disease prevention news

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The Use of Undiluted Bleach to Inactivate HIV

In its February issue, the *Journal of Acquired Immune Deficiency Syndromes* (*JAIDS*) (Vol. 6:218-219, 1993) published a "Letter to the Editor" entitled "Inactivation of Human Immunodeficiency Virus-1 at Short Time Intervals Using Undiluted Bleach." The authors of this letter concluded that undiluted bleach solutions completely inactivated human immunodeficiency virus (HIV) within 30 seconds of contact, while 1:10 (v/v) solutions of bleach failed to inactivate the virus even after five minutes. Persons who have read this material are calling the Texas Department of Health (TDH) to ask if they should begin using undiluted bleach for environmental infection control in health-care settings.

TDH staff reviewed this information and consulted with hospital infection control experts from the Centers for Disease Control and Prevention (CDC). Based on an evaluation of the experimental method used and an assessment of the results described in the article, TDH staff concluded that there was no significant evidence to support any change in current recommendations for standard environmental infection control. TDH recommends using 1:10 bleach solutions for disinfection in settings where contamination from blood and body substances is possible. Hospital infection control experts from the Centers for Disease Control and Prevention (CDC) have concurred with this conclusion.

TDH and CDC scientists agree that, compared to methods described in mainstream disinfection science, the experimental method outlined in the *JAIDS* "Letter to the Editor" is unorthodox. First, virus quantities or concentrations used at the start of the experiments were not specified, thereby making standard determinations of percent virus inactivation difficult to measure and the results of the experiment difficult to evaluate accurately.

Second, the process by which HIV was exposed to undiluted bleach in this experiment was significantly flawed. The authors stated that they centrifuged the virus into a tight pellet and then carefully added undiluted bleach to this pellet. Because there is no indication that virus was ever deliberately resuspended in the undiluted bleach, this method does not allow for complete exposure of HIV to the chlorine bleach. In the short times allotted, only resuspension would effect maximum contact of beach and virus. In contrast, when the authors examined the effects of undiluted bleach on normal peripheral blood mononuclear cells (PBMNCs), the method outlined for this phase of the experiment clearly notes that the cells were resuspended for maximum contact with the undiluted bleach.

Third, rather than present data for experiments examining the effects of 1:10 bleach solutions, the authors merely describe their observations in a single sentence. The reader has no unbiased data to review in order to make an independent decision.

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Texas Department of Health

Fourth, the authors of this letter do not adequately address the controversy generated by their contradiction of the efficacy of 1:10 bleach solutions. Mainstream disinfection science has provided substantial published evidence supporting the efficacy of 1:10 bleach solutions for environmental infection control where HIV or other viruses are concerned. That the authors fail to provide substantive discussion of this evidence further undermines the validity of their methods and their conclusions.

It is extremely important to evaluate critically any information that examines the kinetics of microorganism inactivation. As a general rule, disinfection experiments are largely empirical in nature, and results obtained in carefully controlled settings often do not extrapolate to real-life situations. A detailed examination of the experimental method provides the framework for a thorough assessment of the results. No scientific evidence exists which supports the position that current recommendations are inadequate regarding the use of chemical germicides in environmental infection control. In fact, no evidence to date supports an environmental mode of transmission for HIV.

In recent years, efforts to reduce the risk of disease transmission in activities where needles are shared or reused often include recommending the use of bleach to clean such items. However, the use of bleach to clean any surface is a method of **disinfection**; and disinfection, by definition, is not the same as **sterilization**.

TDH endorses the CDC recommendation that any item or piece of equipment must be **sterile** prior to contact with normally sterile areas of the body or prior to entry into the vascular system. To state that use of anything less than undiluted bleach is inadequate in these circumstances is to imply that use of full-strength bleach is a sterilization process, and thereby largely risk-free with respect to disease transmission. Clearly this implication can be tragically misleading. The results of a recent study showed no significant difference in HIV seroconversion rates between injection drug users who used a disinfectant to clean their needles prior to reuse and those who reused their needles without disinfecting them (Vlahov et al., Epidemiology 2: 444-446; November 1991). Therefore, items such as needles, if intended for reuse, must be rendered sterile to ensure the highest level of safety. Bleach, however, because of its extremely corrosive nature, has never been recommended for use as a chemical sterilant.

Finally, readers should note that the information which caused so much controversy appears in a "Letter to the Editor" as opposed to a feature article. Some professional journals use the "Letter to the Editor" section as a means for rapid dissemination of information. Of these journals, some have a system of peer review for the content of a letter to the editor, but many do not. Other professional journals appropriately reserve this venue for actual letters and commentary. Credibility of scientific information is enhanced when it is presented in standard journal article format, subject to full peer review by experts in the field.

If you have questions concerning the use of chemical germicides for environmental infection control, please contact Lynne Sehulster, PhD, Infectious Disease Epidemiology and Surveillance Division, TDH, (512) 458-7328. If you have any specific questions about HIV infections, contact Linda Moore, RN, MS, Nurse Consultant, Bureau of HIV & STD Control, TDH, (512) 458-7463.

Special thanks to Martin Favero, PhD, Chief, Hospital Infections Branch Laboratory, The Centers for Disease Control and Prevention, for offering his commentary and opinions of the research methods quoted in the *JAIDS* article.

Antimicrobial Pesticide Products

Antimicrobial agents, or germicides, are substances or mixtures of substances used to destroy or suppress the growth of microorganisms which are infectious to humans. Antimicrobial agents used on inanimate objects and surfaces are regulated as pesticides by Environmental Protection Agency (EPA). The more commonly used public health pesticides are categorized as follows:

❖ **Sterilizers** (Sporicides): Used to destroy or eliminate all forms of microbial life including fungi, viruses, and all forms of bacteria and their spores. Spores are considered to be the most difficult form of microorganism to destroy. Therefore, EPA considers the term "Sporicide" to be synonymous with "Sterilizer." Sterilization of medical and surgical instruments and equipment used in medical clinics, dental offices, and hospitals is essential for infection control. Sterilization is also a critical step in the processing and manufacture of reagents, pharmaceuticals, and sterile biologicals. Liquid chemical sterilizers and low temperature gas (ethylene oxide) are regulated by the Environmental Protection Agency (EPA) as pesticides. Physical processes of sterilization such as steam under pressure (autoclaving) and dry heat ovens are not regulated by any government agency, but rather by the quality control process established by the individual clinic, hospital, or health department facility. Liquid sterilants are used primarily for delicate instruments which cannot withstand high temperature and gases. Gaseous and dry heat sterilizers are used primarily for sterilization of medical instruments.

❖ **Disinfectants**: Used on hard inanimate surfaces and objects to destroy or irreversibly inactivate infectious fungi, viruses, and bacteria, but not necessarily their spores. Based on their ability to inactivate selected microorganisms, disinfectant products are divided into two major types: hospital and general use. Hospital disinfectants are used on medical and dental instruments, floors, walls, bed linens, toilet seats, and other surfaces. Because they are critical to infection control, they are usually broad-spectrum pesticides. General disinfectants are commonly used in households, swimming pools, and water purifiers.

EPA Anti-microbial Hotline
(800) 447-6349
Monday-Friday
7am-7pm central

❖ **Sanitizers**: Used to reduce, but not necessarily eliminate, microorganisms from the inanimate environment to levels considered safe as determined by public health codes or regulations. Sanitizers include food contact and non-food contact products. The food contact sanitizers include sanitizing rinses for dishes, eating utensils, cooking utensils, and equipment, such as that found in dairies, food-processing plants, and eating and drinking establishments. These sanitizing products are im- portant because they are used on sites where consumable food products are placed and stored. Non-food contact surface sanitizers include carpet sanitizers, air sanitizers, laundry additives, and in-tank toilet bowl sanitizers.

Antiseptics also prevent infection and decay by inhibiting the growth of microorganisms. However, because they are used in or on living humans or animals, antiseptics are considered drugs and therefore are approved and regulated by the Food and Drug Administration (FDA).

For additional information regarding antimicrobial products and methods, call the EPA Antimicrobial hotline, (800) 447-6349.

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Unexplained Respiratory Compromise Syndrome in New Mexico and Arizona

An outbreak of an unusual syndrome involving respiratory failure and death has occurred recently in New Mexico and Arizona. Twenty-two cases have met a surveillance case definition for this unexplained respiratory compromise syndrome, similar to Adult Respiratory Disease Syndrome (ARDS). A case is defined as chest x-ray findings of bilateral pulmonary interstitial infiltrates and an oxygen saturation of less than 90% in a person not receiving supplemental oxygen, or an autopsy finding of non-cardiogenic pulmonary edema in a person in whom there was not a specific identifiable cause of death.

CDC pathologists have ruled out typical bacterial, fungal, and parasitic pathogens as likely etiologies. Although a definite mode of transmission has not been identified, evidence collected to date suggests a virus transmitted by rodents. There is no evidence of person to person spread, nor of increased risk of this disease to travelers to New Mexico or Arizona. Public inquiries should be directed to the CDC Division of Bacterial and Mycotic Diseases, National Center for Infectious Diseases, (404) 639-3056.

Health care providers can obtain specific diagnosis and treatment recommendations, and report possible cases, by contacting the TDH Infectious Disease Epidemiology and Surveillance Division, (512) 458-7328. Please report cases of previously healthy persons between the ages of 13 and 45 who have a prodrome including some or all of the symptoms of fever, myalgia, headache, dry cough, infected conjunctiva and who develop within 3 days ARDS or rapidly progressive interstitial pneumonia requiring intubation and mechanical ventilation.