

Communicable Disease Avoidance for Lifeguards

James G. Dobbins, Ph.D.
National Center for Infectious Diseases
Centers for Disease Control and Prevention
Atlanta, Georgia, USA

International Life Saving Federation Medical/Rescue Conference Proceedings
September 1997

Summary

Lifeguards may be exposed to infectious agents while in the water, on the beach, or in contact with the victim's skin, saliva, or blood. Water-borne infections from polluted water are possible even when fecal coliform counts are low. In general, the risk of infection for lifeguards is high for water-borne infections, moderate to low for infections caused by microbes found in sand, and extremely low for potentially severe, bloodborne infections. Simple preventive steps include avoiding swallowing water while swimming, wearing sandals or shoes while walking on the beach, using pocket masks for resuscitation, avoiding contact with victims' blood, and vaccination for hepatitis B for those guards who do come into contact with blood.

Introduction

In the normal function of their duties, lifeguards are frequently at increased risk of contact with infectious agents. While in the water, they are repeatedly exposed to water-borne infectious agents. Walking on the beach, they are exposed to other infectious agents as well as to the threat of contact with medical wastes. Finally and most importantly, while in contact with a victim, they are often exposed to infectious agents. These agents may be present on the victim's skin or in their saliva, or they may be present in the blood of the victim.

Perhaps the most common type of exposure occurs in the water, while exposure to blood is certainly the most serious infectious disease threat to the guard's health. Fortunately, much can be done to reduce the risk from each type of exposure.

Contact with Water

A wide range of infectious organisms can be found in swimming pools, rivers, lakes, and near oceans beaches, especially those beaches adjacent to rivers or sewers. Some examples of these agents are hepatitis A virus, enteroviruses, salmonella, *Cryptosporidium*, *Vibrio vulnificus*, and leptospira. Most of these pathogens enter the water in inadequately treated human sewage, while others come from domestic and wild animals living near rivers and lakes.

A number of studies of human illness associated with recreational exposure to contaminated water have been done in various countries (for example, Australia, Canada, Costa Rica, Denmark, Egypt, France, Germany, Great Britain, Israel, Poland, and the U.S.A.), but research on this problem is extremely difficult to conduct. In the next presentation at this meeting, you will hear a description of one of these studies and understand better the problems of connecting exposure to swimming water with illnesses that may develop days or weeks after that exposure. Furthermore, even though most of these pathogens are usually associated with diarrheal diseases, exposure in the water can commonly result in lung, eye, and ear infections (Corbett, *et al.*, 1993).

Standards for safe water are traditionally based on the presence or absence of fecal coliform bacteria, but recent published and unpublished studies have repeatedly shown that these standards are inadequate (see, for example, Myint, *et al.*, 1994). While it is true that high fecal coliform levels indicate a high risk to swimmers, low or undetectable levels do not mean that there is no risk of infection from other agents.

Risk to lifeguards. Based on the results of a British study of persons with long-term exposure to ocean water, we can estimate that the virtually all ocean lifeguards will experience some illness from these water-borne pathogens (Myint, *et al.*, 1994). Furthermore, both the British study and an Australian study found that the risk of illness among persons with prolonged exposure to ocean water is approximately 4 times greater than that of persons who do not swim in the ocean.

Prevention. Individual lifeguards can take a number of steps to avoid contact with water-borne pathogens. The most obvious of these is to avoid swallowing water while swimming. A new Hepatitis A vaccine is available for previously unexposed guards working in areas where hepatitis A is

prevalent. In addition, because some pathogens enter the human body through the skin, guards with cuts and abrasions should avoid water contact. Lastly, shellfish that have collected at the water line should also be avoided, since a puncture wound can lead to infection with *Vibrio vulnificus*.

Long-term prevention, of course, involves stopping the discharge of inadequately treated sewage into bathing areas. One way of encouraging this change is to maintain records on water quality and to initiate or collaborate in studies on illnesses among lifeguards and visitors to beaches.

Contact with Sand

Some infections, especially those caused by various types of worms, can be contracted by walking on sand beaches. Recent studies of this type of infection have been conducted in England, France, the Netherlands, and Poland. In tropical areas, the most common type of infection, and perhaps the least studied, is helminth infections from worms deposited in dog and cat feces (*larva migrans*). In developed areas, a second hazard on the beach is contaminated medical waste. Studies in Great Britain indicate that this problem is continuing to increase in spite of new control measures that may have been taken since the advent of the AIDS epidemic (Phillip, *et al.*, 1993; 1994).

Risk to lifeguards. Evidence of human contact with medical waste on beaches suggest that infection is certainly possible. For example, Phillip and colleagues (1994) report that between 1988 and 1991, 40 needlestick injuries on British beaches were reported to public health authorities. In Palm Beach, Florida, 3 needlestick injuries to lifeguards have been reported in a 10-year period (J. Fletemeyer, personal communication).

Prevention. Contact with both of these hazards can be prevented by wearing sandals or shoes while walking on the beach. Surveying the beach for medical waste each morning, along with the use of containers to collect and dispose of sharp objects, will also help to reduce the chance of infection from needlesticks. Exclusion of pets from popular bathing areas is also helpful, but regulatory and logistic support for such efforts is usually lacking.

Contact with Victims

Direct contact with injured or drowning victims is unavoidable, yet these people can present a rich mixture of pathogens to a lifeguard. I will comment separately on the risk from contact that occurs in administering cardiopulmonary resuscitation (CPR) and the more serious risk from general contact with blood and other blood-contaminated bodily fluids.

Contact with skin or saliva

A number of viruses can be transmitted through direct contact when a guard is attempting to resuscitate a victim. Some viruses, such as herpes simplex virus type 1 (HSV-1), the cause of oral herpes, are present on the mucosal surface, while others, such as cytomegalovirus (CMV) and Epstein-Barr virus (EBV), are present in saliva.

Risk to lifeguards. The risk of infection caused by these agents is probably relatively low. An unpublished study conducted at the US Centers for Disease Control (CDC) and Prevention (J. Stewart, personal communication) found that some of these viruses can persist on the surface of mannequins used for training in CPR. However, these viruses are fairly common, with 50-95% of lifeguards having already been exposed to them, and therefore it is only the previously unexposed guards who are at risk for new infection.

Prevention. The use of pocket masks while administering CPR to victims should significantly reduce the risk of this type of infection, and wiping the mouth areas of mannequins with alcohol will prevent transmission of viruses during CPR training.

Contact with blood

The two major bloodborne viruses are hepatitis B virus and human immunodeficiency virus (HIV).

Risk to lifeguards. The risk of occupationally acquired infection from these viruses in lifeguards is extremely small. In 1990, CDC conducted a collaborative study of the risk for hepatitis B virus infection among lifeguards at an ocean beach in the state of New York. The beach is heavily used in

the summer, with many visitors coming from New York City. Serum specimens collected from over 100 guards were tested for antibody to hepatitis B virus and all were negative, indicating that none of the guards had been exposed to hepatitis B virus at any time in the past. (Guards who reported high-risk sexual behavior, injection drug use, and tattoos were excluded from the study so that the results would apply only to occupationally acquired infection).

Prevention. All blood and all bodily fluids should be assumed to be contaminated with these viruses, and steps should be taken to avoid contact with these fluids. Protective devices, such as gloves and pocket masks or disposable mouthpieces, should be routinely available for all first aid. Specialized first aid kits should also contain barrier masks and gowns. Special containers should be provided for the disposal of blood-contaminated sharp objects, and special water-proof bags should be available for the disposal of other blood-contaminated waste. A mixture of 10% bleach and water should also be available for cleaning blood-contaminated surfaces.

All lifeguard services should provide hepatitis B vaccination in advance to those guards who are regularly exposed to blood as part of their duties. In addition, detailed plans should be developed to be followed once a guard has actually been exposed to blood. This plan should include vaccination against hepatitis B for guards who have not been previously vaccinated, an evaluation of the risk of HIV infection in the victim and the probability of transmission to the guard, and counseling of the guard concerning procedures that may be followed for treatment for HIV.

Conclusions

Lifeguards are, by the nature of their work, routinely exposed to communicable diseases. The major steps to avoid these infections include:

contact in the water

- ! avoid swallowing water while swimming, even when coliform counts are low
- ! guards with cuts and abrasions should avoid swimming in polluted water
- avoid puncture wounds from shellfish

contact on the sand

- ! clean all types of waste, especially medical waste, from the beach
- ! wear sandals or shoes while walking on the beach

contact during CPR

- ! use pocket mask or other barrier over victim's mouth
- ! wipe practice mannequins' mouth area clean with alcohol

contact with blood

- ! avoid all contact with blood
- ! assume that all blood is contaminated
- ! have gloves, masks, gowns, "sharps" containers, water-proof bags, and disinfectant available for all first aid
- ! obtain hepatitis B vaccination if exposed to blood
- ! develop a plan for evaluation, counseling, and treatment following exposure to blood

Selected References

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