

# Can the human coronavirus epidemic also spread through solid waste?

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## Abstract

Wastes generated in healthcare facilities have been discussed and the World Health Organization has proposed a guideline for controlling the spread of the virus that causes Coronavirus Disease 2019 (COVID-19). However, waste management outside the generating facility should be discussed in more detail, taking into account factors such as virus resistance, differences in waste management systems and the climatic conditions in each affected region. Patients infected by human coronavirus being treated at home are generating infected waste possibly discarded as domestic waste, which can pose risks to workers and the environment, depending on the conditions of transport and disposal. In particular, the spread of the coronavirus may be increased by inadequate waste management, highlighting poor handling conditions associated with inappropriate use of personal protective equipment and other unfavourable conditions presented mainly in developing countries.

## Keywords

Coronavirus infections, medical wastes, household waste, communicable diseases, environment

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Coronavirus Disease 2019 (COVID-19) is a respiratory disease caused by the virus named SARS-CoV-2, that was first detected in China (COVID-19, 2020) and which has been detected now, as of 11 April, in 185 countries/regions/sovereignty. It is estimated that more than 1,720,000 cases have occurred worldwide since January 2020 (Gardner, 2020). On 11 March, the World Health Organization (WHO) characterized COVID-19 as a pandemic (COVID-19, 2020). One month later, the worldwide death rate has reached around 6.2% (Gardner, 2020). SARS-CoV and MERS-CoV also belong to the large coronavirus family, all of which are believed to have originated in bats (COVID-19, 2020). From November 2002 to July 2003, more than 8000 probable severe acute respiratory syndrome (SARS) cases were reported from 29 countries with an estimated 10% death rate (>50% in people older than 60) (CDC, 2004), but since 2004, no cases of SARS have been reported worldwide (CDC, 2020). Middle East Respiratory Syndrome (MERS), first reported in Saudi Arabia in 2012, has reached 27 countries globally, with a death rate of 34.3% and 2519 confirmed laboratory cases to the end of January 2020 (WHO, 2020a).

Kampf et al. (2020) report in a review that human coronaviruses, such as SARS, MERS and COVID-19, can persist on inanimate surfaces such as metal, glass or plastic for up to 9 days. Compared with SARS-CoV and MERS-CoV, SARS-CoV-2 has spread more rapidly, due in part to increased globalization and the focus of the epidemic (Peeri et al., 2020). The higher mortality rate among confirmed cases of SARS and MERS, may be a probable reason for their lower transmission rates when compared to COVID-19. Therefore, the high resistance of

the SARS-CoV-2 for up to 9 days on inert surfaces as well as its ability to transmit from humans to humans (COVID-19, 2020; Chan et al., 2020) seem to be key aspects for its rapid spread. Nevertheless, SARS-CoV-2 transmission from person to person has been described in hospital and family settings. In this context, has the management of discards from infected people been properly considered?

Disposal procedures in healthcare facilities have been proposed by WHO (2020b) considering controlled conditions of thermal treatment or use of traditional biocidal agents, which are effective in eliminating the coronavirus (Kampf et al., 2020). On the other hand, waste management outside the generating facility should be discussed in more detail, taking into account factors such as virus resistance, differences in waste management systems and the climatic conditions in each affected region. Patients being treated at home are generating infected waste possibly discarded as domestic, which can pose risks to workers and the environment, depending on the conditions of transport and disposal. For the conditions in which the domiciliary waste collection vehicle has a compaction system, this process can cause the spread of contained air, if the wastes were provided by a home of

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an infected person, in a worst scenario. In particular, the spread of the coronavirus may be increased by the inadequate waste management, highlighting poor handling conditions associated with inappropriate use of personal protective equipment and other unfavourable conditions presented mainly in developing countries.

Doremalen et al. (2020) explained that viable COVID-19 virus could be detected in different conditions as presented: up to 3 hours post aerosolization; up to 4 hours on copper; up to 24 hours on cardboard; and up to 2–3 days on plastic and stainless steel. This relative long viability on studied materials suggests potential to the virus presence in wastes, as discussed below.

As already mentioned, coronavirus can be easily inactivated by biocidal agents or thermal treatment. It can be emphasized that hygiene procedures are seen as the key to controlling viral spread. According to WHO (2020b), ‘where decontamination cannot be performed in the laboratory area or onsite, the contaminated waste must be packaged in an approved manner, for transfer to another facility with decontamination capacity’. This same procedure should be recommended for infectious wastes from patients in treatment at home.

Poor solid waste management also intensifies the risk to health conditions of a specific informal worker group: the waste pickers (Cruvinel et al., 2019). They perform an important activity, informally collecting, separating, classifying and selling recyclable waste produced by the population. Without adequate management of domiciliary waste infected by coronavirus from patients undergoing treatment at home, these workers will be at increased risk, as well as formal workers and consequently the whole population. Therefore, information about safety segregation is essential for good waste and risk management in all generated places.

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