

Expiry drug removal and handling, and disposal. Disposal of Narcotics, cytotoxic drugs

Irrespective of whether expired medicines have desired potency or not, they are toxic or not, it is legally and ethically not favourable to use them in clinical practice. But very often reports are on the contrary. The expired medicines get recycled with a new label showing fresh manufacturing and expiry date. The alleged kingpin, mastermind of business of supply of expired medicines with a fresh label in Tamil Nadu, seems to have made an estimated Rs 100 crore in just 17 years of operation. Chennai police reported to have seized expired drugs worth Rs 5.5 crore. Such drugs are found to be dumped in various places including Corporation dump yard to avoid police action. This is not an isolated case.

While the expired medicines may not cause a serious health hazard to the public or to the environment, their improper disposal could be serious. Pilfering from a stockpile of waste drugs may result in expired drugs being diverted to the market for resale and misuse as incident described above. Expired medicines may come into the hands of scavengers and children if a landfill is insecure. Some of the issues relating to the inappropriate disposal of expired medicines are:

- Possibility of contaminating drinking water source or supply from the disposal place the leachate may get access to the water supply system.
- Disposal of non-biodegradable antibiotics, anti-neoplastics and disinfectants into the sewage system may kill bacteria necessary for treatment of sewage. Flushing of anti-neoplastics into water resource may damage aquatic life or contaminate drinking water. Discharge of large amount of undiluted disinfectants into the sewage system or water resources may too cause similar situation.
- Burning of the expired medicines at low temperature or in open containers results in release of toxic pollutants to the air. Ideally this should be avoided.
- Inefficient and insecure disposal may lead to recycling of the expired medicines. This is true especially when they are disposed in original containers.

The following disposal methods have been recommended by the international authorities:

Returning to the manufacturer: Wherever feasible this should be the first choice because the manufacturer is likely to have good disposal method at its disposal.

Landfill: The waste materials are directly placed into a land disposal site without prior preparation or treatment. This is the oldest and most practiced method for solid waste disposal. Untreated waste must be rapidly covered with other municipal waste to prevent scavenging. Care should also be taken to prevent contamination of ground water.

Waste immobilisation (encapsulation): Expired drugs are immobilized in a solid block within a plastic or steel drum. After filling these substances into the drum to about 75 per cent of the

capacity, the drum is filled with a mixture of lime, cement and water in appropriate proportion. The sealed drums may be placed at the base of the landfill and covered with a fresh municipal solid waste.

Waste immobilisation (inertisation): In this method the products are removed from the package like removing pills from blister. The products are then ground and made a paste with a mixture of water, cement and lime. Then they are taken to landfill and decanted into normal urban waste.

Sewer: Some liquid medicines like syrups, intravenous fluids can be flushed into sewer after dilution. Small quantities of liquid medicines including antiseptics can be disposed off if they are well diluted before flushing.

Burning in open containers: Burning of medicines in open containers at low temperature cause release of toxic pollutants to the environment. Though not a preferred method, small quantities of waste medicines can be disposed off this way.

Incineration: Medium and high temperature incineration devices require a capital investment, operation and maintenance budget. Medium temperature incinerators operate at a medium temperature combustible process (800-1000°C) while high temperature incineration works at a temperature above 1000°C. Incineration of expired medicines is recommended only when absolutely necessary.

Chemical decomposition: As the method is tedious and time consuming, it is useful only for small quantities of medicines when appropriate incineration method is not available.

Before disposal, the expired medicines are required to be sorted out to different categories that require different disposal method or based on dosage forms. Based on dosage forms they may be classified into three basic categories: Solids, semi solids and powders; liquids and aerosols canisters. However, the special care is required for disposal of the controlled substances like narcotics and psychotropic substances; anti-infective drugs; antineoplastics; antiseptics and disinfectants etc. The recommended disposal methods based on dosage forms are summarized in this table.