One of the safety practices recommended for the handling of biohazardous materials is the protection of the laboratory worker with a coat or a gown. The standard and special safety practices to be published shortly by the Centers for Disease Control and National Institute of Health[1] include the wearing of protective garments such as laboratory coats, gowns, smocks, or uniforms while working with biohazardous materials of Biosafety Level 2—parasites, fungi, bacteria and viruses commonly encountered in clinical microbiology specimens. For work with cultures containing or suspected to contain organisms of Biosafety Level 3, eg, *Mycobacterium tuberculosis* or mild forms of certain fungi causing systemic infection, solid front or wraparound gowns with closure in the back, scrub suits, or coveralls are recommended. In a hospital such garments are best obtained from the operating suite.

The policy of your Bacteriology Department is correct, protective garments should be removed before leaving the laboratory. Coats, gowns, dresses or suits used in the laboratory should be treated as contaminated linen when returned to the hospital or contract laundry for reprocessing.

The safety policy established by your pathologist, who is the responsible safety officer for the laboratories, conforms to sound laboratory safety practices and deserves the support by the infection control personnel as part of the overall employee health program.

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Source of Biliary Infections

To the Editor:

We would like to comment on an editorial change made in the abstract of our article, "The source of biliary infections associated with T-tube drainage," in *Infection Control,* Volume 4, Number 2.

Our article reported data which we felt indicated that a great majority of these infections begin as biliary infec-

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