

**UNDER THE FATAL ACCIDENTS AND SUDDEN DEATHS INQUIRY
(SCOTLAND) ACT 1976**

DETERMINATION

by

Sheriff Principal Edward Bowen QC

In an Inquiry into the death of

Pasqual Niall Norris

EDINBURGH, 3 FEBRUARY 2009

The Sheriff Principal having resumed considered of the cause finds in terms of Section 6(1) of the Fatal Accident and Sudden Deaths Inquiry (Scotland) Act 1976:

- (a) That Christopher (known as Pasqual or Pascal) Niall Norris died on 8 July 2006 at 03.45 hours within the Intensive Treatment Unit of the Royal Infirmary of Edinburgh.
- (b) That the cause of death was sub arachnoid haemorrhage and disseminated intravascular coagulation resulting from systemic *bacillus anthracis* infection acquired by inhalation of anthrax spores.
- (c) That there are no reasonable precautions whereby Mr Norris' death might have been avoided.
- (d) That no defects in any system of working contributed to his death.

(signed) *E Bowen*

- (e) That the following facts are relevant to the circumstances of death.

ANTHRAX

1. “Anthrax” is the disease caused by bacteria known as *Bacillus anthracis*. The bacteria is created from spores which occur naturally worldwide; they are inactive and harmless in soil, but when consumed by an animal may germinate and transfer into bacteria. The bacteria draw nutrients from the area around them and reproduce rapidly, with the quantity of anthrax in the blood of the animal reaching very high levels. When the animal dies blood and other fluids leak out. Once in contact with the air or soil the bacteria then turn back into spores which contaminate the meat, skin and fur of the animal as well as the ground in the area of the carcass. At the same time they form their own protective case, which means that they can exist for decades.
2. Anthrax may enter the human body through broken skin (cutaneous anthrax); by consumption of infected meat resulting in generalised anthrax, or by inhalation of spores. Cases of generalised anthrax occur most commonly in under-developed countries where standards of hygiene in meat processing are low or non-existent. Cases of cutaneous anthrax are infrequent. Between 1950 and 2001 there were 39 cases of cutaneous anthrax in the whole of the United States of America. There were nine between 1968 and 2005 in Scotland. Cutaneous anthrax is relatively easy to identify due to the presence of a black lesion at the site of the infection. If treated promptly by antibiotics it is not fatal, and even untreated cutaneous anthrax is believed to be fatal in less than 20% of cases.
3. Cases of inhalation anthrax are extremely rare. The last reported case of inhalation anthrax in the UK was in 1904. A condition known as “wool-sorters disease” which very occasionally affected persons handling imported hides and wool is believed to have been anthrax, but was effectively eliminated by decontamination procedures introduced by 1904. There are no accurate

estimates for the “dose” of anthrax which may require to be inhaled to cause infection. One study has indicated that of workers in a goat hair mill who were exposed to several hundred spores per day few succumbed to the disease. On the other hand, it is known that people can succumb to relatively low exposure, and susceptibility may depend upon factors such as age, frailty, malnourishment and weakness of the immune system.

4. Inhalation of anthrax is where an individual breathes in air containing anthrax spores. Only the smallest of particles can enter the lungs. Some of these may stick in the lungs and are picked up by scavaging cells known as macrophages. These turn into vegetative bacteria which produce a lethal toxin that kills other macrophages, that is it develops the capacity to kill those cells designed to remove it. The destruction of cells leads to an accumulation of fluid (oedema) which itself contains lethal toxins. Thereafter the disease progresses very rapidly. Organisms appear in the blood, and the level of tissue damage becomes overwhelming with major organs beginning to fail. The leaking of blood vessels and fluid leaks results in fluid accumulation in the lungs and restricts the operation of the heart.
5. The form of infection makes it extremely difficult, if not impossible to identify that a patient is suffering anthrax infection until such time as highly specialised blood cultures are created and examined. There is nothing distinctive about the symptoms which in their initial stages are similar to common ailments such as influenza. By the time the infection has taken a hold the presence of fluid in the lungs is consistent with pneumonia.

MR NORRIS AND AFRICAN DRUMMING

6. At the time of his death Mr Norris was 50 years of age. He lived alone at Black Lodge, Stobbs, Hawick. He was, amongst other things, a skilled maker of musical instruments. He was a Buddhist and a strict vegan. Although he enjoyed good health in 2006 he had previously suffered acute myeloid leukaemia for which he received treatment by way of chemotherapy in the

early part of 2002. His condition was complicated by pneumonia. He required two periods of in-patient treatment in Borders General Hospital (“BGH”) each of about four weeks duration. His leukaemia was successfully treated. He continued to receive regular check-ups at BGH and at each stage blood tests confirmed that his leukaemia was in remission.

7. Mr Norris became interested in African drumming early in 2006. He attended classes conducted by Geraldine Broadgate, who subsequently married a man from the Republic of Guinea by the name of Nansady Keita. Mr Keita’s uncle, who lives in Germany, is a world famous drummer. The principal drums used in this type of music are known as djembe drums. They are played by hand. They are made out of wood and goat skin. A deeper sounding drum, the doun doun, is played with sticks. The skin of a doun doun is normally cow skin. Miss Broadgate had a number of drums which came from Guinea which she had brought into the UK herself (via Hong Kong) or she or Mr Keita imported directly. In particular seven drums in total were imported from Guinea in February and July 2006. They were conveyed by Air France from Conatry, Guinea to Paris Charles de Gaulle Airport and thereafter to Manchester.
8. Mr Norris attended drumming classes regularly up to the time of his death. In particular he attended a class in the Abbey Road Centre, Kelso on 2 July 2006. Classes were also held by Miss Broadgate in Smailhom Village Hall, near Kelso. Mr Norris attended a class which was held there on 4 July 2006.

ONSET OF SYMPTOMS, TREATMENT & DEATH

9. On 5 July 2006 Mr Norris began to suffer symptoms of ill-health. He told a neighbour that he thought he had flu or a fever. On the following day he said that he was feeling better, but was plainly very unwell when seen by his neighbour at 08.45 hours on Friday 7 July. The neighbour took him by car to the O’Connell Street Medical Practice, Hawick. He was unable to walk and required assistance to enter the surgery where Dr Graham Bianchi examined

him. Mr Norris told the doctor that he had suffered from leukaemia, complicated by chest infections in the past and “felt the same now”. Dr Bianchi noted a raised temperature and signs of left-sided chest infection. He considered that Mr Norris might be suffering an acute relapse of leukaemia and arranged for his immediate transfer by ambulance to BGH.

10. On admission to BGH Mr Norris was noted to look very ill and septicaemic. He was semi-conscious on admission and his conscious level dropped significantly in the course of the day. A chest x-ray showed left-sided consolidation consistent with pneumonia. A CT scan revealed severe meningitis with wide-spread meningeal enhancement. He was given antibiotics and steroids, and was intubated. Later in the evening he was transferred to the Intensive Care Unit of the Royal Infirmary of Edinburgh (“RIE”).
11. Mr Norris arrived at the RIE shortly after midnight on 8 July. He was in profound septic shock and was beginning to haemorrhage from some of his orifices. He was given blood transfusions, clotting factors and platelets in an attempt to curtail the obvious disseminated intravascular coagulation. Thereafter he suffered four cardiac arrests in quick succession and life was declared extinct at 03.45 hours.
12. A post mortem examination of the body of Mr Norris was carried out on 17 July 2006. It revealed haemorrhage around the oesophagus and the aorta. Examination of the respiratory system confirmed the presence of oedema in both lungs and there was a yellowish fluid in both plural cavities. In the cranium there was sub-arachnoid haemorrhage on the surface of both hemispheres of the meninges. Death was certified as due to (1) (a) sub-arachnoid haemorrhage, (b) disseminated intravascular coagulation with acute myeloid leukaemia as a secondary cause. The history of acute myeloid leukaemia was considered relevant because of medical opinion that it might have affected the immune system.

THE DISCOVERY OF ANTHRAX

13. Blood samples were taken from Mr Norris during his brief time in BGH on 7 July. A blood culture was booked into the laboratory system at BGH Microbiology Department on that day. Over the weekend sub-culturing and routine examination revealed an organism which was identified as being of the *bascillis* species. The presence of an organism of that species is not unusual in specimens submitted to the laboratory and is frequently found in cases of superficial skin infections. The presence of the organism was nevertheless reported by BGH to the Microbiological Department of ERI.
14. Following the death of Mr Norris a decision was taken in the Microbiology Department of ERI to follow up the verbal report received from BGH. A request was made to BGH to send the isolate of *bascillis* to ERI and this was done on 14 July. As the majority of organisms of the *bascillis* species come from food and water a decision was taken then to forward the isolate to the Food Safety Microbiology Laboratory (“FSML”), Colindale Avenue, London.
15. The isolate was received at FSML on 20 July. Following further culturing and testing it was identified, on 3 August, as being of the *bascillis cereus* group. This group includes both *bascillis anthracis* and *bascillis cereus*, the latter being a bacteria commonly found in cases of food poisoning.
16. The results of the testing at FSML were further analysed by an experienced biomedical scientist Vina Mathani who noted that the strain did not wholly fit the *bascillis cereus* profile. After obtaining further information from ERI about Mr Norris’ medical history Ms Mathani arranged for the culture to be examined at the Health Protection Agency Laboratory at Porton Down, Salisbury.
17. The UK Special Pathogens Unit at HPA Porton Down has methods of latching on to targets in the course of DNA analysis of cultures, which targets are indicative of *bascillis anthracis*. Such a test gave a presumptive finding of

anthrax on the morning of 10 August and this was confirmed by further tests that afternoon. The results were conveyed immediately to FSML; to the Microbiology Department at ERI, and to Health Protection Scotland.

18. Subsequent histopathology investigations of tissues taken from Mr Norris' lungs and other organs carried out at Porton Down and at the Center for Disease Control and Prevention in Atlanta USA showed the presence of *Bacillus anthracis*. A review of the case notes was carried out by Dr David Stephens, Emory University School of Medicine, Atlanta, who is a world expert on the anthrax. He was of the view that "an inhalation event" was the most likely case of Mr Norris' infection.
19. In the light of the histopathological findings and the conclusions reached in Dr Stephen's report, the certifying pathologist concluded that the case of death (as originally set out in Finding in Fact 12 above), should be amended to: "systemic *Bacillus anthracis* infection".

SUBSEQUENT ACTION, INVESTIGATION AND DECONTAMINATION

20. An Incident Control Team was established on 11 August 2006 by the Director of Public Health for NHS Borders. An extensive contact tracing exercise was planned, organised and undertaken. That involved tracing people who might have had contact with Mr Norris, or his home or workshop, and included those who had been present at a wake following his death which involved the scattering of ashes. In all 167 people were contacted and 73 of them commenced a course of antibiotic prophylaxis.
21. Environmental sampling was instructed with a view to tracing the possible source of anthrax infection. This was carried out at four different locations. Testing was conducted either using wet swabs or sponges to wipe surfaces, or using a vacuum cleaner fitted with a high efficiency particulate air filter from which the material is extracted. Any material from the swabs/sponges or the

HEPA filters were extracted and cultured. Samples were transported to Porton Down for further examination.

22. Initial testing was carried out at Mr Norris' home and workshop at Black Lodge. 164 samples were taken but all were negative. At an early stage of investigations a potential significance of a link between Mr Norris and African drumming was recognised. Tests were carried out at Smailholm Village Hall and at a residential property and garage in Smailholm where Mr and Mrs Keita lived until July 2006. Tests were further carried out at a cottage in Belford, Northumberland to which they moved in about August 2006 and at a house in Cumbria, being the home of an individual who had purchased a single goatskin from the Keitas in March 2006.
23. Cultures created from samples from soft chair covers, on the floor and brooms in Smailholm Village Hall and from the floor of the garage there produced isolates of *Bacillus anthracis*. Similar isolates were cultured from samples from a drum, a spare drum skin and a bedroom floor rug taken from the Belford property. The isolates were identified as being of the strain of anthracis which had infected Mr Norris. The samples from Cumbria produced no positive findings.
24. An expert working group was convened embracing worldwide decontamination experience with representatives from Porton Down, the Government Decontamination Service, the United States Environmental Protection Agency, and from Germany. The properties where traces of anthrax had been found were decontaminated by specialist contractors.

DRUM SKINS AND RULES OF IMPORTATION

25. The majority of African drums enter this country "ready made". As such they are regarded as "finished products" and are not subject to any regulations covering the importation of animal hides.

26. The importation of hides from outwith the EU is governed by the EU Animal By Product Regulations 1774/2002. Further, Council Directive 97/78/EC of 18 December 1997 lays down the principles governing the organisation of veterinary checks on products entering the EU from Third Countries. The Regulations provide that all products of animal origin (“POAO”) entering the EU must come from countries that have been approved, and which must meet EU wide product specific standards. In general POAO require to be accompanied by a health certificate in a form prescribed by the regulations, signed by a veterinary officer, in the country of export. POAO from approved countries must be imported through a Border Inspection post, being the point of entry into the EU where checks are carried out. Once in the EU, POAO may circulate freely.
27. The checks carried out at a Border Inspection point involve checking the documents to ensure that the consignment is accompanied by a certificate signed by a duly authorised veterinary officer; confirmation that goods are the same as those described in the accompanying paperwork; and further may involve examination of a proportion of the shipment to ensure it does not impose a threat to animal or human health. This may involve taking samples for laboratory tests.
28. The tests which are carried out at a Border Inspection point are not of a nature which would be likely to detect the presence of anthrax on a hide.

CONCLUSIONS

29. Mr Norris became infected with anthrax by inhalation of spores.
30. The source of the anthrax spores was African drums imported from the Republic of Guinea.

NOTE:

1. This Inquiry arises from the death of a 50 year man in somewhat unusual circumstances. As his death was caused by the inhalation of anthrax spores it is rightly a matter of public concern, anthrax being a disease, often associated with terrorism and biological warfare, which is widely feared.
2. It is only fair to comment at the outset of my remarks that the circumstances were very fully investigated both by the Health Protection Agency and the Director of Public Health for NHS Borders. Both organisations produced full and detailed reports in December 2007. These reports, which contain numerous recommendations, were circulated to all appropriate agencies. It would be idle to pretend that the findings of a Fatal Accident Inquiry 12 months later will add to the detailed medical and technical information previously made available. For that reason the foregoing Findings in Fact contain only a synopsis of the history of Mr Norris' sad demise and the events following it.
3. To assuage fears which may arise from the case I can offer the following general observations.
 - (1) The chances of encountering and being infected by anthrax are extremely remote; the chances of succumbing to it through inhalation are remoter still.
 - (2) Mr Norris received all appropriate medical care. Nothing could have saved him by the time he was seen by a doctor.
 - (3) Mr Norris' death might have been recorded as due to natural causes and would have passed unnoticed had it not been for a considerable degree of diligence on the part of Microbiologists in Borders General

Hospital, Edinburgh Royal Infirmary, and the Food Safety Microbiology Laboratory in London.

- (4) All appropriate steps were taken thereafter to trace the source of infection and to decontaminate those areas affected; and
- (5) It is not apparent what steps might have prevented the infection, nor what could be done to avoid a repeat.

I shall expand to some extent on each of these observations and also offer some comment on whether there is any explanation for the fact that Mr Norris was the only person to have been infected.

THE CHANCES OF BEING INFECTED BY ANTHRAX.

- 4. Findings in Fact 2 and 3 give some indication, on a purely statistical basis, of the remote nature of the risk of being infected by anthrax in a developed country. It cannot be emphasised too strongly that this was the first recorded case of death by anthrax inhalation in the UK in over 100 years.
- 5. The circumstances in which Mr Norris came to be infected themselves demonstrate the “freak” nature of the event. Mr Norris was known to have made at least one drum himself, and indeed is believed to have made it from the skin of a dead badger he had found in the road. From knowledge of the fact that an individual in America had contracted anthrax from making drums an early suspicion in the inquiries following his death was that Mr Norris had been infected in like manner. There was, however, no trace of anthrax found in either his home or his workshop. On the other hand traces of anthrax were found in other places linked with African drums with which he might have had some contact, although at least one of the findings was in a property Mr Norris had never visited. It can be said, in consequence, that other people – in fact many other people – were exposed to the risk of anthrax infection from the same source without coming to harm. It is not possible to say how Mr Norris

came to be infected; it is quite conceivable that he could have been infected if he had swept the floor in Smailholm Village Hall. He did not need to be playing any particular drum for infection to have occurred.

6. The very inhalation of anthrax in such a way as to result in infection is itself an event which requires a concurrence of chance events. First, there has to be some form of force causing the spores to rise into the atmosphere creating a “pocket” of infected air. The whole atmosphere in the vicinity of the source of spores is not affected; it thus requires the unfortunate individual to inhale the infected “pocket”. Many spores may simply remain in the back of the throat. Only the smallest enter the respiratory system and even then they may not stick or develop to full infection.
7. Issues of individual susceptibility then enter into the equation. In general terms people are more susceptible to any form of disease if “immuno suppressed”. That can result from as simple a condition as a common cold. Variations in the pattern of deaths in previous recorded cases of anthrax infection provide a demonstration of the significance of individual susceptibility. One of the victims of a terrorist anthrax attack in the USA in 2001 was a lady of 94 whose age and frailty was believed to have contributed to her susceptibility. An accidental release of anthrax spores in Sverdlovsk in the USSR in 1978 resulted in a high incidence of death amongst malnourished people in the locality. The American case of inhalation of anthrax which occurred in 2006 and involved drums made from goat hide from the Ivory Coast did not have fatal consequences. The individual infected had previously suffered cutaneous anthrax and was believed to have had partial immunity.
8. The most relevant factor in the case of Mr Norris was his history of acute myeloid leukaemia for which he had received chemotherapy. The immuno system is suppressed by chemotherapy. Mr Norris’ condition was, however, successfully treated in July 2002. It was in remission and he was not “immuno suppressed”. In the opinion of an experienced consultant haematologist he was no more susceptible to infection than anyone else.

However, the weight of medical opinion was that the effect of leukaemia on the immune system falls to be taken into account, and indeed a consultant in clinical care said that doctors in intensive care units have a general concern that persons who are in remission from acute myeloid leukaemia have less resistance to infection. The conclusion can only be that it cannot be discounted that Mr Norris' previous health problems contributed to his susceptibility to anthrax infection.

9. Overall, putting the matter in simple terms, not only was Mr Norris in the wrong place at the wrong time, but he was probably the wrong person to be there.

ADEQUACY OF TREATMENT

10. It is not possible to say, nor does it seem to me to be necessary to speculate, on exactly when Mr Norris was infected. Whilst a normal "incubation period" of anthrax bacteria is 3 to 10 days, there are recorded cases of symptoms not appearing until several weeks after exposure. Mr Norris appears to have been aware of symptoms 2 to 3 days before he was seen by a doctor. There is no reason to think that it would have made any difference if he had been seen earlier. He was admitted to hospital very promptly. Appropriate examination and investigation was carried out showing symptoms consistent with pneumonia. Amongst the antibiotics administered to him were those which provided the best chance of surviving the anthrax infection. He was rapidly transferred to the largest intensive care unit in Scotland where he received expert care, but by then his overwhelming infection had passed a point of no return.

DISCOVERY OF ANTHRAX

11. Mr Norris' symptoms, and examination of his body post mortem, gave no indication of the underlying cause of the overwhelming infection which killed him. It is, in my view, reassuring to know that those involved in the culturing

of blood samples in microbiology laboratories after his death were not prepared to stop the investigations until wholly satisfied of the explanation for what were only marginally unusual results. Although an organism of bascillis species was identified early, it was of a type commonly encountered in routine laboratory investigations. It was nevertheless followed through with meticulous care and attention to detail. It was only through very high levels of skill that anthrax was discovered.

TRACING THE SOURCE AND DECONTAMINATION

12. I have not considered it necessary to consider this aspect of matters in detail. The evidence led relating to it was necessarily of a general nature. It was very fully covered in the reports referred to in paragraph 2 of this Note.

PREVENTION

13. Short of an outright ban on the importation of animal skin products into the United Kingdom it is difficult to see what steps could be taken to eliminate the risk of repetition. Having regard to the level of risk such a step would be wholly disproportionate. Dr Tim Brooks, Head of Novel and Dangerous Pathogens at Porton Down, put it in these terms: "From time to time animal skins are imported into this country contaminated with anthrax. But that has been going on for 150 years. We don't know how many hides are imported, what percentage have anthrax, and what percentage retain it when converted into drums. What we know is that there may be thousands of drums, many people play them, and there was no known case of anthrax through inhalation until the death of Mr Norris. This is not a major public health problem". I have no difficulty in agreeing with that observation.
14. It further falls to be observed that it would be difficult to make any recommendation relating to the importation of animal hides which would not be met with very considerable legal difficulties. The importation of products of animal origin is an EU regulated matter. The nature of any controls would

have to be enforced at EU points of entry since such products can circulate freely once they have entered an EU country. The introduction of any form of ban would only lead to the potential for illegal importing of POAO and might well lead to an increased danger of imports from unapproved sources.

15. Even it were in my power to recommend that consideration be given to more stringent forms of testing at points of entry there is no evidence that any form of test currently exists which would lead to the detection of anthrax spores on hides or animal skin products in the course of importation.
16. Subject to one observation, one is left with the conclusion that the acquisition of anthrax infection by inhalation was an extremely unlikely occurrence and that the level of risk is not such as to cause any degree of concern amongst those engaged in African drumming or those who may find themselves in the proximity of African drums. The qualification relates to the fact that a second case of a similar nature appears to have occurred in England shortly before the hearing of the Inquiry into Mr Norris' death. No information relating to the circumstances of that were available to me. It goes without saying that if there is anything in the circumstances pertaining to that incident which relates in any way to Mr Norris' death the whole situation may require to be carefully reviewed by the Public Health Authorities.
17. Finally, if anything positive can be said to emerge from this episode it is that microbiologists and medical practitioners now have a higher awareness of the possibility of cases of anthrax infection appearing from natural sources. The Health Protection authorities have also gained some valuable experience in responding to and dealing with anthrax contamination in diverse locations.