

Infection in the deceased: a survey of management

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Summary

Funeral directors, control of infection officers, chief environmental health officers, and consultants in communicable disease control were surveyed to identify the sources and nature of advice about infectious hazards from the deceased available to undertakers. They were asked about management responsibilities, policies, particular activities (viewing, hygienic preparation, bagging, embalming, and final disposal by burial or cremation), specific diseases (hepatitis B, HIV infection, tuberculosis, meningitis, septicaemia, and salmonellosis), and repatriation. A wide range of opinions and advice was received on each topic. Medical personnel need a greater understanding of the work of funeral directors. Policies based on a realistic assessment of risk should be agreed.

Introduction

The main job of a funeral director is to arrange for the disposal of the body of the deceased person, allowing the next of kin to take leave of the deceased as they wish, within the constraints of statutory regulations. The opportunity to spend time with the deceased assists the grieving process. To reduce the distress of 'viewing', the body is usually washed and dressed before being placed in a coffin. The process aims to reduce offensive odours and give the body an acceptable appearance up to the time of final disposal, which is usually seven to ten days after death in the United Kingdom (UK). The best temporary preservation is achieved by embalming¹. Preparation of the body for viewing after necropsy or severe trauma may require special skills. Some religious groups have their own rituals in relation to funerals, and cultural practices may be very important to the next of kin. Repatriation of the deceased is sometimes requested.

About 600000 deaths occur each year in the UK. Fewer than 1% are associated with known or suspected infectious disease, but such conditions cause considerable concern to funeral directors who are obliged to protect the health and safety of their staff, the next of kin, and the public. Funeral directors commonly say that they are not always informed of the cause of death or the presence of infection, the advice they receive on handling varies, and the application of policies designed for control of infection in hospitals to their business may distress the bereaved. In recent years the emergence of HIV infection has caused great anxiety in the funeral business, not only because of perceived risk but also because the level of confidentiality with which the diagnosis is treated means that funeral directors may not be informed about the infection. The purpose of the regulations about notification of infectious diseases is sometimes misunderstood by members of the funeral trade, who often assume that notifiable diseases are always dangerous.

Small independent funeral directors carry out more than half of the funerals in the UK². Few large companies exist, and policies about handling bodies that may be infected vary widely. It is difficult for associations and

training schools for funeral directors and embalmers to apply advice written in microbiological jargon to their situation.

About two thirds of deaths occur in hospitals. Advice based on policies for the control of infection in hospitals may affect the instructions given to funeral directors. The *Health and Safety at Work Act 1974* and the *Control of Substances Hazardous to Health* regulations require appropriate assessments of the risks of infection and other hazards to be made, and action taken to minimise hazards¹. Environmental health departments have statutory duties in relation to cemeteries and crematoriums and are often responsible for health and safety on funeral premises. None of the agencies concerned with control of infection has wide technical knowledge or experience of the funeral business. They rely on safety guidelines for laboratories and postmortem rooms (neither of which is wholly applicable to the funeral trade), and on theoretical considerations, when asked to advise.

Most of what has been written about occupational risks of exposure to infection from the deceased refers to pathologists and mortuary staff¹, whose degree of exposure at necropsies greatly exceeds that of the staff of funeral premises even where embalming is carried out. Few papers deal with the risks to funeral staff and embalmers^{3,4} and prospective studies are needed to assess whether occupationally acquired infections occur. Embalmers are thought unlikely to become infected because they wear protective gloves and aprons, use embalming fluids containing formaldehyde, and the cadavers are usually refrigerated. Nevertheless, anxiety exists about bloodborne viruses, 'notifiable diseases', septicaemia, and 'killer germs.' Purging of stomach contents and faeces (common after death), blood staining of the skin and leaking wounds, and clothing recently stained with faeces or body fluids are at least unpleasant when handling the deceased. Funeral workers other than embalmers do not always wear gloves when handling the deceased, especially when collecting them from the home of the deceased. It is likely that most pathogenic organisms die off soon after death (when commensals, especially anaerobes, take over the decomposition process), but there is evidence that HIV – for example – can be retrieved from tissues many days after death⁵⁻⁷.

This paper reports on a survey of professional groups with responsibilities for the safe and appropriate disposal of the deceased. The survey was undertaken in order to identify the sources and nature of advice available to people who work in the funeral business about infectious hazards from the deceased.

Methods

A postal questionnaire was sent to samples of 50 of the following four professions concerned with disposal of the deceased: funeral directors in the UK, infection control officers (ICO) in hospitals in England and Wales, consultants in communicable disease control (CCDC) in England and Wales, and chief environmental health officers (CEHO) in England. Recipients who had not responded after two months received a reminder.

Forty of the funeral directors belonged to or were associated with one company, which has branches throughout the UK. One of the authors ((SEJY) acts as the company's microbiological advisor, and the company had indicated its willingness to participate in the survey. The remaining 10 funeral directors worked independently throughout the UK. At least three hospitals from each NHS region were picked at random from the *Health Services Year Book*⁸ and their ICOs were sent questionnaires. CEHOs were selected randomly from the Department of Health's directory of environmental health departments in England. CCDCs were selected at random from an unpublished directory.

Questions were asked about management responsibilities, written policies, particular activities (viewing, hygienic preparation, bagging, embalming, and final disposal by burial or cremation), particular diseases (hepatitis B, HIV infection, tuberculosis, meningitis, septicaemia, and salmonellosis), and administrative matters about repatriation from the UK. We chose diseases that often cause anxiety in funeral directors and their staff. Most questions could be answered 'yes' or 'no', but some respondents added comments throughout. Questions that were unanswered or stated to be inapplicable to the respondent were not scored. Space was provided for respondents to comment on problems they encountered.

Results

One hundred and fifty-five of the 200 questionnaires were returned. The overall response was 77.5%, but this varied with profession: 92% for funeral directors, 82% for CCDCs, and 68% for both ICOs and CEHOs. The functions of some respondents overlapped, particularly those mailed as ICOs and CCDCs; some individuals performed both functions but were treated as respondents of the category originally assigned. Some respondents enclosed copies of their policies. ICOs included microbiologists, nurse specialists, and infection control managers. A few questionnaires were completed by people who may have been in an unexpected category, especially among the CEHOs (these included local authority mortuary and crematorium managers, and mortuary technicians). Some respondents in all categories said that they had not been asked for advice and had based their answers on what they might do. Twenty-four of the 34 CEHOs who responded said that their role was confined to National Assistance disposals and suicides for whom no next of kin were traced, or to implementation of the *Health and Safety at Work Act* on undertakers' premises; their medical advice came from CCDCs.

Replies to questions about responsibility for particular aspects of the management of the deceased are summarised in table 1. As might be expected, the funeral directors knew the extent of their responsibilities, namely, the entire business, apart from disposal, which clients determine. The other groups were much more varied in their responses. Most funeral directors (67% to 87%) and ICOs (88% to 94%), but only about half of the CCDCs (36% to 64%), had access to written guidelines for the management of cases of hepatitis B, AIDS/HIV infection, and tuberculosis. Many funeral directors (51% to 67%) had guidelines for dealing with cases of meningitis,

septicaemia, and salmonellosis but fewer ICOs did so (28% to 61%), and most CCDCs did not (18% to 24% did). Fewer than a quarter of the CEHOs answered questions about specific diseases. One ICO reported having 'a single composite policy' but did not relate this to the infections listed. A number of ICOs noted that their policy in relation to salmonella cases and carriers applied only to *Salmonella typhi* and possibly *S.paratyphi* infections. Five CCDCs simply said that their 'hospitals or acute units had policies which would be appropriate.'

In relation to the selected infections most respondents said that they would permit viewing in almost all cases. Between 12% and 24% of funeral directors did not allow viewing: the highest proportion of refusals was for salmonellosis. A number of respondents in all categories specified that if a risk of infection was known 'no touch viewing' could be acceptable, or that they might consider a flexible approach, after discussion, if the bereaved were unduly distressed. Some respondents said that they would permit viewing through glass only; a few only agreed to viewing of a sealed coffin in 'cases of infection.'

Over three quarters of funeral directors would not permit hygienic preparation of cases or carriers of hepatitis B or cases of AIDS/HIV infection, compared with fewer than a quarter of ICOs and CCDCs. Conversely, few in any group of respondents (particularly funeral directors) would permit such cases to be embalmed and nearly all required them to be bagged. Responses to questions about the handling of cases of tuberculosis, meningitis, septicaemia, and salmonella infection by all categories of respondent were much more varied. The executors or the local authority have the right to decide on burial or cremation, unless the deceased is known to have expressed a wish not to be cremated. If haste is needed, or the next of kin have not been traced, burial is usually chosen. Opinions were evenly divided in the funeral trade as to whether they would recommend cremation rather than burial for infectious cases. ICOs and CCDCs generally did not.

The responses to questions about 'free from infection' certificates for the repatriation of the deceased indicate considerable uncertainty in this area (table 2). Although most funeral directors would monitor the sealing of coffins before repatriation, few respondents in the other categories said that they would do so.

Discussion

The results of this survey show substantial variation in the advice available to funeral directors as to how they should handle bodies that pose a risk of infection. Comments from many of the respondents illustrated this point: 'no problems', 'there are no policies in this area', 'hospitals often fail to inform us of septicaemia', and 'not always informed by the general practitioner/coroner/hospital of risk of infection.' Funeral directors were frequently made aware of an infection hazard after embalming, when they received the documents required for cremation.

Viewing

Viewing the body of the deceased at the funeral directors' premises is often requested by the bereaved. Most funeral directors have a chapel of rest where the bereaved can

Table 1 Taking responsibility for aspects of management of the deceased

Decisions	Funeral directors		Infection control officers		Consultants in communicable disease control		Chief environmental health officers	
	Yes	No	Yes	No	Yes	No	Yes	No
Permission to view at funeral directors' premises	45	1	3	28	14	16	4	5
Permission for hygienic preparation of the deceased (includes laying out, and customary rites or rituals normally undertaken by next of kin or religious leaders)	44	2	16	17	10	19	4	4
Bagging	41	5	28	6	18	14	6	2
Permission to embalm	4	42	4	27	11	19	2	6
Method of disposal (burial or cremation)	4	40	2	29	13	18	1	–

spend time in private with the encoffined body. This type of 'viewing' is very different from a brief look in a hospital or mortuary, and more closely resembles the access encouraged by hospices. The demand for this type of viewing is increasing. Many bereaved people find it hard to accept that there is a risk of infection, particularly if the deceased was nursed on an open ward or at home. It can seem unduly restrictive to deny the opportunity for viewing, especially if the body has been embalmed. Although a recommendation to forego viewing may be made if temporary preservation has not been carried out, or when a definite risk of transmitting infection is thought to exist, or the appearance of the dead person is unpleasant because of decay or autopsy, the next of kin may insist and on very few occasions can the request be denied. In some communities large groups of friends and relations wish to pay their respects at the unsealed coffin. It is especially difficult for funeral directors to restrict viewing to immediate relatives and deny it to friends, as some respondents suggested – for example, in cases of meningitis and HIV infection.

Body bags and universal precautions

Zipped or sealed plastic body bags may be used for cases thought to be infective to handlers, as a 'universal precaution' against infection, or to transport leaking or otherwise offensive bodies. The bags may be transparent or opaque and some are biodegradable. The survey revealed that the increasing use of body bags was widely misunderstood. In the past, only 'infectious' bodies were bagged, and funeral directors took the body bag as an indication that it would be dangerous to unseal the bag for any reason. Recently, however, many more bodies are received in body bags and the hospital inspired policy of universal precautions is having serious repercussions in the funeral business. Only a very small proportion of deaths are attributable to transmissible infections. A clear indication of hazard is needed to enable funeral directors to do their job, and facilitate viewing by the bereaved. 'Biohazard' stickers defeat the object of universal precautions, and diagnostic information often fails to reach funeral directors. Some ICOs and CCDCs commented that overzealous nurses and mortuary technicians might bag

uninfectious bodies despite local policies.

Funeral directors who (reluctantly) open body bags increasingly find that cases from hospitals arrive in a soiled and offensive condition because 'last offices' have not been carried out, and because bodies cool more slowly when enclosed in a plastic bag, facilitating decomposition. Although limited hygienic preparation may be carried out, display of the head for viewing in a plastic bag that has been folded back is not a comforting experience for the bereaved. Bags made of polyvinyl chloride cannot be cremated because dioxins are thereby emitted from the crematorium. Respondents commented about the cost of body bags 'which are not always necessary', referred to 'protests from histopathologists that tissues were rendered unsatisfactory for examination after a body has been stored in a bag', and some said that bags should be reserved for cases that posed a real risk of infection to handlers.

Hygienic preparation and the 'offices'

The 'last offices' performed on the deceased by nursing staff (also known as 'laying out'), washing by relations or religious leaders in some ethnic minority groups, and 'first offices' performed by the funeral staff may be described as hygienic preparation. It includes washing the face and hands, closing the eyes and mouth, tidying the hair, and possibly shaving the face. It may or may not be followed by dressing in special garments. Some hospitals have recently cut hygienic last offices, and funeral directors are receiving increasing numbers of bodies that have not been prepared. One CCDC deplored the fact that last offices no longer included packing of orifices.

Fear of acquiring hepatitis, HIV infection, or other infections through handling the deceased makes workers in the funeral business reluctant even to wash and tidy bagged bodies. Members of ethnic minorities in the UK, especially first generation immigrants, often wish to perform ritual preparation before burial. The suggestion that a loved one has suddenly become an infectious risk to be handled wearing protective clothing, including gloves, is incomprehensible and distressing. Several funeral directors and CCDCs said that they were prepared to be flexible to avoid excessive distress.

Table 2 Freedom from infection certificates

Questions*	Percentage of respondents who answered 'yes'		
	Funeral director	Infection control officer	Consultant in communicable disease control
a) Do you expect 'Free from infection' certificates to state that:			
– the deceased did not die from an infectious disease?	96	83	82
– the deceased was not a carrier of any infectious agent?	78	44	55
– no infectious disease was currently circulating in the community?	64	0	77
b) Which diseases do you understand to be included in a 'Free from infection' certificate?			
– any infectious disease	81	75	48
– any notifiable disease	91	92	44
– only diseases subject to International Health Regulations	37	69	64

* Few chief environmental health officers replied to these questions

Embalming

Embalming reduces postmortem staining, restores a more natural colour to the skin, reduces odours, and by retarding decomposition preserves the body until the final rites have been completed. It is carried out in 30% to 70% of cases in the UK – with a higher proportion in urban areas – because of the relatively long time between death and disposal in this country. Modern embalming involves the intra-arterial injection of solutions containing formaldehyde followed by drainage of blood from the heart and instillation of a stronger formaldehyde solution into the abdominal and pleural cavities. Cosmetic treatment is rare in the UK but reconstructive work may be carried out after severe trauma.

Although embalming is thought to reduce the risks of infection to the bereaved, embalmers feel very exposed to infectious risks in their work, particularly from bloodborne viruses and if septicaemia was the cause of death. Funeral directors said that they were often not informed of these conditions and might find out only after embalming had been carried out. Funeral staff want the right to know if and what infection risks exist. Immunising all embalmers with hepatitis B vaccine only partly answers this concern. Three respondents stated that they use an embalmer 'trained in the United States' to embalm bodies of those known to have been infected with hepatitis B virus and HIV. Legal cases in the United States have been brought by relations who claim that failure to embalm an HIV positive body constitutes discrimination. Such cases are now embalmed in many states.

Specific infectious agents

Many respondents commented on the infections mentioned in the questionnaires and some suggested other conditions that caused concern. In 1988 the chief medical officer 'reminded doctors to inform funeral personnel when a body poses a risk of infection which requires it to be handled with safeguards' and drew attention particularly to hepatitis B, tuberculosis, salmonella infection, and HIV infection⁹. Although vaccination of embalmers and mortuary staff against hepatitis B is recommended, fear

remains, and the British Institute of Embalmers recommends that its members should avoid working on cases known to be infectious with this virus; and that they should treat HIV with similar caution. Recent work has shown that hepatitis C needs to be treated similarly¹⁰.

The risks of respiratory tract pathogens from the deceased to funeral personnel is probably remote, even from the single exhalation of air that occurs when the body is first moved. Covering the face with a cloth would be a simple precaution. Some respondents expressed reservations about meningitis, but others clearly stated that their recommendations would depend on the causative organism.

Septicaemia causes anxiety to funeral directors, and embalmers avoid handling such cases. Funeral directors commented that they received conflicting advice and that positive guidance on individual cases would be useful. Most ICOs commented that advice on cases that had died of septicaemia would depend on the organism; one said that the funeral director would be notified of the serious risk from group A streptococcal septicaemias but not others.

Postmortem leak from the gastrointestinal tract often occurs after death, and faecal staining of skin and clothing is common, but most answers to questions about salmonella infections mainly related to cases of enteric fever. Salmonellas that cause food poisoning were seldom mentioned.

Cremation or burial

Many respondents wished to recommend cremation for infectious cases. Unless the deceased is known to have expressed a wish not to be cremated, relations or executors have the right to decide about disposal and their wishes and customs take priority over opinions of professionals about the disposal of infective clinical material. In circumstances when there is a need for hurried action or the next of kin have not been traced the local authority has the responsibility to decide, and burial is usually carried out.

International transport of cadavers

Families sometimes wish to repatriate the body of a relation to another country or into the UK. Regulations that cover international transport of cadavers vary from one country to another, and advice can be obtained from appropriate embassies. Most airlines require that the body be embalmed and 'hermetically' sealed in a casket or a zinc lined coffin before they will carry it. Sealing of coffins to avoid leakage of body fluids during transit is normally carried out by the funeral director, who may be supervised by an environmental health officer and/or a consular representative. Export of cremated remains poses few problems. Before bodies can be transferred from one country for final disposal in another, or for burial at sea, a number of requirements have to be met, including certification of freedom from infection.

The 'free from infection' certificate (also known as the non-contagious declaration) is signed by the medical practitioner who attended the deceased. Some countries also require a declaration that no infection is circulating in the community in the area where the death occurred. There are currently no standard formats for such certificates and the statement requested varies from one country to another. The certificates may refer to death due to an infectious disease, death due to a notifiable disease, the presence of infection or carrier state in a person who died from other causes, or the known occurrence of a notifiable/infectious disease in the community where the individual died.

Free from infection certificates are only a small part of the documentation legally required for international transport of the deceased, even after embalming. Respondents to our survey exposed uncertainty about the meaning of 'infectious disease' in this context. Whether such certificates should refer only to those diseases covered by international health regulations (cholera, typhus, yellow fever, and plague) or should include the much commoner bloodborne agents (such as hepatitis B and C viruses, and HIV) needs to be clarified and agreed. Confusion would be reduced by a clear standardised format that indicated which diseases were covered by the certificate and whether it referred only to the cause of death or also to carrier states. Infections may also be incidental or contributory, rather than the cause of death. People with HIV infection and carriers of hepatitis B e antigen continue to cause concern.

Conclusion

Better communication between concerned professional groups would assist funeral directors when dealing with their clients. Funeral directors must be informed which cases present real risks of infection to their staff and which can be embalmed and prepared for presentation to relations, so that they can provide clients with the funeral they request without compromising safe working practices. Education, appropriate protective clothing, and hygienic

measures provide safe working conditions for handling most cadavers. It is unrealistic to classify all notifiable diseases or all pathogenic microorganisms as equally dangerous to the funeral director, or to place all bodies in body bags, with the implication that a serious infection risk exists. If the practice of universal bagging is widely adopted some additional indication of real risk is essential. Bagging leads to denial or modification of viewing access or to the reluctant opening of bags that contain a soiled and malodorous body. Religious rites are important to many bereaved people. There seems little justification for preventing customary cleansings before final disposal, except in rare and obviously dangerous conditions.

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