

Central Lancashire Online Knowledge (CLoK)

Title	Pandemic Continuity Planning: will coronavirus test local authority business continuity plans? A case study of a local authority in the north of England
Type	Article
URL	https://clock.uclan.ac.uk/52182/
DOI	##doi##
Date	2020
Citation	Kruger, Helen-Marie, Meaton, Julia and Williams, Anna orcid iconORCID: 0000-0002-5237-857X (2020) Pandemic Continuity Planning: will coronavirus test local authority business continuity plans? A case study of a local authority in the north of England. <i>Emergency Management Review</i> , 4 (1). pp. 4-27.
Creators	Kruger, Helen-Marie, Meaton, Julia and Williams, Anna

It is advisable to refer to the publisher's version if you intend to cite from the work. ##doi##

For information about Research at UCLan please go to <http://www.uclan.ac.uk/research/>

All outputs in CLoK are protected by Intellectual Property Rights law, including Copyright law. Copyright, IPR and Moral Rights for the works on this site are retained by the individual authors and/or other copyright owners. Terms and conditions for use of this material are defined in the <http://clock.uclan.ac.uk/policies/>

Pandemic Continuity Planning: will coronavirus test local authority business continuity plans? A case study of a local authority

Helen-Marie Kruger
U1170086@unimail.hud.ac.uk
Huddersfield Business School,
University of Huddersfield,
Queensgate, Huddersfield, HD3 1DH,

Julia Meaton
j.meaton@hud.ac.uk
Huddersfield Business School,
University of Huddersfield,
Queensgate, Huddersfield, HD3 1DH,
01484472949
*Corresponding author

Anna Williams
a.williams@hud.ac.uk
University of Huddersfield,
Queensgate, Huddersfield, HD3 1DH

Author Biographies

Helen-Marie Kruger

Helen undertook this research when she was a masters Student on MSC Risk, Disaster and Environmental Management,

Julia Meaton

Julia is a Reader in Sustainability at Huddersfield Business School, and Director of Graduate Education. Her research interests include community sustainability, disaster and emergency management, social enterprise and land use management

Anna Williams

Anna is a Principal Enterprise Fellow in the School of Applied Sciences, University of Huddersfield She leads the MSc in Forensic Anthropology and lectures on the BSc/MSci Forensic and Analytical Science degree. She leads the Forensic Anthropology Research Group and is an experienced Forensic Anthropologist, with considerable case work experience.

Pandemic Continuity Planning: will coronavirus test local authority business continuity plans? A case study of a local authority.

Abstract

This paper considers the potential impact of the coronavirus on a UK Local Authority's ability to manage excess deaths, and models the potential impact of a 50% clinical attack rate and a 1% and a 2.5% death rate. The case study was undertaken in 2019 prior to the coronavirus outbreak and was originally focussed on a pandemic flu epidemic, but the findings are relevant to the potential impacts of this new virus.

During a pandemic, UK Local Authority (LA) death and bereavement services will be subject to an increase in workload and staff absences. Business continuity plans to ensure service continuity are required but uncertainty regarding the actual number of excess deaths makes accurate planning challenging. This paper models death rates in an authority in the north of England using the UK Government Cabinet Office's National Planning Assumptions Assessment Tool, and, drawing on qualitative interviews with key stakeholders, considers how people working in death and bereavement services in a local authority would be able to cope. Findings suggest that although business continuity plans are in place, it is highly likely that the services will be overwhelmed even in the case of the lower mortality rate.

Key Words:

Coronavirus, Covid-19, Pandemic, Excess Deaths, Local Authority, Death Services, Business Continuity.

Introduction

At the time of writing Coronavirus has infected approximately 200,000 people globally and has resulted in the death of nearly 8,000 people since December 2019 and on the 11th March, 2020 the World Health Organisation declared it a pandemic. (WHO, 2020). The virus, named COVID-19, started in China but has spread around the world resulting in nations closing their borders, governments imposing 'lockdowns' on their citizens and global economic chaos. Accurate figures regarding the clinical attack rate or the mortality rates are currently difficult to confirm, but it is thought that that each person infected transmits the virus to 2.5 people resulting in a 'clinical attack rate' of between 60% and 80%. Estimations of the mortality rates tend to hover around 1%, but it could be lower, or higher (Battegay et al, 2020).

The UK's National Risk Register assesses significant potential threats and the number one risk has consistently been pandemic flu (Cabinet Office, 2008; 2010; 2012; 2013; 2015; 2017). The spread and impact of a new flu strain is difficult to

predict and, once the pandemic begins, it can take between four to six months for a new vaccine to be developed, giving rise to a significant number of fatalities (Cabinet Office, 2017). The coronavirus, although not a flu strain, presents the same type of threat but with potentially more serious implications.

Pandemics result in increased work absences causing disruption to essential health, education and emergency services. The UK Home Office (2008) predicted that between 15% and 20% of staff from large organisations, and 30% to 35% for smaller establishments may be absent from work concurrently over a 2 to 3 week peak pandemic phase, although many will 'return to normal activity within 7 to 10 days' (Local Resilience Forums & Partnerships, 2017, pg.11).

While the impact on medical staff and the UK's National Health Service are of grave concern, and often attract the most attention, a pandemic would also significantly impact on death and bereavement services in local authorities. These include registrars, Coroners and mortuary services (cemetery workers and crematoria operators). Registrars are responsible for recording the details of all births, deaths, marriages and civil partnerships in their authority area, but among their duties is the requirement to inform the coroner if they suspect anything suspicious concerning a death. The role of a coroner is to investigate deaths where the cause is unknown or uncertain, and when there is a reason to think that a death is suspicious. This can mean a simple consultation with the doctor who last treated the patient, or it could mean an inquest, a judicial inquiry, in order to determine the cause of death.

Any 'excess deaths' will increase the workloads of all staff employed in death and bereavement services and staff shortages due to illness and care responsibilities would further compromise service delivery. There is also likely to be a psychosocial impact on staff during a pandemic that will further undermine service delivery (Gierer, 2018). There are several studies that have looked at this from the perspective of medical staff (Matsuishi et al, 2012), but there is scant evidence on how this plays out for non-medical service providers during pandemics.

To mitigate potential delays in death certificates being issued, backlogs in burials, cremations and mortuaries, and funeral parlours being filled beyond capacity, the Civil Contingencies Act 2004 placed a statutory duty on UK Local Authorities to produce and maintain business continuity plans. These have, as yet, never been tested, so their contribution to managing the impact of an outbreak like coronavirus is unknown, but this paper attempts to assess the potential of one local authority to cope.

Methodology

This paper considers the capacity of death services in a northern English local authority to manage excess deaths resulting from a pandemic (for example, coronavirus). A case study was selected as the most appropriate approach, defined as "an empirical method that investigates a contemporary phenomenon (the "case") in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident" (Yin, 2018, pg. 15).

This case study focusses on an anonymised Local Authority in northern England and presents evidence collected from a wide range of sources (Yin, 2018), including local and central government guidance documents, legislation, and interviews with employees engaged in the death management process (a senior emergency planning officer, a mortuary manager, a registrar and a bereavement services manager). These interviews were conducted as a means of obtaining better explanations, such as the “hows”, “whens” and “whys” of key events, as well as the insights reflecting participants’ relative perspectives” (Yin, 2018, pg. 118).

The Case Study

The case study authority provides local government services for an area of approximately 150 square miles, with a population of nearly half a million (Office for National Statistics, 2017a) and is one of the largest Local Authority districts in England and Wales. The area’s current mortality rate is just under 4000 per year (Office for National Statistics, 2017b). The council’s primary responsibilities within the death management process are to register deaths and dispose of the deceased, roles predominantly managed by registration and bereavement services, including the HM Coroner, all of which would be stretched in the event of a pandemic.

Government guidance for managing excess deaths predominantly centres around ‘working differently’, such as introducing shift work, increasing working hours, extending opening hours, focusing on crucial services, and redeploying staff from non-essential services (Home Office, 2008). Registration and bereavement service managers have business continuity plans documenting plans to maintain staffing levels and manage significant increases in workload, but the difficulty is knowing how many deaths to plan for. Learning from historic pandemics might help to address some of this uncertainty.

Previous Influenza Pandemics

A flu pandemic occurs when ‘a new influenza virus emerges and spreads around the world, and most people do not have immunity’ (World Health Organisation, 2010). Several flu pandemics have emerged in the last century, the deadliest being the 1918 ‘Spanish flu’ which caused approximately 50 million deaths worldwide. In the UK, the pandemic lasted 46 weeks with one third of Britons becoming symptomatic, 2.5% died resulting in 228,000 deaths, 25 times more than in a normal flu season (Honigsbaum, 2009).

The Asian Flu in 1957 caused 1 million deaths worldwide and 33,000 in the UK, and the 1968 Hong Kong Flu, caused between 1 and 4 million deaths globally and 30,000 in England and Wales (Department of Health, 2005). In comparison, the 2009 pandemic’s impact was relatively mild, with approximately 18,500 laboratory confirmed deaths reported worldwide and 457 deaths in the UK (Hine, 2010), although the true global figure has been estimated at 15 times that (Dawood et al., 2012). Table 1 summarises these figures.

Pandemic	Deaths Worldwide	UK Deaths
Spanish Flu 1918	50 million	228,000
Asian Flu 1957	1 million	33,000
Hong Kong Flu 1968	1 - 4 million	30,000
Swine Flu 2019	18,500 (laboratory confirmed)	457

Table 1: Summary of Flu Pandemic Deaths Worldwide and in the UK

As viruses continue to mutate they are difficult to immunise against (Finnegan, 2018) and specialists have long agreed that the likelihood of a pandemic, such as coronavirus is high. The pandemic is highly likely to test the continuity plans of local authorities across the world with the lack of certainty regarding clinical attack rates and mortality rates making it difficult for death services personnel to plan.

Key Challenges

The 1918 pandemic bore an exceptionally high death rate, and caused extreme situations, ‘in October deaths in London were running at 1,500 per week ...people you saw one day were dead the next’ (Honigsbaum, 2009, pgs. 96 and 98). ‘Families were badly affected, mothers and fathers were often stricken together, the children, themselves ill, could not receive attention’ (Report on Pandemic, 1920, pg. 499, cited in Honigsbaum, 2009, pg. 102).

‘...The dead and living in the same beds, no food in the house, no one able to crawl about to get it; hundreds of people starving because they couldn’t go out to get food; all delivery carts stopped, no one to drive them, shops shut...’ (The Times, 6 January 1919, cited in Honigsbaum, 2009, pg. 146).

This dystopian image may have seemed highly unlikely even a few weeks ago, but some reports from China suggest that the approach to containment has caused distress and potential human rights violations (New York Times, 2020).

In 1918 the situation became so bad that it was impossible to manage the transportation, storage and burial of the dead,

“...Bodies lay unattended in crowded dwellings...covered wagons were dispatched to collect the bodies of people who had collapsed in the streets” (p499)

“People had to bury their relatives with their bare hands, often they were so weak they could only dig two or three feet deep, and as they turned to get the body they had brought, other people came and threw the bodies of their friends into the grave. The subsequent fights were terrible” (p82)

“or a time, it seemed as if it would not be possible to get coffins for the dead or gravediggers to dig the graves...bodies were left as long as a fortnight unburied, partly at home, partly at mortuaries and partly at the premises of undertakers” (p146) (Honigsbaum, 2009).

While the notion of mass graves may still seem unthinkable, there are unconfirmed reports that Iran is already preparing these in order to manage the excess deaths resulting from Covid-19 (Space, 2020).

There is little contemporary literature regarding dealing with the dead during pandemics although the Ebola experience generated some insights into the concerns of relatives regarding the importance of transparent policies and practices for the correct recording and management of deaths (Abramowitz and Omidian, (2014). There is, however, plenty of literature pertaining to the mitigation and management of deaths resulting from mass fatality incidents. Mass fatality situations, such as earthquakes, tsunamis, terrorist incidents, transport or industrial accidents, have death tolls limited to the specific event, a specific time period, and to a specific geographical area. In pandemics the number of victims continues to rise as the flu virus spreads. With mass fatality incidents neighbouring areas can provide additional personnel to support police and fire services, and provide mortuary space and administrative support. During a pandemic access to such resources will be limited as all areas will be experiencing similar pressures.

Scanlon & McMahon (2011) argue that despite these differences, mass fatalities and pandemics have similarities, namely issues with paperwork, locating and transporting the dead and shortages of supplies and staff, such as coffins, body bags, medical provisions and cemetery workers. They suggest that ‘no matter what planning approach is taken, that approach must include plans to deal with large numbers of dead’ (pg. 181).

Table 2 summarises the key challenges, impacts and concerns surrounding pandemic deaths.

Key Challenges	Impacts and Concerns
Staff Shortages	<p>Registration services – if death certificates are delayed cremations and burials will be held up which will have an impact on body storage space.</p> <p>Bereavement services – a shortage of cemetery workers and cremator operators would mean a delay in burials and cremations which also impacts body storage space.</p>
Lack of Supplies	<p>Is there sufficient grave digging equipment, cremator ovens, body bags, coffins and stock, e.g. death certification and burial/cremation forms?</p> <p>A lack of burial and cremation equipment will cause delays in body disposal, as would an insufficient supply of death certification paperwork, thereby creating further body storage issues.</p>
Lack of Body Storage Space	<p>If funeral parlours, hospitals and mortuaries become filled to capacity where will the decedents be stored?</p>
Lack of Cemetery Space	<p>Will there be enough cemetery space to meet demand? If not, are there alternative options?</p>
Unknown Rate of Influx	<p>Bereavement Services – if death certification is delayed, the rate at which the bodies reach the Service could be much slower than usual. Alternatively, these could continue at a similar rate should Funeral Directors be arranging burials and cremations as normal.</p> <p>Bereavement Services – an increase in disposals could occur if funeral directors request additional services to be held due to an increase in workload, or if Government decides burials need to be carried out as soon as possible owing to insufficient body storage space.</p> <p>Registration Services – if individuals are unable to attend to register a death there may be less of an impact on the Service, however, if individuals are able to register deaths without delay this would put significant strain on Registrars.</p> <p>Registration Services – it also depends on how soon the doctor can issue the Medical Certificate of Cause of Death (MCCD), without which the death cannot be registered. Delays will put further strain on body storage space as disposal cannot take place without registration of death and the subsequent certificate.</p>

Table 2: Key Challenges to Service Provision: Potential impacts and concerns

The Home Office and the Department of Health have produced advice to Local Authorities to plan for pandemic deaths and provide direction for regional and local plans and frameworks which, in turn, are used as reference guides for devising Local Authority Continuity Strategies.

Planning for Excess Deaths

Government guidance in a flu pandemic predicts that up to 50% of UK residents will experience flu symptoms (clinical attack rate) and, assuming a ‘worst-case scenario’, 2.5% of symptomatic individuals will die if no effective treatment is received (mortality rate). Because of the anticipated availability of antivirals and antibiotics this mortality rate could be lower and central government advice is that plans should be made for a 1% mortality rate of symptomatic individuals over a 15-week period (Local Resilience Forums & Partnerships, 2017), in addition to routine everyday deaths. However, the uncertainty of attack rate and mortality means that fatalities

could be significantly lower, or higher. With regard to coronavirus, these two factors are still unknown, but there is some evidence to suggest that the clinical attack rate could be as high as 60-80% and the mortality rate, anything from 1 – 18%, but with most commentators assuming a rate of 2% (The Guardian, 2020).

Planning in times of uncertainty is challenging and local authorities are advised to use the National Planning Assumptions Assessment Tool (Cabinet Office, 2011) which calculates what percentage of fatalities will occur within a given week over an estimated 15-weeks, as demonstrated in Figure 1 below.

Pandemic Week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Projected Percentage of Additional Deaths	0	0	1	3	11	22	21	14	10	8	5	3	2	1	1

Figure 1: Projected Percentage of Additional Deaths over a 15-week period (Home Office, 2008, pg. 14)

The case study council’s basic data necessary for the use of the tool are shown below in Figure 2 (not all sources are referenced in order to maintain anonymity), and show that under normal conditions the body processing capacity is 120 deaths per week.

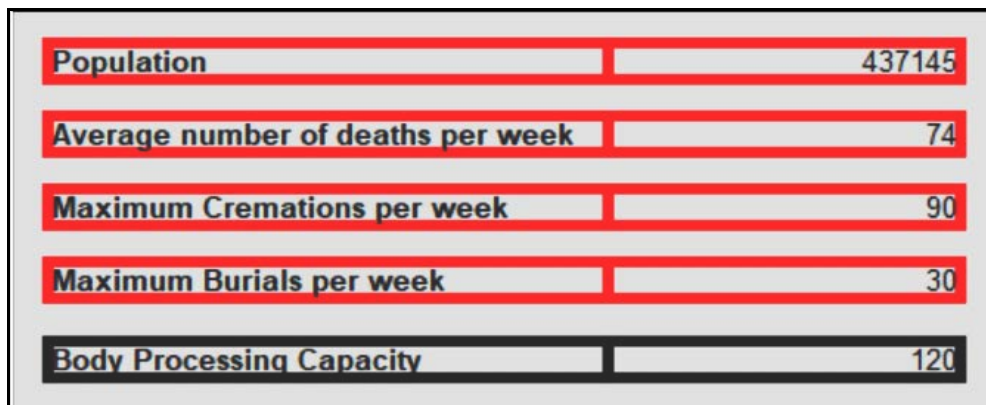


Figure 2: National Planning Assumptions Assessments Tool (Cabinet Office, 2011)

Table 3 shows the calculations made by the assessment tool for an anticipated clinical attack rate of 50%, and a 1% mortality rate over a 15 week period. Resulting in a total of 2,188 (rounded up) additional deaths.

Week	% total cases	Additional Deaths	Total Deaths	Deaths over and above capacity (Nb a positive figure denotes bodies over and above capacity)
1	0.1	2.185725	76.185725	-43.814275
2	0.2	4.37145	78.37145	-41.62855
3	0.8	17.4858	91.4858	-28.5142
4	3.1	67.757475	141.757475	21.757475
5	10.6	231.68685	305.68685	185.68685
6	21.6	472.1166	546.1166	426.1166
7	21.2	463.3737	537.3737	417.3737
8	14.3	312.558675	386.558675	266.558675
9	9.7	212.015325	286.015325	166.015325
10	7.5	163.929375	237.929375	117.929375
11	5.2	113.6577	187.6577	67.6577
12	2.6	56.82885	130.82885	10.82885
13	1.6	34.9716	108.9716	-11.0284
14	0.9	19.671525	93.671525	-26.328475
15	0.7	15.300075	89.300075	-30.699925
Total	100.1	2187.910725	2261.910725	

Table 3: Number of Additional Deaths for a pandemic with a 1% mortality rate (Cabinet Office, 2011)

This is below the current assumed clinical and mortality rates for coronavirus, but even that suggests that UK authorities will struggle if it develops into a global pandemic.

Table 4 reports the results of modelling a 2.5% mortality rate, which results in a total of 5,470 total additional deaths, a much more significant and challenging scenario.

Week	% total cases	Additional Deaths	Total Deaths	Deaths over and above capacity (Nb a positive figure denotes bodies over and above capacity)
1	0.1	5.4643125	79.4643125	-40.5356875
2	0.2	10.928625	84.928625	-35.071375
3	0.8	43.7145	117.7145	-2.2855
4	3.1	169.3936875	243.3936875	123.3936875
5	10.6	579.217125	653.217125	533.217125
6	21.6	1180.2915	1254.2915	1134.2915
7	21.2	1158.43425	1232.43425	1112.43425
8	14.3	781.3966875	855.3966875	735.3966875
9	9.7	530.0383125	604.0383125	484.0383125
10	7.5	409.8234375	483.8234375	363.8234375
11	5.2	284.14425	358.14425	238.14425
12	2.6	142.072125	216.072125	96.072125
13	1.6	87.429	161.429	41.429
14	0.9	49.1788125	123.1788125	3.1788125
15	0.7	38.2501875	112.2501875	-7.7498125
Total	100.1	5469.7768125	5543.7768125	

Table 4: Number of Additional Deaths for a flu pandemic with a 2.5% mortality rate (Cabinet Office, 2011)

The personal tragedy and loss of such a pandemic will be unquantifiable and while the authors acknowledge this, the focus of this paper is on how authorities will manage the number of excess deaths. The impact of such an increase from normal levels will mean that the authorities will struggle to maintain death registrations and disposals that will potentially have serious consequences. Practically, not being able to registering a death or obtain a death certificate will mean that disposal cannot take place. There will be a bottleneck of burials and cremations, causing ceremonies to be delayed with mortuaries filled beyond capacity. Families will be prevented from closing bank accounts, pensions, selling property or receiving insurance, which could have financial implications.

Registration Services

The authority can currently process 60 death certificates per day, approximately 300 per week (Case Study Council, 2019). However, the number of death registrations doesn't necessarily equal the number of death certificates produced. The original certificate is the Register and those registering the death purchase certified copies of the original entry. Several certificates can be requested for the same death depending on the size of the decedent's estate. The service currently has 21 employees qualified to register deaths, and 5 who are death registration trained to provide cover. The process takes 30 minutes and is carried out in person with the Registrar. The service is available 9am to 5pm Monday to Friday, 9am to 12pm on Saturdays, with an on-call service provided from 10.30am to 11.30am on Sundays and Bank Holidays. Section 16(3) of the Births and Deaths Registration Act 1953 requires all deaths to be registered within 5 days of death.

Based on current capacity and the requirement for additional certificates, which, for illustrative purposes is set at 5 per registration, if facing a pandemic with a 1% mortality rate, the service would be beyond capacity within the first week, and 9 times that by week 6, as indicated in Table 5 below.

Week	Total deaths at 1% mortality rate	Approximate number of certificates required at 1%	Total deaths at 2.5% mortality rate	Approximate number of certificates required at 2.5%
1	76	380	79	395
2	78	390	85	425
3	91	455	118	590
4	142	710	243	1,215
5	306	1,530	653	3,265
6	546	2,730	1,254	6,270
7	537	2,685	1,232	6,160
8	387	1,935	855	4,275
9	286	1,430	604	3,020
10	238	1,190	484	2,420
11	188	940	358	1,790
12	131	655	216	1,080
13	109	545	161	805
14	94	470	123	615
15	89	445	112	560
Total	2,262	11,310	5,544	27,720

Table 5: Death certificates required at 1 % & 2.5% Mortality Rates at 5 per registration

Should the service have to contend with a 2.5% mortality rate, it will also be beyond capacity by week 1, but almost 21 times that by week 6. Evidently, whether faced with a 1 % or 2.5% mortality rate, registrars will struggle to maintain certificate production with current resources and so must make significant adjustments to increase production.

Bereavement Services

The Authority's bereavement services is responsible for providing cremations and burials to residents, operating from 9am to 4pm, Monday to Friday and, according to management, conducting approximately 3,000 cremations and 500 burials per year. Disposals should be carried out swiftly following death registration to minimise the numbers of deceased stored at mortuaries and funeral parlours (Home Office, 2008).

Fourteen cemetery workers can bury 6 individuals per day if digging individual graves, or 12 to 14 individuals for multiple interments, which equates to approximately 30 individual graves and 60 to 70 multiples per week (Case Study Council, 2019). Multiple interments generally occur when family members die and are buried at the same site, but are rare.

It can one to two hours to dig a grave with an excavator, but a couple of days if digging by hand. The depth of the grave depends on the number of bodies interred, 4ft 6 for one interment, 6ft for two, 7ft 6 for three and 9 foot for four. The ground conditions should also be considered, rocky and icy ground are challenging and other practical adjustments can increase the time required. The service has two small teams who prepare the grave, carry out the interment, and backfill the site.

During a pandemic, burials would increase significantly. Table 6 below illustrates the total deaths over the 15-week period for 1% and 2.5% mortality rates and displays the approximate burials per week, calculated at 15% of total deaths.

Week	% Total Cases	Total Deaths at 1% mortality rate	Approximate number of burials per week (15%)	Total Deaths at 2.5% mortality rate	Approximate number of burials per week (15%)
1	0.1	76	11	79	12
2	0.2	78	12	85	13
3	0.8	91	14	118	18
4	3.1	142	21	243	36
5	10.6	306	46	653	98
6	21.6	546	82	1,254	188
7	21.2	537	81	1,232	185
8	14.3	387	58	855	128
9	9.7	286	43	604	91
10	7.5	238	36	484	73
11	5.2	188	28	358	54
12	2.6	131	20	216	32
13	1.6	109	16	161	24
14	0.6	94	14	123	18
15	0.7	89	13	112	17
Total	100.1	2,262	495	5,544	1153

Table 6: Burial Numbers expected at 1% & 2.5% Mortality Rates for Individual & Multiple Interments.

With a 1% mortality rate, the service will be beyond capacity by week 5 for individual interments, and week 6 for multiple interments, with burials peaking at 82 in week 6. At a 2.5% mortality rate the service faces well above 90 burials per week over a 5-week period, peaking at 188 in week 6, more than six times the usual number of weekly individual burials, and almost 3 times the number for multiple interments. Without a significant injection of resources these will be extremely difficult to manage.

The Authority conducts an average of 90 cremations per week (Case Study Council, 2019). Each cremation takes approximately 90 minutes and the service currently has 4 permanent cremator officers and 6 officers that are cremator trained.

Table 7 below shows the total deaths over 15 weeks with mortality rates of 1% and 2.5% and sets out the approximate cremations per week, accounting for 85% of total

disposals. As with burials, there is a significant increase in cremation numbers depending on whether a 1% or a 2.5% mortality rate is projected.

Week	% Total Cases	Total Deaths at 1% mortality rate	Approximate number of cremations per week (85%)	Total Deaths at 2.5% mortality rate	Approximate number of cremations per week (85%)
1	0.1	76	65	79	67
2	0.2	78	66	85	72
3	0.8	91	77	118	100
4	3.1	142	121	243	207
5	10.6	306	260	653	555
6	21.6	546	464	1254	1,066
7	21.2	537	456	1232	1,047
8	14.3	387	329	855	727
9	9.7	286	243	604	513
10	7.5	238	202	484	411
11	5.2	188	160	358	304
12	2.6	131	111	216	184
13	1.6	109	93	161	137
14	0.6	94	80	123	105
15	0.7	89	76	112	95
Total	100.1	2262	2803	5544	4712

Table 7: Cremation Figures expected at 1% % 2.5% Mortality Rates

At a 1% mortality rate the service would exceed capacity by week 4 and for the subsequent 9 weeks. At 2.5%, this increases to 13 weeks from week 3 meaning that there will be insufficient resources to deal with demand.

Local Authority Business Continuity Plans

Clearly an increase in the number of deaths entering the death management system will adversely impact capacity, and the higher the death toll, the more significant the impact. The most pertinent issues would be staff shortages, lack of supplies, body storage, cemetery space and the unknown rate at which bodies and registration requests will reach the relevant services. In June 2019, face to face, in-depth interviews were held with key personnel to determine how they intend to tackle these issues. Each service is discussed in turn below, although the exact names and titles are withheld due to anonymity guaranteed during the interview process.

Staff Shortages

During a pandemic, business continuity plans for registration and bereavement services focus on increasing staffing levels to deal with the influx of work and

increased absence levels. One manager stated ‘...we will be down significantly on staff ...we also assume our death figures will go shooting through the roof’. The service therefore plans to increase capacity by utilising current staff members and

“..are in the process of developing a quick training guide to register deaths, ...once additional training is completed we could have at least 10 more staff from existing resources”.

If additional staff are required the service intends to use retired staff or draft in people from other council services, hoping that *‘their work would decrease’* and that *‘people would just slot staff into the critical services’*. They also intend to streamline working practices, for example, by looking ‘at changing shift patterns and having an out-of-hours service’ and by adopting a ‘ticketing service’ where people would just turn up and register. The service also reported that on-line registration is currently unavailable, but being explored.

Staffing levels are also problematic for Bereavement Services and the plan is to cremator train all grave diggers and back-office staff, increasing numbers from 10 to 20 plus people. However, because training takes 3 to 4 months this might not be a timely intervention. The service is considering using outside staff such as retired cremator operators (which could put older people at risk) and those who work through agencies, plus personnel from other local authorities. To further increase capacity, the service also intends to increase the number of daily cremations to 12, (currently rate is 10) by having an extra morning and evening cremation. Cremators are only able to operate for 12 hours a day in order to keep the facilities operationally safe and to maintain the brickwork within. In a full-blown pandemic these hours could be marginally extended but only for a short period.

The capacity situation for burials is similarly restricted because of resource issues, *“...the current daily capacity to dig graves for 6 individuals or 12 to 14 multiples would be difficult to maintain for extended periods without additional resources such as extra help for digging from Highways who could operate JCBs”*.

The need for extra staff during a pandemic is less urgent for mortuaries as additional staff is only required during a mass fatalities incident, i.e. when multiple post mortems and Scenes of Crime Officers are required. In those situations the interviewee said that they normally got in extra staff from agencies to help out and work on rotation (e.g SOCO teams, Mortuary Technicians and Pathologists) and this might be possible in the case of a pandemic.

Lack of Supplies and Inefficient Equipment

Another concern is limited or unsuitable equipment and/or materials. For Registration Services, the issue would be a reduced number of certificate stock and release forms,

“...we only hold so many certificates and green forms in any one year, so one of the first things we do would be to immediately start rationing stock, this would be

one certificate per person and we would stop producing any but the most urgent copy certificates”.

Limited Cemetery and Body Storage Space

When mortality rates increase so does the need for body storage and cemetery space. This could be problematic, and one respondent said that “...certainly in some of the cemeteries we could end up going back to mass graves depending on the volume of excess deaths”.

This would be highly controversial and could upset and anger many communities. One mortuary manager expressed concerns about body storage space, saying that “places that will back up will be the crematoria and the cemeteries, then the funeral directors won’t have any room and everything stops here”.

This is an issue as staff will already have the usual deaths and post-mortems to contend with and already

“...during the winter period we could have bodies in here for a few weeks, just waiting for a funeral...we are basically the store room and storage capacity is limited, we can only store 300 at any one time, if we get a flu pandemic we will be inundated...will have to call the Army”.

When asked what the Army’s solution would be, he responded ‘they would probably store them in one big hangar, then you’ve got the logistics of finding and collating them all’.

Unknown Rate of Influx

There is also uncertainty surrounding the rate at which deaths would reach various Services. For Registrars, the unknown is whether deaths would be delayed by the Coroner, with one respondent saying,

“...we expect there would be a decision made at higher levels around doctors being able to record the death...so no need for a referral to the Coroner” and they thought that

“..if all deaths were referred there would be a trickle into Registrars rather than being overwhelmed, resulting in slightly more work but over a much longer period”.

However, one mortuary manager counters this saying

“...chances are...people will be dying of something natural...so would they come here? Doctors would sign them off...we will only conduct an autopsy if the death is sudden and unexplained”.

Bereavement Services also believe they will escape the immediate impact,

“...the bottleneck might start before us and we will have bodies trickling in as the legal paperwork dictates, we are at the end of the chain”.

Despite these contingency plans, all interviewees were uncertain as to what would happen during a true pandemic, claiming ‘*we can only test this out once it actually happens*’ with one asserting ‘*pandemic flu is more likely to happen than a terrorist*

attack, but we are not as prepared'. The familiarity of the occurrence and impact of terrorist attacks, and the prominence given to their threat and reality by government and media, means most people, and those working in Local Authorities are likely to prioritise planning for these events. The last serious flu pandemic is beyond living memory and Local Authority personnel have no real experience to draw from. Although the interviewees appear to appreciate the potential threat of a pandemic, and have put good strategies in place, it is apparent these have limitations. The following section explores the inadequacies of these proposals and considers the implications of failure, drawing on past experiences.

A Critical Evaluation of Death Services Business Continuity Management

The 1918 pandemic depleted the workforce and by November deaths were running at more than double the birth-rate, with mortuaries backed up due to body disposal difficulties (Honigsbaum, 2009). Further issues arising from previous pandemics include a shortage of supplies and experienced personnel, as well as a pressing need for volunteers, (Scanlon et al, 2007), problems consistent with those that societies are still trying to safeguard against today. However, there are serious flaws to some of the current continuity plans.

Registration Services are aware that during a pandemic their staffing levels will be considerably reduced and plan to increase staffing levels, limit the number of death certificates produced, reduce appointment times and extend service hours. By limiting death certificates to one per person, the service may be able to produce the necessary numbers, however, at 2.5%, with 1,254 deaths in week 6 and 1,232 in week 7, it is unlikely (Table 5). Although limiting death certificates to one per person may reduce workload certificates are essential for closing down financial accounts and selling property, so having a sufficient number is important. If more than one certificate per person is required, even at a 1% mortality rate, these contingency plans may not be adequate.

The service is unsure how a pandemic will affect Coroner referrals and the issue of Medical Certificates of the Cause of Death (MCCDs), which could impact the rate at which death registrations reach the Service. If all coronavirus related home deaths are referred on, registrations would trickle into the Service rather than overwhelming it. However, if these deaths bypass the Coroner, the Service could be inundated, particularly as deaths have to be registered within 5 days. Some clarification can be found in Government guidance documents which state that, during a pandemic situation, legislative amendments can be requested by Strategic Co-ordinating Groups (SCGs) to expedite the issue of the MCCDs and reduce Coroner referrals (Department of Health, 2012). One such amendment would be to allow a registered medical practitioner, who has not attended the deceased in their last illness, to be able to certify those who appear, to the best of the physician's knowledge, and based on the information available, to have died of coronavirus without needing to refer this on. The guidance also suggests contingency plans that may be more highly contentious. For example, because previous pandemics have resulted in high clinical attack rates in prisons, there is a suggestion that the usual high level of scrutiny of deaths in custody may be suspended in the event of a pandemic, with the requirement for inquests being reviewed. Clearly this approach has some risk.

Government contingency plans to avoid delays to death registrations include the possibility of those needing to register a death not being required to attend in person, and being permitted to fax or email the MCCD to the Registrar. This will allow the death to be registered, with the certificate and disposal documentation processed promptly and collected at a later date. The requirement that deaths be registered within the first 5 days after death will still stand (Department of Health, 2012).

Anyone who intentionally fails to register a death within the required timeframe will be subject to a fine (Registration of Births and Deaths Act 1953, s.36(e)), however this is unlikely to apply if the failure to register is due to delays at Registration Services. Nevertheless there are circumstances where the 5 day rule can be excluded, for example, if a body is referred to the Coroner, a death cannot be registered until the investigations have been concluded. Also, if the Registrar is informed a medical certificate has been issued, registration can be delayed for a further 9 days, i.e. 14 days from date of death (Registration of Births and Deaths Act 1953).

A quick release of MCCDs and fewer Coroner referrals would mean an influx of work for Registrars, not the trickle they may be expecting and managers will need to plan accordingly. Registrars will also have to deal with the rest of their everyday business such as births, which have to be registered within 42 days (Registration of Births and Deaths Act 1953), and any marriage ceremonies, postponements or cancellations, still have to be managed.

At a 1% mortality rate, with additional staff and changes to working practices, it may be possible for the Bereavement Service to cope with an increase in burials of up to 82 per week but they may struggle with 188 per week at 2.5%. The service is relying on obtaining additional staff from other services to assist with manual tasks such as digging graves, but it is unclear whether these will be available. Extending opening hours, increasing staff, having shorter timeslots for committals and encouraging funeral services to be held at local places of worship (Home Office, 2008) will allow an increase in interments but an increase will also depend on available staff, the condition of the ground, and whether “common burials” are to be used to increase cemetery space.

Common burials or “mass graves” are controversial, conjuring up images of large trenches filled with bodies, akin to those during the Great Plague of 1665, or the Ebola crisis in West Africa, but these may become necessary during a crisis. In 2006 the Home Office considered using mass burials as part of their contingency plans to prepare for a future pandemic (Stones, 2006) but fortunately, due to the low UK death toll during the 2009 pandemic, this was never put into practice, but if it had, public acceptance could not be guaranteed. For such a suggestion to be publicly acceptable the Government would need to overcome many preconceptions and convince the public of the country’s need for it. Changing the terminology and using the expression “collective burial, i.e. “where burials occur in a trench in rapid succession, each burial separate and identified” (West, 2006) may help in this case. These are generally used when either body storage capacity is overfull due to body disposal delays or as temporary interments due to an increase in demand on the Coroner’s service. Once the crisis is over, the bodies are exhumed and autopsied, reburied or cremated as normal (West, 2006).

A further risk relates to any decision made to allow doctors who have not attended the individual in their last illness to certify cause of death which could be open to abuse. The physician would make a death-by-coronavirus determination based on the evidence available, if there are no obvious reasons for doubting the cause, and the decedent's representatives confirm the victim had been suffering from the virus, whether true or not, it is unlikely a post mortem examination would be requested. Risks could be mitigated by insisting on burials so that remains could be exhumed and re-examined should there be any suspicion over time. However, such a precaution would put added pressure on cemetery workers and deplete the cemetery spaces available.

According to Bereavement Services, there are currently 5,574 burial plots still available in the case study Local Authority, excluding those plots pre-purchased and family graves. If burials and cremation split remains at 15% and 85% there should be enough burial plots available within the Local Authority area, even at a 2.5% mortality rate where the total number of potential deaths amounts to 5,544 (although, for specific religious groups these figures may be different). If the burial figures are considerably higher, Government recommends Local Authority collaboration with private sector churchyards to increase capacity (Home Office, 2008). However, difficulties may arise if a burial within a specific cemetery is requested. UK society consists of multiple cultures and faiths. During a mass death situation, where some religions decree burial within a certain time, prioritising the needs of such groups may give rise to feelings of discrimination in others potentially leading to public disquiet and anger (Honigsbaum, 2009). Local Authorities must work closely with multi-faith groups to ascertain precisely what will be necessary in such a situation and to gain understanding that, in certain circumstances, certain religious elements may need to be relinquished.

During the 1918 pandemic, representatives from Sheffield, Manchester and Bethnal Green appealed to the National Service Board to release soldiers to help with burials (Honigsbaum, 2009). Since military personnel will also be affected they cannot automatically be relied upon to provide aid as their main focus will be to "maintain critical military operations" (Department of Health, 2011, pg. 60). The Civil Contingencies Act 2004 requires Local Authorities to direct the response to any non-military threats and emergencies to the UK, but when their capability is overwhelmed by a serious incident, the military may be petitioned to assist in the response, known as Military Aid to the Civil Authorities (MACA). The Ministry of Defence (MOD) must authorise any appeals for military aid but if there is an urgent need to protect life, local commanders are permitted to act under the authority of a 1983 Defence Council Order (Brooke-Holland, 2018).

With a 1% mortality rate, 464 is the highest number of weekly cremations that can be processed over a 15-week period. With managers intending to significantly increase staffing levels through training back office staff, using previous staff members, and staff from other Local Authority departments, as well as agency workers, the service may be able to process these. Although, with a 2.5% mortality rate the figures increase to just over 1,000 cremations in weeks 6 and 7 which will be beyond capability. With only 10 cremator trained officers, and training taking from 3 to 4 months to qualify, there may not be sufficient people in place in time to deal with the

increase in cremations. Even former cremator officers require a couple of days of refresher training, and agency staff will be sought after by other Local Authorities. However, cremation figures could decrease if there is an insistence that burials be used instead, although opting for burial over cremation to reduce body storage issues and expedite the disposal process could have longer term implications.

Exactly how quickly the deceased are going to come through for disposal is unknown. In the normal process, after death, the body is either held at the public mortuary or sent to the funeral parlour. Once the death has been registered funeral directors make arrangements on behalf of the family and the funeral or cremation takes place and the deceased transported to the grave site or crematoria (Home Office, 2008). However, this may be different during a pandemic as funeral slots may be fully booked, funeral directors may become ill themselves, and death certificates may be delayed. These factors may result in funeral directors having insufficient storage space to meet demand or a delay in the rate at which death registrations and disposals are carried out, which, consequently puts pressure on body storage availability.

Additional body storage would be required if disposals are delayed. The Local Authority is required to provide this service under Section 198 of The Public Health Act 1936. The hospitals in the case study authority have a combined body storage capacity of 110 units and the two crematoria can hold 6 bodies each (Case Study Council, 2019), amounting to 112 available body storage units pending burial or cremation. In a normal situation this would likely be sufficient, however, not during a pandemic, although there are additional storage sites available if necessary.

According to the Authority's Excess Deaths Plan (2019), the first option for additional storage would be a neighbouring public mortuary, which is expected to have immediate temporary storage available for 150 bodies, with a maximum of 300 units. However, some may be in use, and should the mortuary exceed capacity, mutual aid will be sought from other Local Authorities, failing this, a temporary storage site will be activated. There is currently only one such site within the case study area that can store approximately 144 bodies if using 12 x12 person body storage units, or 40 persons if these units are unavailable. The combined maximum body storage capacity available equates to approximately 556 spaces. With the maximum number of deaths at a 1% mortality rate peaking at 546 in week 6 (Table 3), it is likely these body storage facilities would be sufficient, provided registrations, cremations and burials are processed in a timely manner. Should there be any backlog, or the number of available spaces be less than anticipated, there is the option to hire and utilise appropriate refrigerated vehicles or containers. However, if the mortality rate reaches 2.5% the maximum number of deaths in week 6 would peak at 1,254 (Table 4), meaning these facilities would be insufficient, then consideration should be given to calling on national capabilities which may include utilising military facilities. Since it is highly likely that other Local Authorities will be competing for mortuary space the resources the case study authority believe they have to fall back on may not be available.

Recommendations

Both Registration and Bereavement Services know the death toll will increase during a pandemic but are unsure of the actual figures to plan for. Underestimating the mortality rate could reduce the effectiveness of business continuity plans, whereas knowing what to expect will focus attention on the resources required. An option would be to have Escalating Business Continuity Plans, where the service prepares for a worst-case scenario, which can then be scaled back depending on the anticipated mortality rate.

Services may need to legitimately ring-fence employees so that during periods of severe staff shortages their availability will be guaranteed. Since a key issue services face is severe staffing shortages, having official agreements within the business continuity documentation would help to expedite back up plans with managers knowing precisely where their additional staff are coming from, and ensuring any training can be carried out in a timely manner. Safeguarding staffing levels will also help counter impacts caused by those decisions made which are beyond Local Authority control, such as Coroner referrals. For example, if the majority of coronavirus victims were to be referred, the flow of daily registrations and disposals in to the services would decrease, however, if they were not referred the flow would increase. The impacts from these decisions could be further neutralised through producing flowcharts depicting alternative scenarios and the staffing numbers, equipment and supplies required for each. These scenarios will allow managers to be better prepared, regardless of the decision made.

From a technological standpoint, having an on-line registration service would be beneficial as it would speed up the death registration process, especially if people are too ill to attend. On the other hand, this could be open to misuse as, with limited staff, the process may not have sufficient safeguards in place

The discussion in this paper so far has focussed on what the case study Authority could do regarding pandemic planning. The current regional framework, Local Resilience Forums & Partnerships, 2017, states it aims to ensure 'a coordinated multi-agency response to minimise the impact of an influenza pandemic' across its region and neighbouring region, however this 'does not detract from the need for each partner organisation to maintain their individual plans' (pg. 4). The framework maintains that 'the overall responsibility for the management of excess deaths lies with the relevant Local Authority' (pg. 40) and that 'local service providers will aim to maintain current process for as long as possible. Should this become unsustainable, providers may need to work differently' (pg.41). Finding ways of working differently is precisely what these Services have done, but it does not appear to be enough.

Conclusion

Local Authority death management services are likely to be severely affected during the coronavirus pandemic. Government documentation advocates the notion of 'working differently' in order to maintain service delivery and these form the basis of the continuity plans for the case study local authority. However, death, bereavement and coronial services have been severely stretched and under-resourced for years and the continuity plans for working differently are insufficient. Services will try to

plug their capacity gaps by borrowing staff, equipment and body storage space from other services, using agency workers and hiring plant, but their assumption that these resources will be available is potentially misplaced. A more cohesive national approach that pools resources for death management services might be more effective during a pandemic so that staff, stock and equipment could be shared between authorities and, should the worse case scenario arise, a national perspective on collective burials might be more workable.

Even before the coronavirus outbreak The Local Government Association (2020) have argued specifically for a national coronial service that would have greater national oversight and consistency. Such a development would help to address some of the issues identified in this paper. However, change in death services is notoriously slow. In 2004 the Shipman Inquiry concluded that a restructuring of the coroner's system was required in order to strengthen the death investigation system and promote greater dialogue between coroners, the public and medical professionals (Smith, 2004). It has taken until 2018 for progress to be made (Luce and Smith, 2018) so it is unlikely that any change to coronial services will happen fast enough to deal with the current coronavirus threat. Decisions and changes in practice will be made 'on the hoof' but coronavirus may well be the catalyst for more effective excess death planning. As Scanlon and McMahon (2011) assert on page 181, 'Dealing with the dead has been a problem in pandemics for centuries. That is not likely to change'.

This paper has taken an operational perspective on the challenges posed by the coronavirus pandemic. The focus has been on the operational implications to a Local Authority service but the issues this paper raises are primarily about people and how we, as a society treat our citizens in life and in death. In a pandemic situation there is likely to be a necessary change to the 'business as usual' death and bereavement management services.¹ How humanely these are managed is hugely important for those affected at the time of crisis, and the humanity of the government's response will reflect the nature and values of our society, and will be judged accordingly.

¹ The COVID-19 situation is changing hourly and at the time of publication there are reports from Italy of funeral services being overwhelmed, a shortage of coffins, and the army being enlisted to transport corpses to storage facilities (The Guardian, 2020).

In the UK, emergency legislation for managing the dead is being considered. The *Coronavirus Bill 2020* includes such key elements as : coroners only needing to be notified when there is no medical practitioner to sign the death certificate (or not being able to do so within a reasonable amount of time since the death); changes to the *Burial and Cremation (Scotland) Act 2016* regarding the collection of ashes, and a relaxing of the criteria for which family members can complete the cremation application form; funeral directors being allowed to register some deaths; the use of electronic documents for the registration of deaths; lifting of the need for second confirmatory medical certificates before cremations can go ahead and relaxing the requirement for jury held inquests into Covid-19 deaths. It is also possible that local authorities will be able to ask death and bereavement actors (funeral directors, mortuaries, crematoria) to streamline their processes by implementing some of the interventions discussed in this paper, such as increasing the operating times of crematoriums and to use other agents to assist in logistics (Department of Health and Social Care, 2020).

References

- Abramowitz, S and Omidian, P. (2014) Brief on Attitudes towards Ebola-related funerary practices and memorialisation in urban Liberia.
http://www.ebola-anthropology.net/key_messages/attitudes-towards-ebola-related-funerary-practices-and-memorialization-in-urban-liberia/, accessed 09/03/20.
- Brooke-Holland, L. (2018) Military Aid to the Civil Authorities. House of Commons Library. Briefing Paper 08074, 18 August 2017, London, UK.
- Battegay M, Kuent R, Tschudin-Sutter S, Kirsch H, Widmer Andreas F, Neher R A (2020). 2019-Novel Coronavirus (2019-nCoV): estimating the case fatality rate – a word of caution. Swiss Medical Weekly. <https://smw.ch/article/doi/smw.2020.20203>, accessed 20 March 2020.
- Cabinet Office. (2008) National Risk Register.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/61934/national_risk_register.pdf, accessed 2 March 2020.
- Cabinet Office. (2010) National Risk Register of Civil Emergencies.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/211853/nationalriskregister-2010.pdf, accessed 2 March 2020.
- Cabinet Office. (2011) National Planning Assumptions Assessments Tool.
<https://www.gov.uk/government/publications/pandemic-flu-national-planning-assumptions-assessments-tool>, accessed 2 March 2020.
- Cabinet Office. (2012) National Risk Register of Civil Emergencies.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/211858/CO_NationalRiskRegister_2012_acc.pdf, accessed 2 March 2020.
- Cabinet Office. (2013) National Risk Register of Civil Emergencies.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/211867/NationalRiskRegister2013_amended.pdf, accessed 2 March 2020.
- Cabinet Office. (2015) National Risk Register of Civil Emergencies.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/419549/20150331_2015-NRR-WA_Final.pdf, accessed 2 March 2020.
- Cabinet Office. (2017) *National Risk Register of Civil Emergencies*.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/644968/UK_National_Risk_Register_2017.pdf, accessed 2 March 2020.

Dawood F. S., Iuliano A. D., Reed C., Meltzer M. I., Shay D. K., Cheng P, and Widdowson, M. (2012) 'Estimated global mortality associated with the first 12 months of 2009 pandemic influenza A H1N1 virus circulation: A modelling study.' *Lancet Infectious Diseases*, 12(9), pp 687-695.

Department of Health. (2005) Explaining pandemic flu: A guide from the CMO. https://webarchive.nationalarchives.gov.uk/20080818000712/http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/Browsable/DH_5093033, accessed 2 March 2020.

Department of Health. (2011) UK Influenza Pandemic Preparedness Strategy. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/213717/dh_131040.pdf), accessed 2 March 2020.

Department of Health. (2012) Pandemic Influenza: Guidance on the management of death certification and cremation certification. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/216822/2012-06-21dh-template-guidance-on-management-of-death-certification.pdf, accessed 2 March 2020.

Department of Health and Social Care. (2020) Coronavirus bill: what it will do. <https://www.gov.uk/government/publications/coronavirus-bill-what-it-will-do/what-the-coronavirus-bill-will-do> accessed on 18/03/2020

Finnegan, G. (2018) 100 years after 'Spanish Flu': Is the world ready for the next pandemic. <https://www.vaccinestoday.eu/stories/100-years-spanish-flu-world-ready-next-pandemic/>, accessed 2 March 2020.

Gierer, B. 2018. Pandemic Influenza Plan – Psychosocial Services Preparedness <https://health.mo.gov/emergencies/panflu/pdf/panfluplanpsychosocial.pdf>, accessed 09/03/20.

The Guardian. (2020). <https://www.theguardian.com/world/2020/mar/19/generation-has-died-italian-province-struggles-bury-coronavirus-dead>, accessed 19/03/20.

Hine, D. (2010) *The 2009 Influenza Pandemic: An independent review of the UK response to the 2009 influenza pandemic*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/61252/the2009influenzapandemic-review.pdf, accessed 2 March 2020.

Home Office.(2008) Planning for a possible Influenza Pandemic: A Framework for planners preparing to manage deaths. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/62045/flu_managing_deaths_framework.pdf, accessed 2 March 2020.

Honigsbaum. M. (2009) Living with Enza: The forgotten story of Britain and the Great Flu Pandemic of 1918. Hampshire: Macmillan. US.

International Organization for Standardization. (2012). ISO 22301:2012: Societal security – Business continuity management systems. <https://www.iso.org/obp/ui/#iso:std:iso:22301:ed-1:v2:en>, accessed 2 March 2020.

Case Study Council (2018). XXXX *Factsheets*.

Case Study Council. (2019). XXXX *Excess Deaths Plan*. (Version 3.1).

Local Government Association (2020)
<https://www.local.gov.uk/sites/default/files/documents/LGA%202020%20Budget%20submission%20FINAL.pdf>, accessed 09/03/20.

Local Resilience Forums & Partnerships. (2017) Yorkshire and Humber LRFs and LHRPs Pandemic Influenza Framework. (Version 0.3).

Luce T and Smith J (2018) Death certification reform in England. *British Medical Journal*, 361 <https://doi.org/10.1136/bmj.k2668> (Published 21 June 2018).

Matsuishi, K et al (2012) Psychological impact of the pandemic (H1N1) 2009 on general hospital workers in Kobe. *Psychiatry and Clinical Neurosciences* 66(4):353-60

New York Times, (2020) Coronavirus Updates: Global Infections Approach 90,000 as U.S. Scrambles to Slow Spread. (<https://www.nytimes.com/2020/03/02/world/coronavirus-news.html>, accessed 20 March 2020.

Office for National Statistics. (2017a). Population Estimates for UK, England and Wales, Scotland and Northern Ireland: time-series. <https://beta.ons.gov.uk/filter-outputs/93bd026f-7582-4f3d-be16-c1ae098efd70>, accessed 2 March 2020

Office for National Statistics. (2017) Deaths registered by area of usual residence, UK. <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/deaths/datasets/deathsregisteredbyareaofusualresidenceenglandandwales>, accessed 2 March 2020.

Registration of Births, Marriages and Deaths (1953). <http://www.legislation.gov.uk/ukxi/1968/2049/made>, accessed 10/03/20.

Scanlon J., McMahon T., & Van Haastert C (2007), 'Handling mass death by integrating the management of disasters and pandemics: Lessons from the Indian ocean tsunami, the Spanish flu and other incidents'. *Journal of Contingencies and Crisis Management*, 15(2), pp 80-94.

Scanlon J and McMahon T (2011), Dealing with mass death in disasters and pandemics: Some key differences but many similarities. *Disaster Prevention and Management: An International Journal*, 20(2), pp 172-185.

- Smith, J. (2003). The Shipman Inquiry. https://webarchive.nationalarchives.gov.uk/20090808163914/http://www.the-shipman-inquiry.org.uk/images/sixthreport/SHIP06_COMPLETE_NO_APPS.pdf, accessed 09/03/20.
- Space (2020). <https://www.space.com/iran-coronavirus-graves-satellite-images.html>. Accessed 18 March 2020.
- Stones, A. (2006) Mass graves planned if bird flu pandemic reaches Britain. *The Telegraph*. <https://www.telegraph.co.uk/news/uknews/1514565/Mass-graves-planned-if-bird-flu-pandemic-reaches-Britain.html>, accessed 2 March 2020.
- The Guardian. (2020) <https://www.theguardian.com/world/2020/feb/11/coronavirus-expert-warns-infection-could-reach-60-of-worlds-population>, accessed 10/03/20).
- West, K. (2006) Preparing for the Pandemic: A guide for cemetery and crematorium managers. <https://www.iccm-uk.com/iccm/library/PandemicPlanningKenWest.pdf>, accessed 2 March 2020.
- World Health Organisation. (2010) Emergencies preparedness, response: What is a pandemic? https://www.who.int/csr/disease/swineflu/frequently_asked_questions/pandemic/en/, accessed 2 March 2020.
- WHO. (2020) Coronavirus disease 2019 (COVID-19) Situation Report – 41. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200301-sitrep-41-covid-19.pdf?sfvrsn=6768306d_2, accessed 20 March 2020.
- Yin, R.K. (2018) *Case Study Research and Applications: Design and Methods* (6th ed.). Los Angeles: SAGE.