

Reprint

A Rational Approach to Ambulance Cleaning and Disinfection Practices

Mary Ann Miller, RN, TNS, REMT-P, CMTE - Jack Wagner, D.Sc., MSc.PH, REMT-P, CRT - April, 2014

Cross-contamination is an important issue. Transmission of pathogens via ambulance surfaces is well documented. Protection from cross-contamination for both patients and personnel is paramount.

Disinfectants used for the cleaning and disinfection of medical devices (stretchers, mattresses, restraints, backboards, monitors, respirators, etc.) must be registered and approved by the US EPA in the United States and as well as each state's department of pesticide (disinfectant) registration and in Canada by Health Canada. By state and federal law, ambulances and EMS units, both private and municipal, must adhere to this regulation. Products that are approved for this use will list an EPA Registration Number on each container label and in Canada a Drug Identification Number (DIN). In addition, examples of the types of devices the product is intended to be used on should be listed on each container label. In the US disinfectant manufacturers should be prepared to present a current annual certificate to the ambulance provider attesting to each State's approval. This certificate should be kept on file and be available for regulatory inspections.

Surface Decontamination

Ambulance equipment surfaces are generally made up of non-porous surfaces that are produced from a number of materials including aluminum, stainless steel, plastics (including clear plastics) as well as flexible materials such as vinyl and other soft to touch materials. Surfaces should be wiped down using an appropriate disinfectant cleaner according to its labeled instructions between each patient. The use of pre-moistened disinfectant wipes used according to their label instructions may be used for this process. Each 24 hours all surfaces should be meticulously and thoroughly cleaned and disinfected preferably using a liquid disinfection solution along with the use of microfiber cloths.

Soft surfaces such as cot sheets, pillow covers, blankets and other such items that are porous in nature cannot be appropriately cleaned and decontaminated without laundering. (many receiving hospitals allow for exchange of these items). In the absence of an exchange program, the use of single-use, disposable items of this nature, exchanged between each patient is prudent. Patient restraint straps (an often over-looked patient care item produced of non-porous, nylon material) should be wiped down between each patient and then thoroughly disinfected via immersion or by the use of a spray bottle of the disinfectant solution each 24 hours. Keeping an extra set of straps on each ambulance is prudent so that straps visibly soiled during use can be exchanged between patients and then appropriately cleaned and disinfected back at the station or at the receiving hospital.

Efficacy

It is important to use a disinfectant that is effective against a broad range of microorganisms. There are many hundreds of cataloged bacteria, viruses, mycobacteria and pathogenic fungus of concern that are transmitted via inanimate surfaces. (Cross-contamination). It is impossible to test efficacy against each one microorganism individually. For that reason five major families of concern are generally represented by a member of each family. It is prudent to use a product that has known efficacy against the

representative of these various families (Table 1). The US Centers for Disease Control (CDC) lists generally accepted representatives (aka: benchmarks or surrogates) of the five major categories and they should be listed on the container label along with the necessary contact times. Using a disinfectant contrary to its labeled instructions can result in its inability to perform as expected.

Table 1.

Microbial Family	Family Representative	Examples of family members
Gram-positive bacteria	Staphylococcus aureus	MRSA, C. difficile bacteria*,
Gram-negative bacteria	Pseudomonas aeruginosa	E. coli, Salmonella enterica, KPC
Mycobacteria species	Mycobacteria tuberculosis BCG (var. bovis)	M. avium, M. chelonae
Enveloped viruses	Herpes Simplex Virus	Hepatitis B & C viruses , HIV (Aids)
Non-enveloped viruses	Rotavirus or Poliovirus	Norovirus, Adenovirus
Pathogenic fungus	Trichophyton mentagrophytes (Ringworm)	Candida albicans, Aspergillus niger

Source: Brock- Biology of Microorganisms

Mixing of Concentrates

It is important to note that the use of concentrated products may not always be appropriate due to the various qualities of available water, including particulates found in tap water. Water contaminants and other chemicals found in tap water such as chlorine, fluoride, calcium and other particulates are known to have an influence on a disinfectants ability to perform. Ready-to use disinfectants provide the best option for the cleaning and disinfection of surfaces under these circumstances.

Transferring from a Larger Container to a Smaller Container

It is important to thoroughly read and understand the labeled instructions for use, storage and handling requirements. Not all disinfectants may be transferred to other containers. The “Storage and Disposal” section found on each container label will indicate whether the container may be refilled or must be disposed of.

Pre-cleaning and Disinfection

Removal of blood and other soil is the most important pre-requisite to disinfection. Always pre-clean surfaces prior to applying the disinfection solution. Some, but not all, disinfectants are approved for performing both the cleaning and disinfection processes however it is important to keep in mind that these steps are individual steps. Attempting to clean and disinfect in a single step is strongly discouraged. Federal and State law require that a product be used according to its labeled instructions. Each approved product label displays the following statement; ***“It is a violation of federal law to use this product in a manner inconsistent with its label”.***

Last, it cannot be over-emphasized that the selection and proper application of cleaning and disinfects is necessary to protect the patients you serve, yourself and to keep from taking an infectious agent home from work to your family.