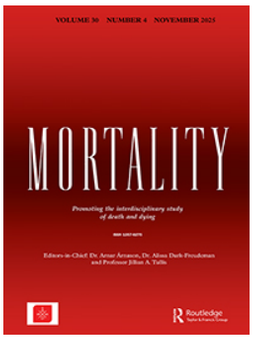

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Is human body disposal an environmental issue?

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ABSTRACT

Despite growing global commitments to addressing climate change, the environmental impacts of human body disposal (HBD) remain poorly understood. In both0 the UK and the US, the contexts from which this paper is written, HBD is typically framed as a matter of personal choice shaped by preference, tradition, or belief rather than as a cumulative social or environmental concern. Given the relatively small emissions generated by an individual's disposal, this framing is perhaps unsurprising. Yet when considered collectively, and when broader environmental consequences are included, the environmental impacts of HBD become significantly more substantial. This paper critically examines whether, and how, HBD can be measured, conceptualised, and addressed as a collective environmental issue. In doing so, it identifies the changes required to make the cumulative environmental consequences of HBD more visible to policymakers, industry providers, and the public.

KEYWORDS

Burial; cremation; disposal; environment; life-cycle assessment

Introduction

Just shy of 165,000 people around the world die per day. Over a year, this equates to around 60 million people, the equivalent of the population of Italy. Each of those individual bodies requires disposal, which in most cases takes place via land burial or through incineration (cremation). In a thorough analysis of the environmental impact of the disposal of a single body (referred to hereon as Human Body Disposal, or HBD) Keijzer (2017) shows that an average burial accounts for around 97 kg of CO^2 equivalent (0.01% of an individual's lifetime carbon footprint). Cremation constitutes 210 kg of CO^2 equivalent (0.03% of an individual's footprint). Compared to an average fossil fuel car emitting 4.6 tons of CO^2 per year (EPA, 2025) – which with around 1.6 people per car means around 3 tons of CO^2 per person per year through car journeys alone (European Parliament, 2024) –

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as a percentage of an overall individual's lifetime CO^2 emissions contribution, the impact of single person's HBD is thus minimal.

But what of the yearly CO^2 emissions of the disposal of a population the size of Italy? What of the other emissions? And what of the wider environmental costs of HBD beyond cremation or burial? When considered together and more broadly, the environmental impact of HBD is substantial. For example, the UK and US alone (from where the authors of this paper originate) there are around 3 million deaths a year combined, consisting of approximately 650,000 deaths a year in the UK and 3 million in the US. With their respective burial/cremation rates in the region of 20:80 for the UK and 44:56 for the US, with just CO^2 alone this results in around 606,000,000 kg (606,000 tonnes) of emissions per year for the two countries. To put this figure into context, the annual CO^2 emissions of the combined disposal of deceased people in (just) the US and UK are equivalent to the emissions of 1.5 natural gas fired power plants or around sixty million gallons of diesel fuel consumption (EPA, 2024) – which is about 2.7 billion road miles. When considered globally, the emissions numbers are even more staggering: using the most basic estimate of 60 million deaths a year and a simple hypothesis of a 50:50 cremation to burial rate, it is possible to estimate that the current global environmental emissions of HBD per year is:

- 97 kg of CO2 × 30,000,000 (for burial) = 2,910,000,000 kg of CO^2
- 200 kg of CO2 × 30,000,000 (for cremation) = 6,000,000,000 of CO^2

In other words, the annual worldwide emissions of HBD equate to 2.1 million fossil fuel powered cars, or 1.7 million homes being heated, or 24 gas-powered power plants. At the same time, alongside the CO^2 emissions from burial and cremation are the facilities to dispose of the human dead that require building, maintenance and upkeep; embalming fluid for bodies to be preserved; memorial stones that are sourced and transported from quarries around the world; (often single use) coffins and caskets that necessitate deforestation; car journeys used to attend funerals and visit burial sites; landscaping of sites that impact their biodiversity, and so on (see Nosi et al., 2024). All of this activity requires natural resources, fossil fuels, energy, manufacturing processes, machinery and more, and much of it affects the environment as an extractive and productive process, but little is known about its cumulative impact. Given these numbers and knowledge gap, with the global death rate predicted to rise by 40% and hit 100 million per year within the next 35 years, and to double to 120 million a year by the start of the next century (Ritchie & Mathieu, 2023), the environmental cost of the collective emissions of HBD – we posit – thus requires more rigorous public, scholarly and political attention.

This paper explores the extent to which HBD is, or can be, regarded as an environmental issue worthy of measurement, political attention, and a response. Focused principally on the UK and US as the countries from which the authors originate, it starts from the position that there has been a surprising disinterest in HBD as an environmental issue within the two countries and elsewhere (Robinson, 2021). Instead, HBD has largely been regarded as (1) an issue of individual consumer choice according to personal preference, tradition and belief, and (2) a localised matter for commercial and public providers rather than a practice that requires a coherent (inter)national policy response (see Babcock, 2022). While 'green(er)' death practices have emerged since the turn of the century (see

Shevlock et al., 2022) and alternative HBD methods established or developed, such as natural burial (Harris, 2008), alkaline hydrolysis (see Olson, 2014; Robinson, 2021; Scarre, 2025) and natural organic reduction (see Cirigliano, 2023), in the last decade relatively little has changed in the environmental conceptualisation of HBD since Rumble et al. (2014) was published in this journal. In that paper, Rumble et al. argued that the development of environmentally focused HBD practices was (re)locating deceased people into the realm of the living. The dead, they argued, were no longer sequestered and instead 'dispersed' into the world through these practices, positioned as a ' ... a gift to the living and to the planet' (Rumble et al., 2014 p. 244). This dispersal, the authors suggested, was a (re)conceptualisation of the dead as either utilisable products *for* the planet or *as part of* the natural ecosystem.

The idea of human bodies being part of an ecosystem has been taken further by the academic study of the concept of 'necro-waste', whereby the dead human body is understood as ' ... an entanglement of organic and synthetic entities that affect the natural environment, global and local economics, creation of archaeological and medical knowledge' (Shtanov, 2025, p. 7). Within this framing, bodily materials are conceived of as a form of material waste, and in so doing the idea of their being necro-waste draws attention to the problems and opportunities that managing the 'waste' materials of the dead body pose for the health of the planet (Olson, 2016) – as well as the limits of existing legal frameworks overseeing dead body management (Troyer, 2016). Through ethnographic work in crematoria and natural burial ground sites, D. P. G. Robins (2025) has suggested that approaching the dead body in such a way – in seeing it as a series of waste materials – facilitates a more critical approach to the way that these (bodily) wastes are conceptualised *through* their disposal. In other words, as they are disposed of the meanings bodily waste materials are reclassified, with the reusability of bodily waste as a means to support the planet emphasised. In this way, Robins argues, the emergence of 'green' HBD practices has shifted HBD to be regarded as *less* a matter of disposing of waste and more a matter of enhancing the deceased body's *utility*.

Thus, the way that bodies have been thought about, and their productive potential, is evolving. Yet, despite significant advances in the study of (and public awareness in) climate change over the last decade, seeing HBD practice(s) as an environmentally 'productive' or polluting process – and addressed it – has not taken off. HBD methods that pertain to be 'greener' have stagnated or been slow to progress. For example, in the US natural burial accounts for only 5% of burials and 10% in the UK, with signs that its UK growth is decelerating (APSE, 2020). Another 'new' method (discussed later in this paper), alkaline hydrolysis, has only just been legislated for in the first UK country of Scotland,[1] and its uptake varies considerably across the United States (World Population Review, 2025), where it was first made legal in the state of Minnesota in 2003. In both countries natural organic reduction (which as of May 2025 it was legal in 13/50 US states) is still in its infancy.

Such slow progress is not surprising given that there is, as this paper will argue, scant consumer or provider pressure to account for or address the environmental impact of HBD choices. There also remains a lack of systematic measurement or tracking of the environmental impact of HBD (in the UK beyond emissions, see later in this paper), nor is there robust documentation of number of HBDs performed using existing (natural burial)

or new (alkaline hydrolysis or natural organic reduction[2]) 'greener' techniques. To date, considerations of the environmental impact of HBD have instead been limited to:

> . . . restrictions in the funeral law . . . . for example, with respect to grave depth in order to protect ground water quality, or via restrictions in other laws, for example, to restrict toxic emissions in air pollution laws. To this extent, the environment is protected from any *excessive* impacts. (Keijzer, 2017, p. 716, emphasis added)

In establishing what might constitute 'excessive impacts', Keijzer provides a useful benchmark for the environmental costs of HBD, breaking down the component parts of HBD practices to include coffin type, metal recycling, and land use, amongst other factors. In her comparison of the environmental impact of burial versus cremation she argues that when the (high) cost of land is taken out of the equation, burial is by far the least impactful HBD option (and cremation the most) at the level of the *individual*. But, as she points out, there is little systematic evidencing or documentation of:

(1) the *collective* impact of HBD;

(2) the contributory factors to political decision-making in driving environmental choices and scaling up impact; and

(3) how these might be addressed cooperatively between nation states committed to climate change action.

Such disinterest in HBD is not unusual, Walter (2024) contends, given that considerations about the environmental impacts of human behaviour are dominated by siloed national interests, and death is typically a peripheral political concern of governments. We would go further to argue that it is unlikely that international cooperation will be achieved when HBD – at least in the UK and US – is barely regarded as a *national* issue (let alone international), and is a matter that is typically dealt with, and regarded as, a highly localised matter of market-led local provision and individual consumer choice.

What *has* changed however, since Rumble et al. (2014) and Keijzer (2017) were published, is the public health agenda. During the COVID-19 pandemic in the early 2020s, on an unprecedented scale countries around the world had to co-operate to contain a novel virus and work together on the social and economic implications of migration, international travel, and lockdowns. It is through this collaboration that there has been a growing recognition of the importance and impact of co-ordinated public health policy and an internationally coherent climate change agenda has, it has been argued, already begun to benefit from this (De Lucia, 2020). Thus, it appears to be an apposite time to address HBD as a cumulative environmental issue with planetary impact, and it is to Keijzer's three points above that this paper responds, namely by establishing the collective impact of HBD, the contributors and contexts of HBD, and how these might be addressed.

The environmental context of human body disposal

First and foremost, to think about HBD as an environmental issue requires, we argue, a reconceptualisation of human death *beyond* individuals and its (re)imagining as something of a planetary or population matter (see Gane, 2014, Olson 2024; Shevlock et al., 2022). Such an argument extends 'Learning to Die in the Anthropocene' (2015), where

Scranton argues that there is a need to admit *the whole of human civilisation* to what Lofland calls 'the dying category' (2019, p. 3). In so doing, he argues, because of climate change the earth's human population must now learn 'how to die not as individuals, but as a civilization' (Scranton, 2015, p. 21). This we see as both in terms of the possibility that humans will burn themselves out as a species, but also that humans die en masse every day and the impact of their cumulative deaths on the planet need to be recognised. This is not a novel viewpoint: in earlier issues of this journal Walter has argued that human death needs to be understood at scale and that an ongoing climate and ecological emergency (CEE) 're-direct[s] attention from the death of personally known individuals to species death' (2023, p. 669–670) – and not only the species Homo sapiens, but 'the entire collective of species (of which humans are a part)' (p. 12). Elsewhere, Olson contends that 'thinking about and designing for death at large scales has provoked a moral dialectic that moves between individual and collective death, and between anthropocentric and ecocentric perspectives on death's meaning and materiality', adding that '[r]econciliation across constructed scales of death and disposition calls for an alignment of human purposes and natural processes' (2024, p. 37). This alignment, Olson contends, requires the (re)conceptualisation of human death (and policy related to human death practices) as *everyone's* business.

Despite these academic assertions about the need for thinking about human death and its cumulative impact as a collective social and environmental problem, there has historically been limited political appetite to address the impact of HBD as a *public* issue requiring a policy response (Foster et al., 2019), nor the ' . . . social, personal, or religious norms on minimizing the environmental impact of disposing of human remains' (Babcock, 2022, p. 165). This lack of interest corresponds with the well-established public conceptualisation of HBD as a matter of individual choice guided by preference, tradition and belief predominantly led by and provided by a mixed-market of providers, at least in the UK and US (Canning & Szmigin, 2010; Walter, 2017). Such a focus on individuals and market-led provision has stemmed from, and contributed to, a dearth of robust and consistent data gathering of, or sharing on, HBD methods beyond basic burial and cremation figures (D. P. G. Robins, 2025) and to date efforts to study the combined impact of HBD choices have been isolated. Examples of such (often highly localised) studies include the specific environmental costs of particular practices, such as embalming (Chiappelli & Chiappelli, 2008; Kleywegt et al., 2019), soil contamination from casket burial (Richardson et al., 2024), the repatriation and transportation of bodies (Jassal, 2015) and, in this journal, the management (and trading) of cremation emissions (D. Robins, 2025). There has been scant attention paid to the cumulative (inter)national consequences of HBD practices.

Progressing the public profile of this as an issue worthy of policy attention has also been variable. In the UK the Environmental Stewardship Group formed in late 2020 'in response to the Climate Emergency declarations, and the recognition that the [death care] sector has a substantial part to play in addressing the environmental concerns affecting the UK' (n.d.). The aim of this group – a partnership between the national bodies of the Institute of Cemetery and Crematorium Management, The Federation of Burial and Cremation Authorities and The CDS Group – was 'to lead the bereavement sector to sustainability' (ibid.). This group has faltered however, subsumed by the founding organisations' need to deal with the consequences of the COVID-19 pandemic and the fallout

from the Competition and Markets Authority (2021) investigation into the financial transparency of the funeral sector.[3] The same period has seen the establishment of the Greener Globe Funeral Standard, which is a UK organisation promoting more consistent and sustainable environmental standards that can be routinely audited. Across the Atlantic in the United States, there have been embryonic indications of national collaboration with advocacy for understanding the environmental consequences of HBD practices now distributed across multiple independent nationwide organisations, including the Green Burial Council, the National Home Funeral Alliance, and the Order of the Good Death. Despite these encouraging signs, at the level of national policymaking (similar to the UK in recent years, see later in this paper) the US Government has focused more on consumer interests – notably transparency regarding deathcare products and services – and their financial, rather than environmental, cost.[4]

With little political pressure to address the environmental consequences of HBD, the deathcare industry in both the US and UK has not been keen to take on the mantel of HBD's environmental impact. The reasons for this are manifold, including: uncertainty about short- to medium-term profitability in developing alternative HBD technologies and their uptake; concerns that without a (costly and sustained) public education campaign it is uncertain whether individual consumers will prioritise environmental HBD choices over other considerations at the point of purchase; the distribution of religious belief across the respective populations that means that there is often little scope for people changing (or even thinking differently about) their HBD choice(s) as they will default to their religious frameworks to inform their decision-making; deeply engrained funerary practices and customs such as embalming (in some areas of the US specifically); the strength of localised familial or community tradition and so on. Thus while commercial providers are often better placed than governments to invest in long-term infrastructure (Walter, 2024) without robust signs to indicate that their current and prospective clients care about the environmental consequences of their HBD choice – nor evidence that they would switch HBD choices even if they did – there is little incentive for deathcare service providers to address HBD as an environmental issue. It is therefore unsurprising that, without a guaranteed immediate or future profit, the mainstream providers of HBD in both the UK and US have not devoted significant financial resources in changing their approach to HBD or reconceptualising HBD as an issue beyond that of individual choice. Nor have they strongly advocated for or pushed innovation in HBD technologies[5] (see Scarre, 2025) which could, at the very least, include alternative energy sources from cremation (e.g. electric cremators), utilising (and selling) heat from cremation to local organisations, and more efficient and effective use of land for burial. Instead, the deathcare sector in the UK and US has stuck with what it knows will generate revenue and satisfy their customers and thus, largely, on burial in relatively shallow (and at present) single use grave plots, and gas-powered crematoria.

A lack of deathcare providers buy-in for conceptualising (or pushing for) HBD in environmental terms has, in part, led to a growing call to 'naturalise' or 'green' death from an 'outsider' movement, often referred to as the natural death movement in the UK or home funeral movement in the US (or Ecological Death Advocates, as termed by MacMurray & Futrell, 2019). Resonant with efforts to de-medicalise childbirth 50 years ago and to de-institutionalise hospices 30 years ago, since the 1990s members in these respective movements have called for the de-professionalisation and de-commodification

of post-death activities (Parsons, 2018). Such calls have sought to challenge the consumer/provider binary that has structured contemporary UK and US deathcare to date and endorsed a more collaborative approach to thinking about HBD as the outcome of a negotiation *between* consumers and providers (see MacMurray & Futrell, 2019; Woodthorpe, 2017). Within these movements, proponents have argued for a variety of policy and practice changes to 'reclaim' HBD, and to think about HBD as a public – and ecological – issue. These changes could include the (re)location of the dead to places of comfort such as domestic homes and natural settings (Herring, 2019; Hooker & Woodthorpe, 2024), addressing the environmental costs of burying embalmed bodies (Ajileye et al., 2024), the sustainable use of land through grave reclamation (Rugg & Holland, 2017), and efforts to change the consumption of single-use products such as caskets and coffins (Shevlock et al., 2022). A significant group within these movements have been supporters of natural burial, who have called for (akin to necro waste arguments) the (re)conceptualisation of burial as a method of 'gifting' bodies back to the land (Davies & Rumble, 2012; Rumble et al., 2014). Curators of this idea of bodies as eco-friendly gifts have, it is argued, successfully intertwined narratives of nature *and* culture within their campaigns, crafting a very particular idea of HBD as something that fosters 'natural processes' alongside the accommodation of personalised (and sometimes inconsistent) mourning choices (see Davies & Rumble, 2012). Such accommodation can include embalming, the burial of items that will not decompose, and individual memorialisation around grave plots. Importantly, this amalgamation of competing narratives means that nature (the environment) and culture (human choices and behaviour) *do not exist in opposition* in natural burial grounds (Balonier et al., 2019) and that, rather, in these sites the boundary between the environment and the human is entangled in what Haraway (2003) has called 'NatureCulture'. This entanglement consists of a '. . . rethinking of culture [that] has to be brought alongside a politics of nature' (Latimer & Miele, 2013, p. 9). In other words, it is not an either or situation; (potentially competing) individual consumer choice and environmental needs/costs/benefits *can* co-exist in these spaces.[6]

Is HBD a 'natural' process disposing of 'natural matter'?

An intertwining of individual consumer choice and a narrative of (more) 'environmental' disposal methods has been fortified by a protectionist ethos or 'land ethic' (Leopold, 1949) that has proliferated the idea that HBD is fundamentally the disposal of *natural* matter (see Krupar, 2018). Such a philosophy, that human bodies are 'natural matter' that can be disposed of using 'natural' resources, has underpinned the development of natural burial and is particularly evident in the invention (and marketing) of new disposal techniques and technologies, namely alkaline hydrolysis and natural organic reduction. The first, alkaline hydrolysis – known colloquially as 'water cremation' and 'green cremation' or by the trade names Resomation and Aquamation – has seen the foregrounding of a narrative that posits dissolution by water as a gentler and more natural or environmentally friendly process for HBD (rather than incineration by fire) to dispose of the body and turn it into powder. This process requires 5–10% of the energy of cremation and enables the recovery of metals rather than their incineration (Nosi et al., 2024). There is a question about how 'natural' or environmentally friendly alkaline hydrolysis is, however (Scarre, 2025). The dissolving of a human body

requires heated alkali-water-based solution of 95% water and 5% strong alkali, heated to temperatures between 95°C and 150°C. Through this alkali solution alkaline hydrolysis reduces the deceased person's body to bones and an inert, sterile, DNA-free effluent and, in most alkaline hydrolysis systems, the pH value of the residual fluid and water used is assessed and, if necessary, chemically treated to ensure the effluent meets local standards for entering the municipal wastewater system. Not only is there thus considerable chemical intervention, but this emergent HBD technology is also resource intensive, requiring around 1500 litres of water per cycle (i.e. per body) and for areas of draught practising alkaline hydrolysis at scale imposes considerable pressure on an already meagre water supply. Moreover, beyond water usage, there are high energy costs associated with the production of the alkali required, as 'one of the most energy-intensive industries out there. Billions of kilowatt-hours world-wide, with the average chloralkali plant consuming as much electricity as 30,000 American households' (Campbell, 2016). While we acknowledge that the vast majority of chloralkali production services industries beyond HBD, Campbell is right when he asserts that a holistic and whole lifecycle approach to HBD technologies, such as alkaline hydrolysis, should be considered when comparing or promoting their environmental impacts. A narrative focus on the final method of dissolution does thus not reveal the backstage (and invisible) processes of production nor their environmental implications.

The second technique, natural organic reduction, is a 'newer' innovation than alkaline hydrolysis and the US has led the way in its development,[7] with Washington State Legislature (the first US State to make legal provision for natural organic reduction) establishing the now widely accepted, legal definition of the process as 'the contained, accelerated conversion of human remains to soil' (WAC 246–500-010). But, as with alkaline hydrolysis, is this an entirely or more 'natural' process dealing with 'natural' matter? While individual natural organic reduction processes differ depending on the manufacturer, the basic proposition involves placing the body in a vessel containing organic materials such as alfalfa, wood chips and straw, before the vessel is closed to begin – and accelerate – decomposition. Halfway through the bone matter is removed from the vessel, crushed in a cremulator and then reintroduced to the composting material for the remainder of the process. After five to seven weeks, the composted material is removed from the vessel and allowed to 'cure' for an additional three to five weeks. Once the entire process is complete – two to three months after the initial 'laying in' of the body in the vessel – the resulting 200-360 kg (500–800 pounds or 35–57 stone) of compost can be returned to the funeral director's client or donated to be spread on land as a soil amendment. While this technique does not require fossil fuels or water to break the body down, it does require the production and maintenance of vessels, and the associated safe and well-maintained space needed to house them,[8] rather than using existing burial plots on the ground. There is also not an insubstantial amount of compost that needs to be moved after 'curation', equating to about a third of the weight of an average car.

Together, these two emergent HBD methods thus require considerable human intervention and comprise environmental impact(s) within their (suggested) more 'natural' processes, be it using a lot of water, alkali production, requiring additional containers and space, or the movement of remains. Much of this environmental impact is obscured to the public however, and neither are consumers encouraged to account

for these factors in their (individual) decision making about what are positioned as 'greener' HBD choices. So, with this camouflaging of the wider environmental implications and given the cumulative environmental impact of HBD, how could this change and does it need to?

Accounting for HBD: identifying the drivers and what to measure

In shifting the conceptualisation of (and attention paid to) HBD beyond individual choice and instead its cumulative environmental contribution, it is important to recognise that there are two driving sets of forces that shape current HBD practices, their environmental impact and their measurement. Those (1) capitalist exchange markets and (2) environmental health values (and costs) are largely entwined in existing HBD practices, with the second (environmental health) typically subsumed into the capital to be derived from HBD. Examples of this in the UK specifically include the reclamation of land earmarked for burial that has been leased for farming, in part so as to not overpopulate the existing cemetery and maintain its biodiversity (as in the recent disputes in Bristol),[9] and how mercury emissions from crematoria are cooled and captured in an effort to stop them from entering into the atmosphere. In this particular example, D. Robins (2025, p. 3) illustrates how this capturing has become enmeshed with a market of credits trading within the mercury emissions measurement system Cameo, where crematoria can 'trade' their mercury emissions or capacity, in other words 'paying to pollute'. What this means is that rather than instal costly new filtration equipment, crematoria without filtration equipment can purchase surplus credits from those that filter above the 50% target of emissions to demonstrate compliance with emissions targets (and to avoid fines). Measurements of environmental impact from polluting HBD techniques, such as mercury emissions, thus have *monetary* value and rather than incentivising moves to improve or lower the environmental impact of HBD they are often traded, forming *new* markets that focus on financial income and expenditure over environmental impact.

Moreover, there is much more to measure in HBD than simply cremation emissions and land usage: as a largely an extractive and productive industry, in both the US and UK, there has over the last century been a reliance upon technologies and practices for HBD that actively generate *more* materials and practices that affect the environment, for example in the embalming of bodies that do not decompose or leak embalming fluid into the surrounding soil; landscaped gravesites; single-use coffins and caskets that require continuous production; creating vessels and containers for cremated or hydrolysed remains; brick lined vaults to house burials, and so on (see Nosi et al. (2024); Olson (2016). What is more, the disposal of bodies in the two countries relies heavily upon global industries to provide (and transport) the chemicals, metals, woods, stone and fossil fuels needed to power cremators (and in time resomaters), and to create embalming fluids, coffins and caskets, urns, cremators, caustic alkali, memorial stones, and other funeral paraphernalia. At the same time, the planning, design and location of HBD sites, often on the periphery of urban areas, requires transport to and from the site for bereaved people to visit; the conventional aesthetic of the lawn cemetery requires heavy maintenance to maintain its appearance; and individualised memorials – often single use – require stone (often granite) that is typically imported from India and China. HBD is thus not just about the technology and emissions, it includes the wider planning, infrastructure and supply

chains that keep the facility running, and culturally dictated mourning customs regarding how a crematoria or cemetery should appear to, and is utilised by, consumers/users.

Given this wider and more extensive constellation of items and practices that constitute HBD, a robust identification and volume assessment of the environmental impact of HBD needs to extend beyond Keijzer's (2017) initial evaluation of the environmental impacts of funeral choices. A life-cycle assessment (see Curran, 2013) is one such tool which might be usefully deployed here, as it aims to codify and quantify environmental (and also social, Jørgensen et al., 2008) impacts of a process so that different options can be compared using the same metric measurements and standards. Such an assessment would capture the infrastructure and resources required and used to dispose of bodies en masse, such as buildings and their maintenance, grounds/land, machinery, fossil fuels and natural resources, as well as the use of fleets of vehicles to transport bodies and funeral attendees, the use of manufactured materials in coffins, the purchasing of memorials made of granite shipped around the world, the embalming of bodies that are soon-to-be-cremated or buried, and the wider use of resources to create what Walter (2017) has called the funeral 'hardware'. Shifting beyond the environmental impact of an individual body's disposal, an approach such as this could also facilitate a better accounting of the value flows (capital or environmental) that pervade the life-cycle of varying HBD methods and document the broader material consequences of dealing with the disposal of the dead (as proposed by supporters of the idea of humans as necro waste), such as stone extraction for grave manufacture and the transportation of said stone. Furthermore, a life-cycle assessment would better be able to identify the tensions between the drivers of capital and environmental value systems, the documentation of the cumulative impact of HBD, and mechanisms to improve efficiencies in existing systems rather than pursuing new technologies such as alkaline hydrolysis and natural organic reduction as the technological 'answer' to existing HBD practices. Resource-efficiencies could include systematic grave re-use in the UK and US (see Babcock, 2022) and moving the powering of crematoria ovens from gas to renewable energy sources (Hadders, 2018). More radically, it could include the location of new crematoria to be better able to re-use and retain heat generated from the cremators, akin to the siting of Spanish crematoria within dense urban locations (Mendaro Ruiz de Larramendi, 2025), or the closing/merging of crematoria competing for business to ensure the ovens (and therefore fuel) is being used as efficiently as possible. Using a life cycle approach would also lend itself to (more) open conversation about how the wider infrastructure of HBD could address the environmental contribution of HBD and overlap with consumer choice in fairer ways, ensuring that (wider) HBD environmental impacts are both made visible to consumers when making their individual choices and *actually* lowered, rather than *appearing* to be.

Discussion: what could make the difference?

To instigate change in HBD thinking beyond the individual and towards its collective impact, incentives for both consumers, providers *and* policymakers will be required. In the US, Haneman (2021a, 2021b) has argued that the way to shift consumer thinking about HBD as an environmental issue (and thereby generate investment in HBD to mitigate its environmental pollutive potential) will be state-mandated policy initiatives designed to incentivise consumer choices through subsidisation or tax relief that may increase

demand, in a similar way to initiatives that have increased consumer demand for solar panels and electric vehicles. Such an intervention, Haneman suggests, will be required as both a source of information and instigator of behaviour change, which in turn will (re) conceptualise HBD as equally an issue of individual preference and one of cumulative environmental implication.

Others think differently. Also in the US, Babcock (2022) has argued for mitigation measures to address the environmental costs of HBD, such as graves of multiple occupancy. Others such as Olson and Wilson (2024) have contended that instead of focusing on financial incentives for individual consumers, change needs to come from policymakers and that deathcare policy needs to appeal to public morality. In other words, efforts need to be made to create a policy environment in which state and federal authorities incentivise environmentally conscientious HBD choices and shift death care policy so that individuals think about HBD as a community issue with a collective outcome. Such an argument loosely echoes calls for a public health approach to – and investment in – the end of life and bereavement care (Lichtenthal et al., 2024). This approach advocates for ways of incentivising people to care for one another as peers and to recognise the impact of their respective individual choices on *others*.

Elsewhere, Gilligan and Steuve (2011) argue that it is the responsibility of governments to ensure that the dead are managed in a feasible and sustainable way:

> [i]t is well within the police powers of the government to require the orderly disposition of the dead in order to promote public health. Society has recognized that health and safety concerns, as well as public morality, necessitate the disposition of the dead by regulated methods. (p. 11)

We contend that these regulated methods need to be integrated into – and planned within – a local and national infrastructure (let alone international) that does not rely on market-led provision. In relying on the market to determine provision, as at present, environmental costs get subsumed by capital value drivers and innovation in HBD risks stagnation and inefficiency as the deathcare sector operates in competition with one another and does not typically collaborate (see Valentine et al., 2013). Despite Walter's contention that corporations are better equipped than governments to drive improvement or efficiencies it is, we suggest, likely that if change in HBD as an environmentally productive practice (as it is at present) is required, it will fall to governments to step up and incentivise the public and providers to engage with, and make more, environmentally friendly HBD choices. Most likely this will be by a combination of what Haneman, and Olson and Wilson, call for, via financial *and* policy incentives.

Shifting responsibility onto governments for the disposal of the dead, and in making visible the environmental consequences of HBD specifically, will not be easy. A critical reason is that – as this paper has noted – at present HBD (in the UK and US at least, from where this paper originates) is predominantly regarded as an issue for the individual (consumer) and much of the environmental impact is hidden (Babcock, 2022). The choice of HBD method is largely regarded as a decision exclusively for the deceased or their family to make, regardless of the impact of that choice on others or the planet. Moreover, even within the UK and US (let alone the Global North or globally), there are differing local and cultural approaches to funerary decision making that will shape the extent to which HBD is understood as an issue that is (1) anyone

else's business beyond the family's and (2) worth policy intervention. This paper has focused on two countries that are highly individualistic neo-liberal nations that typically have a 'hands off' approach to state intervention in funerals (see Valentine & Woodthorpe, 2014) and to convince their respective governments to take responsibility for HBD will be a substantial task of persuasion. For other countries, where there is a more collectively orientated culture and welfare state (such as Nordic countries, ibid), this might not be such a big ask. Given this diversity, at every level (locally, nationally, internationally), we argue that a productive starting point to having a dialogue about HBD and its cumulative environmental consequences – and to persuade the public, providers and policymakers to pay attention – will be a systematic and routine data gathering exercise, that uses standard measures to clearly document and compare the wider environmental costs of HBD choices; namely, a life-cycle assessment. This exercise will go some way to evaluate the annual (and shared) impact of HBD choices, identifying the most and least environmentally impactful practices and places vis a vis their population size in order to make an evidence-based case for the need for political and commercial attention.

Conclusion

This paper has explored the environmental impact of HBD, arguing that there is a need to reconceptualise HBD beyond the individual and as a collective issue, in order to (1) know the cumulative environmental impact of HBD and (2) understand how to address it. It has argued that a life-cycle assessment approach to measuring HBD will help understand the environmental impact of HBD more broadly, and account for the varying driving forces that shape HBD technologies and practice. Such an approach will also go some way to addressing the potential for resource-efficiencies in HBD, rather than, perhaps, seeking the 'magic bullet' that is offered by new disposal technologies.

Notes

1. The Hydrolysis (Scotland) (No. 1) Regulations 2026.
2. Part of the problem is that methods of disposition are not clear on death certificates. In the US in some locations (Colorado, Florida, Georgia, Kansas, Maryland, and Wyoming) AH falls under cremation, but without specification of whether flame cremation or AH was used. In Arizona, NOR falls under the classification of cremation, but without any means of tracking whether flame cremation, AH, or NOR were used.
3. There is potentially positive news on the horizon however, with state-led reviews indicating that there is an embryonic policy appetite to address the environmental contexts of HBD: the Law Commission of England and Wales, at the time of writing this paper, are currently conducting a review of legislation to consider whether to amend laws that allow for the legalisation of alternative HBD methods and systematic grave reuse. While encouraging in that HBD (such as new methods of disposal) and the environment (such as land availability) are now being talked about together, their review will not, however, specifically address nor measure the environmental consequences of HBD methods.
4. One exception to this rule is Olson and Wilson's 'The Affordable (Death) Care Act: Radical Reformation of Federal Funeral Regulation to Address Funeral Poverty' (2024, *Wake Forest Journal of Law and Policy*). There, the authors argue for changes to US public death care policy at the state and federal levels that could help reduce funeral costs, incentivise

environmentally conscientious death care practices, while shifting death care policy towards a public-centred model through which 'society can better support individuals and families during times of grief and loss'.

5. In the UK one of the major funeral providers, Cooperative Funeralcare is positioning itself as a leading provider of alkaline hydrolysis, see https://www.co-operative.coop/media/news-releases/co-op-announces-biggest-change-to-funerals-in-over-120-years-resomation-to
6. Beyond the UK and US, a comparable incorporation of individual choice with an environmental ethos has been successful in Germany, whereby the concept of 'nature' has been negotiated within burial regulations to allow for culturally specific personalisation, for example in authorising the erection and maintenance of markers for burial plots in deliberately unmaintained landscapes (Balonier et al., 2019). For Balonier et al, this careful construction of a 'natural' narrative that can accommodate freedom of choice for consumers has been critical in establishing the credibility and uptake of natural burial as a legitimate 'environmentally friendly' HBD practice across the country.
7. Currently legal in twelve of the 50 US states, at the time of writing this paper natural organic reduction systems are being developed by at least five providers in the US, including Recompose and Return Home.
8. The consequences of poor storage of bodies was seen in Colorado in the US. https://time.com/7008211/colorado-funeral-home-950-million-fine/.
9. Council acted 'reasonably' over Bristol Cemetery expansion – BBC News.

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Data availability statement

There is no original data included in this paper.

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