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## EDITORIAL

# PHARMACEUTICAL WASTE DISPOSAL METHODS AND THEIR EFFECTS

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Incorrect disposal of pharmaceutical wastes is an emerging concern. Pharmaceutical wastes can be described as expired, unused, contaminated medicines or medicines no longer fit for human/animal use. The main sources of pharmaceutical waste seen in Kenya are expired medicines from households, hospitals, and community pharmacies. Pharmaceutical wastes are considered hazardous.

It is becoming increasingly important to focus on safe disposal of these medicines, as the effects of unsafe disposal is detrimental to the well-being of humans/animals. There should ideally be collection points for patients to safely dispose of these medicines; it would be best to collect these medicines at a Pharmacy where it can be stored safely and kept for safe disposal.

It has been found that several different incorrect methods of disposal are used locally. Disposal from households find their way in to dumpsters/landfills or to the water systems, adversely affecting humans and wildlife. Pharmaceutical wastes enter the environment through water systems. This may occur through liquid formulation medicines, for example syrups, that are poured directly into household sinks and eventually find their way into the sewerage system.

Furthermore, there are unregulated landfills where pharmaceutical waste is disposed of by households, industrial waste and even some community pharmacies. This contributes to the presence of pharmaceuticals in ground water. Often this untreated sewerage water is ingested or used for agriculture. Antibiotics in our water systems may be a major contributing factor to the ever so quick development of antibiotic resistance.

Minimal research has been conducted in Kenya regarding the impact of pharmaceutical waste to aquatic life. It is apparent that wildlife is adversely affected by this. For example, in a research conducted at a lake area in Canada, Fathead Minnows were exposed to low concentrations of synthetic estrogen which eventually led to feminization of male fish.

Some individuals choose to burn pharmaceutical wastes. This not only causes air pollution, but may have a health impact on humans/animals that inhale the smoke. Medicines are poisonous substances and may change its composition when exposed to high temperatures. Destruction needs to be carried out in a controlled environment, with sufficient circulation in order to prevent harm to the environment.

By regulation, the correct procedure of disposing drugs in Kenya is to first collect expired medicines and keep a record of the same. This list should then be taken to the Pharmacy and Poisons Board (PPB), where it is approved for destruction. Various companies are available to provide these services, and are approved by National Environmental Management Authority (NEMA). A pharmacist from PPB must be present to witness the safe destruction of the pharmaceutical wastes. On safe destruction of the medicines, a certificate is issued by both the incineration company and the Pharmacy & Poisons Board.

Unfortunately, most pharmaceutical waste generated from various sources does not undergo this process. It may be due to ignorance of procedures or due to the cost of disposal, as destruction entails a fee. There is a need for sensitization on safe disposal of pharmaceutical wastes, not only for the public but professionals dealing with pharmaceuticals.