# Chapter 9
# Ecotoxicity and Human Health Risks of Improper E-Waste Handling

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## ABSTRACT

*Globally, the management of solid waste encompasses electronic waste. E-waste, which makes up a substantial part of solid waste, contains several dangerous substances, including halogenated compounds like polychlorinated biphenyls (PCBs), tetrabromobisphenol A (TBBPA), and polybrominated biphenyl (PBB). These substances exert detrimental impacts on both human beings and the environment. Heavy metals constitute a significant portion of electronic waste, so it is crucial to exercise caution while dismantling them. The involvement of the informal sector in underdeveloped countries exacerbates the issue of handling e-waste. The existing methods for disposing and treating electronic waste are insufficient, and the materials have both immediate and indirect impacts on human health and the environment. This chapter examines the diverse types of electronic waste and their effects on different aspects of the environment and human health. It also discussed information on the procedures for managing electronic waste and effective handling methods.*

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## INTRODUCTION

The proliferation of various technical devices has significantly enhanced the quality of people's living conditions, resulting directly from advancements in development and industrialisation. The advancement of technology in the realm of information has resulted in the extensive utilisation of electronic and electrical equipment (EEE), significantly enhancing our standard of living. Nevertheless, it is concerning as electronic devices generate a substantial amount of waste as a result of their limited lifespan, continual improvements in aesthetically pleasing designs, and compatibility challenges. The need for state-of-the-art electronics is a significant catalyst for the generation of electronic trash (Forti et al., 2020). Over the years, there has been a consistent upward trend, and analysts forecast that this pattern will persist. The global production of electronic waste experienced a growth of 9.2 million metric tonnes (Mt) from 2014 to 2019, resulting in a total of 53.6 Mt in 2019 (Ghimire & Ariya, 2020). The quantity is expected to exceed 74.7 million metric tonnes by 2030, as per predictions (Forti et al., 2020; Ghimire & Ariya, 2020). In 1997, the average lifespan of a computer was four to six years. However, this period has been reduced to approximately two years by 2005 (Angaye & Ogidi, 2018; Needhidasan et al., 2014).

The increasing prevalence of EEE in modern life is placing greater demands on waste disposal facilities to effectively handle the waste stream (Althaf et al., 2021). A significant proportion of the solid waste stream comprises electronic gadgets, including computers, mobile phones, displays, and various industrial and home appliances. The waste contains numerous hazardous compounds and toxic metals, which represent significant dangers to both individuals and the environment. If not managed appropriately, these pollutants could have devastating consequences. The lack of effective enforcement of regulations and the general lack of knowledge among the public are major factors contributing to the poor status of e-waste management in various regions (Odili et al., 2018). Both the amount and disposition of consumers impact their decisions regarding purchases and disposal. Individuals who impulsively purchase new, substandard equipment may experience initial cost savings, but they will ultimately face negative consequences. The reason for this is because both the disposal process and the environment are adversely affected by these products (Shaikh et al., 2020a, b).

It is intriguing that individuals frequently dispose of their electronic equipment prior to its end-of-life (EoL) phase. The quantity of items that are transported to a designated recycling center after their useful life has expired is also relatively low. A substantial portion of this electrical equipment is incinerated for the purpose of energy generation or landfill disposal. Developing countries, such as China, India, and Africa, are disproportionately affected by the substantial inflow of electronic