

# ALTERNATIVE TECHNOLOGIES: MEDICAL WASTE



Incineration, like other technologies for the treatment of medical waste, leaves a residue that must be landfilled. That is why incineration is not considered a technology for disposal, but only for treatment: final disposal must always be in a landfill. In the case of incineration, the residue is a highly toxic ash that requires special handling and special landfills. Sterilization technologies, on the other hand, leave a residue that is much less dangerous. Sharps, however, always require special handling, especially where scavengers operate.

The essential problem of incineration, from the point of view of risk to human health, is that it converts a physically contained, potential, biological threat into a dispersed, real, chemical threat. It is an overkill technology: in addition to the necessary task of destroying the pathogens, it also destroys the materials they rest upon. The following technologies operate through sterilization, which reduces the risk of biological infection with minimal emissions.

**AUTOCCLAVE:** The most popular of the alternative technologies. An autoclave is similar to a high-technology pressure cooker, relying on high temperature and pressure to destroy pathogens. Autoclaves are available in a range of sizes, from tabletop to room-sized. Most hospitals and clinics already use autoclaves to sterilize instruments before use, so it is a familiar technology to hospital staff. It is important to avoid putting any mercury-contaminated wastes into an autoclave, as the mercury will likely end up in the waste water. Autoclaves are manufactured in several countries, and are generally much cheaper than incinerators.

**MICROWAVE:** The microwave uses radiant energy to heat moisture within the waste or to heat water that is then sprayed onto waste. As with an autoclave, it kills infectious agents through heat and pressure. Microwaves are often combined with a shredder to reduce the volume of waste. They are generally more expensive than autoclaves but less expensive than incinerators.

**CHEMICAL DISINFECTION:** Chemical disinfection kills pathogens through the use of chemical agents such as hypochlorite or chlorine (bleach) solutions. It is often not as effective at killing pathogens as more advanced technologies and may involve more risk to personnel, as it requires greater handling of the waste. However, it may be an appropriate treatment option for rural clinics with small volumes of waste, particularly where electrical power is unavailable or unreliable. This is a very cheap treatment option.

**DEEP BURIAL:** The simplest option is to bypass treatment and simply dispose of the waste in a deep pit, away from water sources and secure from disturbance. It is important that chemically hazardous waste such as mercury and chemotherapy drugs are not buried, as they are likely to contaminate water sources. Pathogens, however, are unlikely to have any vector of reaching humans as long as the site is secure. In lightly populated areas, this may be a viable option for general disposal. Otherwise, it remains a popular option for the disposal of pathogenic waste, which is not highly infectious but should not be sent to an unsecured landfill for ethical and/or aesthetic reasons.

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**ESSENTIAL ACTION**  
PO Box 19405, Washington, D.C. 20036  
Tel (+1) 202.387.8030; Fax (+1) 202.234.5176  
action@essential.org      www.EssentialAction.org