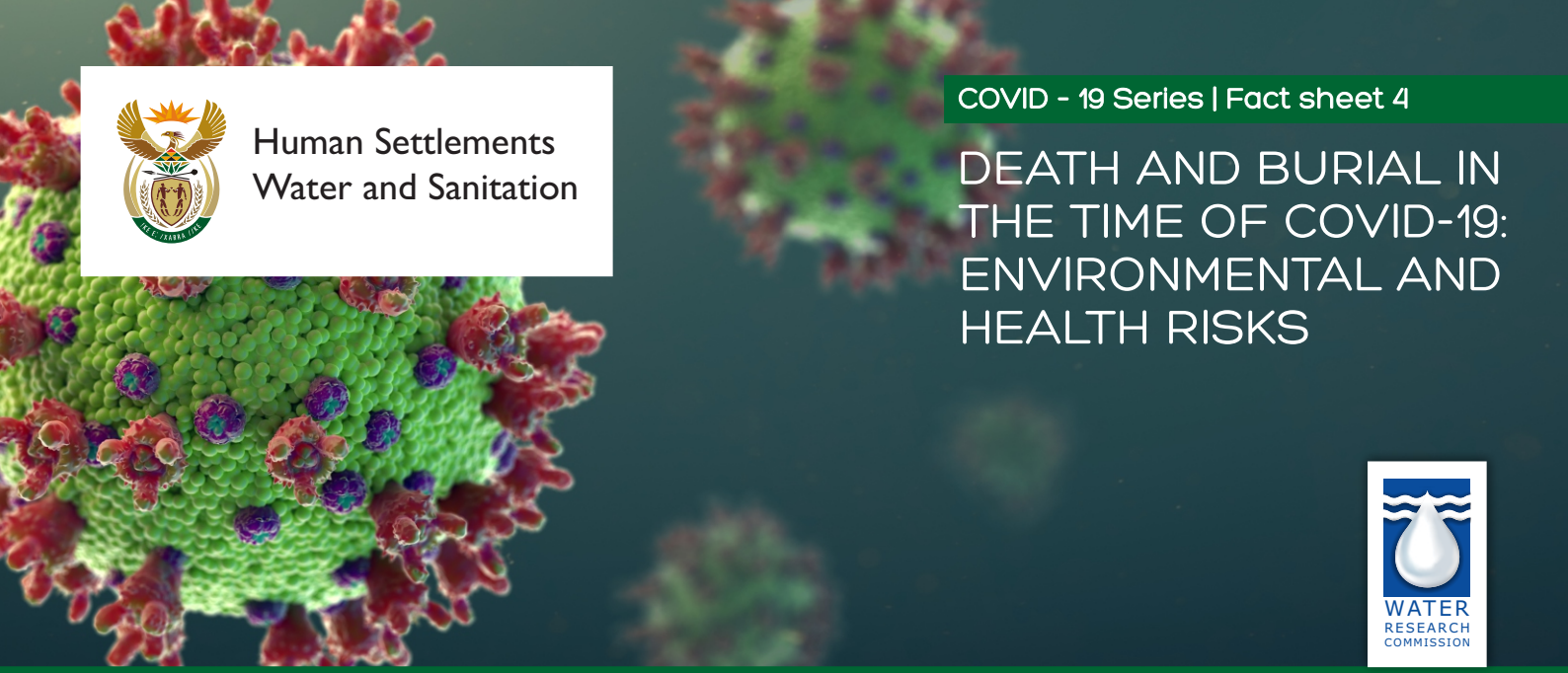


Human Settlements
Water and Sanitation

COVID - 19 Series | Fact sheet 4

DEATH AND BURIAL IN THE TIME OF COVID-19: ENVIRONMENTAL AND HEALTH RISKS

WATER RESEARCH COMMISSION

UPDATE: 23.04.2020

Background

As the Coronavirus disease (COVID-19) pandemic continues its scourge across the world, South African municipalities have been asked to prepare for the possibility of increased fatalities which might exceed current burial and crematoria facilities. Apart from ensuring there are enough facilities, an equally important consideration is to ensure that death and burial occur safely given the highly infectious nature of the SARS-CoV-2 virus (the virus responsible for COVID-19). As little is generally known about SARS-CoV-2, clarity is being sought around the risk to environmental and human health as a result of impending mass burial of COVID-19 victims.

Irrespective of a pandemic, due to the sensitive nature of death and burial practices very limited information is available on possible contaminants and their associated risks during the death and subsequent burial process. However, South Africa is among a handful of countries that has sought to determine possible adverse impacts of cemeteries. A completed 2018 Water Research Commission study (WRC Report No. 2449/1/18) provides a thorough environmental risk assessment of cemeteries based on different case studies and also provides guidance on contaminant monitoring and management of cemeteries[1].

Based on WRC Report No 2449/1/18 and local and international sources, which make reference to burial and death in the context of a viral pandemic, this factsheet addresses some pertinent questions.

The factsheet referred to as **"DEATH AND BURIAL IN THE TIME OF COVID-19: ENVIRONMENTAL AND HEALTH RISKS"** was developed in accordance with the World Health Organisation's (WHO) interim guidance on infection prevention and control for the safe management of a dead body in the context of COVID-19.

What are the risks associated with burial?

In general bodies that are treated and buried in a correctly sited and constructed cemeteries do not pose a threat to public health and are not a source of pollution. When buried, the human body decays to environmentally acceptable compounds mostly made up of water (H_2O) and carbon dioxide (CO_2), with calcium phosphate compounds remaining for prolonged periods as skeletal or cremation remains. Most contamination or pollution from cemeteries are from coffins and embalming processes, as well as accessories during burial such as cosmetics, medical implants, and jewellery. Microbial and chemical contamination can also occur in cemeteries as a result of unmanaged, untreated and incorrectly sited sanitation services, solid waste, and wastewater which allows for the flow of microorganisms and contaminants into cemeteries.[1] When these cemeteries become a reservoir for contaminants, especially microbial contaminants, there is a possibility that the underlying groundwater, surface water and soil can also become contaminated as movement of these contaminants are mostly by water in underground or by surface water. More recently, research is focused around emerging contaminants such as pharmaceuticals (e.g. medicines and cosmetics) and cause of death (e.g. HIV and cholera).

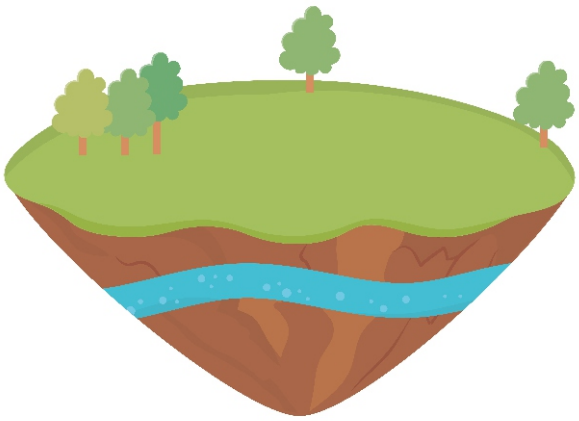
And if the cause of death is COVID-19 due to infection with SARS-CoV-2 virus?

All contaminants - including, metals, petroleum hydrocarbons, and microorganisms - survive in the natural environment for different periods. This is broadly referred to as persistence; i.e. how likely the contaminant is to exist for certain periods of time. In the instance of COVID-19, very little is known. No records are available for mass burials of Coronavirus-related deaths. Although previous strains of Coronaviruses have caused death, scientific evidence is sparse on whether an actual risk is posed when buried, especially in the context of mass burials. There is some available information regarding viral survival studies in human and animal bodies decaying due to death from avian influenza virus and foot and mouth disease (coxsackievirus) respectively.[2] Based on this information, most pathogenic microorganisms will not survive for long once death has occurred as they need a host to multiply and survive for prolonged periods to be continuously infectious. Furthermore, on death, there are little available nutrients for survival as these disease-causing organisms then have to compete for nutrients with other organisms responsible for body decay. When the host is finally interred (or buried), the concentration of viruses left will be released to the ground and surrounding environment. Although little to no research has been conducted on the survival of SARS-CoV-2 in the environment, coronaviruses are enveloped viruses that are unlikely to persist and retain their infectivity in the environment (including groundwater) due to their unstable nature and susceptibility to unfavorable conditions.

Are cemeteries, crematoriums and mortuaries safe?

If conducted according to the usual recommended health and safety practices, choosing to bury or cremate a person who has passed away from COVID-19 should pose no additional risk to persons alive or the environment.[3] However, in South Africa, based on the population's known religious and cultural practices around death as well as the lack of sufficient crematoriums, COVID-19 victims are highly likely to be buried in cemeteries.[1] Cemeteries, when sited properly according to sound scientific judgement, should protect surface water and groundwater from contamination regardless of the cause of death. Provided that the capacity of the cemetery is not breached, the placement and design of the cemetery have a built-in resilience to supply enough time for the attenuation of contaminants on-site. In some instances, poorly sited cemeteries may be at higher risk. In these instances, groundwater or surface water will be the most direct receptors of pollution, and the most at risk will be on-site users of water such as workers. The South African Cemeteries Association (SACA) has provided guidelines for the preparation of mass burials and cremation of COVID-19 victims,[4] and the WRC for the general investigation of burial sites.[1] In instances where new land has to be acquired for cemeteries and subsequent burial, clear specifications are laid out to ensure that the health of the public is not compromised even though mass burial will occur.

So, what constitutes a correctly sited and constructed cemetery?



Guidelines require that burial does not take place near surface water streams or wetlands, or within 250-500 m of drinking water sources, or in areas where groundwater is shallower than 4 meters. South Africa's groundwater is generally deeper than 4 m, and most of our groundwater aquifers are difficult to access from surface due to the depth and high geological variability overlying the aquifer. This is, however, not always the case, and some exceptions do exist where investigation should be done differently, and where different solutions should be employed. Burial depth should ideally be at minimum grave depth of 1.80 m for a single adult body, regardless of whether it is in a coffin or not.

Accompanying materials such as jewellery, pacemakers, makeup and ornaments, should be minimal. Backfill soil compaction should resemble that of the natural ground so as not to serve as a sieve for concentrated inflow of surface runoff. Given all these, groundwater and surface water should be fairly safe from possible contamination. Enough protection is offered by means of slowing down the movement of contaminants.[1]

If someone has died from COVID-19, what should be done in terms of handling the corpse?

To date, there has been no evidence of persons having become infected from exposure to the bodies of persons who died from COVID-19, but guidance has been provided from health authorities on how to handle the deceased. The South African Department of Health/National Institute of Communicable Diseases[5] and the World Health Organisation[3] both provide interim guidelines on infection prevention and control for the safe management of a dead body in the context of COVID-19.

These guidelines provide much needed direction for those whose family members die at home. It must be stressed that due to the highly infectious nature of the COVID-19 virus and how little is known about the virus and the disease it is best that bodies are handled by trained staff. The documents stress the need for personal protective equipment and frequent thorough handwashing with soap and water for those working around bodies and routine disinfection for workspaces in mortuaries and crematoriums.[5] Under experimental conditions, COVID-19 virus has been shown to survive on surfaces for up to 72 hours. It is therefore imperative that continuous supply of safe water is available at these premises to ensure that hygiene requirements and universal precautions are met.[3]

Note on Information Contained in this Fact Sheet

This fact sheet has been compiled on the basis of current knowledge available on COVID-19. It should be expected that information in this document might change or be redundant as the pandemic continues, research and investigation is conducted, and guidelines are amended accordingly.

References and Sources:

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For more information

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