

**INQUIRY HELD UNDER FATAL ACCIDENTS AND SUDDEN DEATHS INQUIRY
(SCOTLAND) ACT 1976 INTO THE DEATH OF ANDREA MCQUILTER v.
SHERIFFDOM OF GLASGOW AND STRATHKELVIN AT GLASGOW**

INQUIRY HELD UNDER FATAL ACCIDENTS AND

SUDDEN DEATHS

INQUIRY (SCOTLAND)

ACT 1976

SECTION 1(1)(a)

SECTION 1(1)(b)

DETERMINATION by EDWARD F BOWEN QC, Sheriff Principal of the Sheriffdom of Glasgow and Strathkelvin following an Inquiry held at GLASGOW on the TWENTY NINTH day of OCTOBER TWO THOUSAND AND ONE and subsequent days into the death of ANDREA McQUILTER.

GLASGOW, 25 February 2002.

The Sheriff Principal, having considered all the evidence adduced, DETERMINES: in terms of the Fatal Accident and Sudden Deaths Inquiry (Scotland) Act 1976 Section 6(1) (a) that ANDREA McQUILTER, aged 19 years who resided at Flat 8.22, 18 Pinkston Drive, Sighthill, Glasgow died at Glasgow Royal Infirmary at 13.36 hours on 26 April 2000;

(b) that the cause of death was multi-organ failure secondary to toxin producing organisms;
(c) that there is no evidence of any precautions which might have avoided the death of the deceased;

(d) that the death of the deceased was not caused by any defect in a system of work;

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

- (1) The deceased has used drugs from the age of 16 and had been a heroin injector since the age of 17. As a result her health deteriorated, she had weight loss and suffered from abscesses. She had complained of an abscess on her right buttock on 22 April but did not seek medical attention.
- (2) On the morning of 26 April she called an ambulance by 999 call which arrived at her home 10.07. The comments of ambulance crew are "IV drug abuser unable to stand - three days - claims to have abscess on posterior - is covered in blue/purple marks also has track marks both arms - has soiled herself - claimed DIB (difficulty in breathing) for past two days".
- (3) Her arrival at the Royal Infirmary was timed at 10.41 and she was seen by the triage nurse at 10.50. She was noted to be cyanosed; her pulse was too frail to give a reading and her temperature at 34.4° was within the range of hypothermia. She was seen by 11.00 by a member of the medical staff who noted signs of cardiac arrest and a rapid deterioration to a level of 5/15 on the Glasgow coma scale, which indicates a very low level of response. She was intubated and ventilated. IV fluids were introduced through a line inserted high on the chest, the condition of her veins being such as to inhibit or prevent normal intubation.
- (4) Thereafter substantial attempts at resuscitation were made. She was given oxygen as well as IV fluids and drugs in the form of adrenaline and ceftriaxone, a non-specific antibiotic. Despite this treatment it became obvious that she was suffering from septicaemia or toxemia. Her white cell count at 137 was extremely high and other blood test results indicated kidney failure. Multi-organ failure became apparent. She died before she could be transferred to the Intensive Care Unit.
- (5) The abscess on the buttock of which the deceased had complained was not of a nature to be regarded as the obvious source of septicaemic infection or toxemia.
- (6) Post-mortem examination revealed the presence of multiple injection marks on her upper limbs and in the groin area. Internal examination revealed that both lungs were markedly oedematous and congested. In consequence death was certified as being primarily due to pneumocystis carinii pneumonia. In the light of knowledge acquired from subsequent deaths with similar characteristics, the finding of pneumonia was incidental and the immediate cause of death was multiple organ failure due to toxin producing organisms.

NOTE:

[1] For my comments on the background to the multiplicity of deaths of injecting drug users in Glasgow during the period April to August 2000 reference is made to the General Note appended hereto.

[2] The death of Andrea McQuilter was the first which occurred and it was not until further deaths, in particular those on 29 April and 1 May in the Victoria Infirmary, that the significance of her demise became apparent. The circumstances are in themselves otherwise unremarkable. It is a tragic case of a young lady who became addicted to heroin at a very early age and had by the age of 19 become a chronic injector. It is more than likely that she became fatally infected as a result of an injection into the buttock and that a toxin producing organism caused the spread of a devastating infection throughout her system which led to her rapid death on admission to hospital. Although the presence of clostridia has not been established in this case certain features of the circumstances of death point strongly to that. These include the fact that she was a "muscle popper", the high white cell count, the rapid deterioration without evidence of overwhelming sepsis and the condition of the lungs found at post-mortem examination.

[3] There was no evidence that the deceased had any particular reluctance to attend hospital. It was accepted that if she had attended earlier the prospects of successful treatment would have been increased. On the other hand the evidence of both the clinical findings in hospital and results of post-mortem examination suggest that there were no outward signs of the catastrophic nature of the infection which was affecting her. It is accordingly unlikely that earlier presentation at hospital would have resulted in measures which would have avoided her death. It is apparent that this unfortunate young lady was in poor health and it is likely that her immune system lacked the capacity to resist the infection which produced the toxins which effectively killed her.

GENERAL NOTE

1. Intravenous injecting of heroin is an activity which is fraught with danger to the health of those indulging in it. The risk of infection from the heroin itself, the substances used in preparing it for injection, and the equipment used, is ever present. Abscesses caused by such infection are a common occurrence, and resultant deaths by no means unknown. The activity becomes more hazardous when the veins of the addict have broken down through constant abuse and it becomes necessary to inject into the vein in the area of the groin or directly into muscle, an activity known as "muscle popping". Those who have sadly degenerated to this level are likely to be in poor general health. Although death is to be regarded as a direct and natural consequence of infection arising from such activities, in the majority of cases infection responds to antibiotic treatment and the sudden onset and rapid development of symptoms of infection leading to death is relatively rare. This Inquiry arises from 18 sudden deaths of heroin addicts which took place in the Glasgow area between April and August of 2000.

2. The Inquiry is constituted and proceeds under the provisions of the Fatal Accidents and Sudden Deaths Inquiries (Scotland) Act 1976. It is, in consequence, an Inquiry into the circumstances of 18 deaths. It is necessary to emphasise this because there were, in addition to those deaths, a further 42 similar cases in the Greater Glasgow area in the same period. In total, 23 persons died. Whilst the circumstances of the deaths fall to be examined in the context of an "outbreak" with certain conclusions as to cause of that outbreak and its management by the relevant health authorities, one ought to acknowledge that the majority of those who appear to have been infected during the outbreak in fact survived. Quite properly little or no evidence was led regarding those "successful" cases. The findings in this Determination do not, in consequence, fall to be regarded as the result of a "balanced" investigation into the circumstances of the outbreak. That observation is not intended as a criticism of the form of presentation of the evidence; it is made at this stage with a view to maintaining a proper perspective.
3. It is also worth bearing in mind that these deaths occurred as a result of an activity that is not only hazardous but illegal. The statistic given in the course of the Inquiry of an estimated 12,500 to 15,000 heroin addicts in the Glasgow area is indicative of illegal activity on a massive scale. The scale of such conduct should not mask the unacceptability of it. In the course of the evidence certain observations were made of perceived deficiencies on the part of hospital authorities in their attitude to, and manner of dealing with, drug addicts. I shall deal with that matter of "perception" in due course. What was not, however, touched on was the cost to the health services in dealing with the consequences of heroin addiction, and the extent to which resources are devoted to it which might be valuably re-directed. In the course of his closing submissions one of the representatives of the family of a deceased observed that the Inquiry had "taken for granted the whole drugs culture". There is much force in that. Each of these deaths represents a wasted life; a tragedy for all who died and those close to them. But they represent only one episode in very large tragedy which deserves to be addressed with as much vigour and commitment as any external threat to our national security and well-being.
4. With these preliminary observations I now turn to deal with issues which were directly addressed in evidence and in parties' closing submissions.

THE CAUSE OF THE OUTBREAK

5. As will be observed from the individual findings, the second and third deaths occurred in the Victoria Infirmary on 29 April and 1 May 2000. The circumstances of these, which involved certain common characteristics, in particular multi-organ failure and rapid deterioration to the point of death, led to very early suspicions both on the part of clinicians and Dr Redding, Consultant Microbiologist at the Victoria, of the likelihood of an outbreak of infection. Dr Redding alerted Dr Syed Ahmed, Consultant at the Department of Public Health with responsibility for infectious diseases on 4 May. He immediately caused inquiries to be made of other hospitals, which revealed similar cases at Stobhill Hospital and Glasgow Royal Infirmary. That information led

to the establishment, on 8 May, of an Outbreak Management Team which included representatives of a range of medical services, the Drug Crisis Centre, Strathclyde Police and the Procurator Fiscal. I pause to observe that it is difficult to envisage swifter reaction by the medical and public health authorities in responding to a potential emergency and establishing a multi-disciplinary team to address it.

6. The report of the Outbreak Management Team is a central production at this Inquiry (pro no 114A). It sets out in detail the wide range of investigations carried out by members of the team, and a significant level of national and international co-operation which they received. It is not necessary for the purposes of these findings to cover these in detail. One of the possibilities which had to be considered was that this was an outbreak of anthrax. That was effectively excluded by 19 May, and by the end of May all bacteriological evidence which had been gleaned mainly from post-mortem tissue specimens pointed to the cause as being anaerobic bacteria. This was confirmed by the appearance of isolates of the clostridium species on 9 June, and by the specific identification of clostridium novyi bacteria on 15 June. The Outbreak Management Team report also discloses that there were similar outbreaks in north-west England (26 cases) and Dublin (23 cases) at about the same time.
7. By 11 May there had been 21 potential cases reported and 10 deaths. At that point the police set up a major incident team involving some 36 officers. They obtained samples of heroin from a variety of sources, including relatives of deceased and known suppliers in areas of the city where victims were thought to have obtained supplies. One sample was provided by a media source. A sample submitted to the United States Drugs Enforcement Agency was profiled with a "signature" identifying it, to a degree of 98% certainty, as emanating from Afghanistan, a finding entirely consistent with the recognised fact that 80% of the heroin circulating in Europe has its source in that country. That sample was also found to be of abnormally high purity, being of the order of 60% pure as against the average "street" purity at the time of 45%. Police seizures of heroin in particular areas of Glasgow at that time were also found to be of twice or even three times more "pure" than seizures in other parts of Strathclyde.
8. The pattern and temporal link of the deaths; the established circulation of heroin of unusual purity; the high incidence of findings of clostridium novyi bacteria post-mortem; and the exclusion by analysis of other potential contaminants (such as samples of citric acid used in diluting heroin prior to injection) points, to a degree which I regard as conclusive, that the cause of the outbreak was a contaminated batch of heroin, emanating from opium produced in Afghanistan.
9. On the basis of evidence adduced as to the manner of production of heroin it is not difficult to see how such contamination might have occurred. Clostridium is a genus of bacteria. Clostridium novyi is a particular species of it which flourishes in the absence of oxygen, ie. it is an anaerobic organism. It is commonly found in soil, and produces spores which are resistant to changes in temperature and consequently can lie dormant for indefinite periods. If it came into contact with heroin it could

contaminate it and remain until conditions become ripe for germination. Evidence was led as to the manner in which heroin is produced. It involves a "back yard" industry which requires, apart from the constituent materials, water, drainage, heat and a suitable receptacle which may take the form of an old oil drum. There is not the slightest regard for basic hygiene and contact between the heating apparatus and soil must be a constant possibility.

10. That leads me to my first conclusion and recommendation. There is every reason to suppose that a similar outbreak could occur again without warning. The dangers of heroin as a highly addictive drug are well known. What also deserves to be well publicised is that injecting heroin, particularly directly into muscle, involves a significant risk of introducing a deadly bacteria into the body.

THE INFECTION AND ITS EFFECTS

11. Knowledge as to precise circumstances in which clostridium novyi infection flourishes is incomplete. It is probable that it requires the presence of other organisms to produce the anaerobic condition causing the clostridial spores to germinate. The rate of development is uncertain, but this can be rapid. The deadly nature of the infection then becomes beyond question. The bacteria travel along the muscle planes killing them as they go - the condition known as necrotising fasciitis; popularly, although inaccurately referred to as "a flesh eating bug". Once that condition is underway the mortality rate is extremely high. This is due to the release of toxins which enter the blood supply and cause irreversible damage to major organs. These toxins are not susceptible to antibiotic treatment.
12. The condition of necrotising fasciitis is relatively rare. Evidence was given to the effect that only 4 or 5 cases a year are normally encountered in Glasgow Royal Infirmary. Some experienced surgeons had never encountered it. It is also extremely difficult to diagnose. In the early stages the only signs may be some localised pain and thickening of the tissues at the site of an injection. These features do not in themselves point to serious illness, and indeed some of those affected looked and felt reasonably well before deteriorating dramatically. For example, Deborah McElvanney, who died on 27 April, was afebrile, systemically well, alert and orientated when seen by a consultant surgeon on the morning of 24 April. Biopsy - examination of tissue taken from the affected area - can be strongly suggestive of necrotising fasciitis but often a definite diagnosis can only be made visually following surgery. "Black skin almost spreads in front of your eyes" was the description used a surgeon involved in one of the early cases.
13. By that stage it is more than likely that toxins will have been released and it is largely a matter of chance whether the individual affected has sufficient natural resistance to the effect of them until the cause of the infection has been checked. Although the use of an anaerobic antibiotic plays its part in combating the clostridial infection, necrotising fasciitis can only be dealt with by aggressive and if necessary extensive

surgery. The treatment given in two of the "successful" cases demonstrates this. One individual, admitted to Monklands Hospital on 1 June, required excision of 7% of body skin and a course of intra-venous antibiotics over a period of four weeks before discharge on 2 July. A second case, admitted to Glasgow Royal Infirmary on 10 June, received surgical treatment on 13 occasions culminating in amputation of the left leg before all tissues were pronounced healthy. One plainly cannot embark on treatment of this nature without certainty of diagnosis. At the same time such an approach is not necessarily successful. Miss McElvanney underwent debridement of most of the skin of the arm and wrist along with an area from the adjacent torso but sadly did not survive. Had she done so she would have needed massive skin grafting and would have been extensively scarred if not disabled.

MANAGEMENT OF THE OUTBREAK

14. In paragraph 6 above I set out that it was not until 15 June that clostridium novyi bacteria were identified. It was, however, recognised at an early stage that the possibility existed that a contaminated batch of heroin was in existence and that there was a danger that injecting drug users presenting with relatively innocuous symptoms might have a potentially fatal underlying condition. As knowledge was acquired, Dr Ahmed was in a position to issue a series of circular letters directed to those (in particular General Practitioners and Accident and Emergency Departments) who might have "front line" contact with patients. Thus on 8 May 2000 he said:

"We are aware of at least twelve drug injectors in Glasgow who presented over the last two weeks in various A&E departments and GEMS. Six of them are already dead and another three seriously ill in hospital. Most of these cases are from the south of the city.

These patients initially presented with a local infection/abscess at the site of an injection and clinically did not look very unwell. However within a few days they developed an overwhelming septicaemia-like picture with multi organ failure. There was also evidence of deep tissue necrosis and fasciitis in some cases. To date the exact cause of these cases is unknown.

Can I therefore advise you that anyone presenting with an infection/abscess/DVT related to injecting drug should be referred to a hospital surgical team for further assessment. The infection may look trivial but should still be referred for surgical assessment".

That advice was "upgraded" in a circular issued on 17 May. It drew attention to the high proportion of females amongst the victims, of whom there were then 39 probable cases. It re-iterated that the patients initially presented with a local infection/abscess at the site of an injection and clinically did not look very unwell. It repeated the advice that anyone presenting with an infection/abscess/deep vein thrombosis related to drug injecting should be referred to a surgical team. It added:

"Patients with abscesses should have early intervention with surgical debridement and broad spectrum antibiotics including clindamycin."

15. As a result of the coordinated investigations carried out by the Outbreak Management Team, a "consensus protocol" was prepared and distributed on 14 June. The distribution list included all Medical Directors of Trusts, who were asked to bring the protocol to the attention of medical and surgical team members (general and orthopedic) as soon as possible. Under the heading "Management" it set out the following:

"Any IDUs presenting with soft tissue inflammation at an injecting site must be assessed by a senior surgeon as soon as possible. The inflammation may look trivial but should still be referred for urgent surgical assessment.

Early surgical intervention should be considered in the management of possible cases, including exploration, drainage, and/or extensive debridement (to the viable tissue) of any injection site infection together with microbiological sampling. In addition to surgical and supportive therapy, specific anti-microbial therapy should include one or more agents known to be active against anaerobes (such as penicillin, metronidazole, and clindamycin, possibly in combination). Clindamycin may have some specific advantage in these cases, but it should not be given alone as resistance to this antibiotic has been described. Those patients with an extensive tissue inflammation and/or a white blood cell count of more than 30×10^9 should be monitored closely in a High Dependency Unit".

16. In general terms the accuracy of this advice is not in doubt, although one clinician did express reservations about the use of clindamycin, indicating that she considered it to be a "high risk" antibiotic with a potential to cause disease of the colon. This was not otherwise explored in the evidence and I cannot express any view on it. I draw attention, however, to this potential area of controversy which I consider warrants further discussion and if necessary research. Apart from the validity of the advice what is important from the point of view of the Inquiry is satisfactory evidence (a) that the information provided by Dr Ahmed reached all those with a "need to know" and (b) that, where appropriate, the advice was acted on.

17. In respect of the second aspect I am satisfied, with one possible exception, that in each of the deaths under investigation the appropriate procedures were followed and that, in particular, there was surgical intervention with the minimum of delay when the signs calling for that action were observed. Where there was no immediate intervention I am satisfied that the presenting symptoms did not warrant a reference to surgeons. That observation applies in particular to the cases of Steven Reynolds who was admitted to Glasgow Royal Infirmary on 26 May and Samuel Johnstone who was examined at the Victoria Infirmary on 2 June. The one exception is the last case, David Cameron, who was admitted to Glasgow Royal Infirmary on the evening

of 6 August 2000. The findings on admission - an abscess which was extensively inflamed and tender; low temperature and high pulse rate - brought him within the guidelines requiring admission "for urgent consideration of early surgical intervention". Whilst he was admitted and the appropriate investigations instructed, namely ultra sound, Doppler scan to check for DVT, and a full blood count, this does not appear to have been done with any real sense of urgency. Unfortunately the Senior House Officer responsible was not available to give evidence as to why this should have been.

18. In relation to whether the information provided by Dr Ahmed reached all appropriate levels, the evidence was rather less clear. In this respect I think it is right to make allowance for the fact that some of those who were asked if they had seen the "advice" letters were being asked about an event which took place more than a year before and which involved reading a letter which contained information of which they may well have been aware from other sources. Nevertheless I was not wholly convinced that the information was disseminated to the extent which it might have been. There appears to have been full circulation of it at the Victoria Infirmary. It was known to staff in the Accident and Emergency Department at the Royal Infirmary, but there was doubt as to whether surgical staff were aware of the protocol. There were doubts as to the extent to which the letters were seen in the Western Infirmary, and positive evidence that it was not brought to the attention of surgeons in Stobhill Hospital. The District Nurse who dealt with Michael Taggart also appeared to be unaware of the advice. I stress that in no case did such an absence of knowledge affect the outcome; but it might have done and although I am conscious that the proper distribution of written information does not always result in every recipient being fully informed I consider that this is an area which ought to be looked at. In particular, information of this type when sent to Accident and Emergency Departments should be specifically directed to the responsible consultant to ensure that proper instructions are given, rather than run the risk of the letter simply being stuck on a notice board.
19. In the context of the distribution of information it is worth recording that the Outbreak Management Team arranged for the regular provision, and updating, of advice to injecting drug users and the general public. These are set out in detail in paragraph 5 and Appendix 3 of the Team Report. They involved news releases, news conferences, alerts, and latterly the provision of posters and warning cards. The advice provided to addicts, namely to avoid injecting heroin if possible and not to inject into muscle or under the skin; to minimize the use of citric acid which might damage muscle or tissue, and to seek medical help urgently if an abscess or painful injection site developed, was appropriate. The evidence disclosed a heightened awareness on the part of addicts of the danger of injecting and an increase in the numbers seeking both advice and medical attention. I have no doubt that the provision of information played an important part in that.

THE "PERCEPTION" ISSUE

20. During the course of the inquiry evidence repeatedly touched on the issue of "perceptions" of drug users, and indeed of those who support them, as to the quality of medical treatment available to drug addicts. This is an area of delicacy which I approach with caution, not least because I am in no doubt that to attempt any wide ranging examination of standards of treatment of drug users goes beyond the scope of a Fatal Accident Inquiry. It would be equally wrong to attempt to deal with the question of whether there is any justification for a perception that drug users are treated contemptuously by medical and nursing staff. It is manifestly obvious that they are a difficult group to deal with and treat. Examples of behaviour given during the Inquiry ranged from simple refusal to take advice to stealing from other patients and concealment of drugs within hospital premises with a view to supply. It would be surprising if they were not regarded warily by many of those who have to deal with them. One doctor who deals with addicts on a daily basis said: "Just taking a history can be difficult. They can be manipulative and very demanding". This was described by an agent acting for one of the parties as "displaying a judgmental attitude". If that was meant as a criticism I reject it emphatically. It is a wholly realistic view and does not in itself imply an unsympathetic attitude to the consequences of drug addiction. It is not difficult to understand why drug addiction causes someone to be "demanding". As an experienced ward sister put it: "They are wanting their drugs and are demanding at the prospect of withdrawal".
21. Subject to certain observations below it is no part of the function of this Inquiry to become deeply involved in the question of health service staffing levels. It is, however, worth pointing out that evidence was given of one accident and emergency department being 40% undermanned against national guidelines. It is not difficult to imagine that, particularly at critical periods, waiting times will be significant. The "triage" system whereby on arrival at an accident and emergency department a patient is seen by a nurse and assessed for priority is designed to ensure that those who need urgent treatment get it straight away. There will, however, inevitably be those who feel that they are further down the queue than they ought to be, and a "perception" on the part of anyone, drug user or not, who has attended at an A & E department and has felt they were not given the priority they deserved must be far from uncommon.
22. In relation to drug users the problem of "perception" is not confined to treatment at accident and emergency departments, but to medical treatment generally. It must, however be acknowledged that there is a general reluctance on the part of drug users to attend hospital simply because of the fear of being admitted and in consequence isolated from their supply of drugs; that is to say it is a reluctance which has nothing to do with a fear of unsympathetic or poor treatment. The problem is compounded by the need for caution in treatment. It is inappropriate, and indeed could prove fatal, to prescribe methadone even at low levels to someone who may still have another opiate drug in their system. As the purity of "street" heroin varies the extent to which a patient may still be affected is unascertainable. If a patient claims to be on a course of methadone it is necessary to confirm that either with the prescriber or with the appropriate pharmacist. That may involve some delay. For patients who are not on a methadone programme and where this is initiated in hospital it is necessary to commence with a very low dose and increase this after 12

hours if persistent withdrawal effects are evident. There are additional complications where, for example, a patient is having difficulty in breathing and the use of any form of opiate may be hazardous. To those "whose whole life centres around drugs" much of this may be hard to understand let alone tolerate.

23. The above considerations lead me to the conclusion that the problems surrounding this issue of perception may to a significant extent be intractable. I am, however, satisfied that it is a problem which is recognised and being addressed. The approach to control of opiate withdrawal is the subject of guidelines which have been issued to general practitioners and to hospitals by the Glasgow Drug Problem Service since 1996. In its report, the Outbreak Management Team noted awareness of "anecdotal reports that some drug users were reluctant to attend A & E Departments because of fears they might be badly treated". They also recorded that "dialogue with front-line services suggest it is widely perceived that some hospital wards do not provide adequate treatment of withdrawal symptoms". In the light of that the Team recommended that "Health Boards should review arrangements for receiving and managing drug misusers in accident and emergency hospitals and acute hospital wards. This should focus on issues such as staff training, staffing levels and protocols for the management of drug dependence in the hospital setting". I am content to endorse that recommendation.
24. It remains to be added that, whatever the "perception" of those with whom this Inquiry has been concerned, it can only be said in relation to the two who appear not to have been infected by *Clostridium novyi*, that earlier presentation at hospital might have made a difference. These are Catherine Rozanski and Joseph Dean who succumbed to staphylococcal infection which might have been susceptible to antibiotic treatment.

CERTIFICATION OF DEATH

25. In the majority of cases the cause of death was formally certified, following post-mortem examination, as "1a. Multiple organ failure due to 1b. necrotising fasciitis due to 1c. chronic injecting drug abuse." In every case, with one exception, that record is technically accurate and the findings that I have made are not to be regarded as contradictory of those recorded on the death certificates. The exception is the first death, McQuilter, where the death was certified as due to "1a. pneumocystis carinii pneumonia due to 1b. injectional drug abuse". As Ms McQuilter's death was almost certainly caused by multi-organ failure due to toxin producing organisms, in common with the majority of other deaths which are the subject of the inquiry, the finding of pneumonia was incidental.
26. For the purposes of my Determinations I consider it sufficient to hold that the majority of deaths were due to multi-organ failure secondary to necrotising fasciitis and toxin producing organisms. In cases where there was a specific finding of clostridial myonecrosis I have included that. If there was no specific finding of necrotising

fasciitis, I have excluded it. I have not considered it necessary to include reference to clostridium novyi infection even in cases where this was identified, as it is adequately covered by the term "toxin producing organisms".

27. I have not recorded in the Determinations that "chronic injecting drug abuse" was a cause of death. I do not consider it necessary to do so in the context of findings in a Fatal Accident Inquiry. I accept that use of that expression as part of the certification of the cause of death can, to some of the bereaved, cause additional distress. It was suggested in evidence that those who die from alcohol abuse are not similarly categorised. That is as a matter of fact incorrect. Where a disease is established as caused by chronic alcoholism this is specified as a cause of death. As a matter of accuracy, and perhaps also for proper statistical purposes, I do not demur from the practice of recording "chronic injecting drug abuse" on a death certificate where an activity such as intra-muscular injection was a contributory cause of death. It was not suggested in submissions that I should make any recommendation as to change in this respect and I do not propose to do so.

LABORATORY STAFFING

28. In general terms it is not appropriate for an Inquiry of this nature to make recommendations as regards staffing levels, this being an area in which complex issues of recruitment and finance have a particular bearing. Where staffing levels are shown to have led to a systemic deficiency it would be appropriate to comment. In this case, I am content to observe that whilst overall it appears that the microbiological services coped admirably with the outbreak, there was evidence of laboratories being seriously over-stretched. For example, Dr Hood, the Consultant in charge of the Microbiology Department at Glasgow Royal Infirmary, spoke of the arrival of 50 specimens in his laboratory on a Friday evening at a time when the laboratory would normally have been shut. Each of these specimens required urgent examination in individual isolated conditions. I accordingly share the concerns of the Outbreak Management Team as articulated in paragraphs 7.6 and 7.7 of their Report. This outbreak could easily happen again, and on a significantly larger scale. Lurking in the background is the threat of bio-terrorism. I wholly endorse the Team recommendation that:

"All necessary steps should be taken to ensure that the current system of local hospital microbiological laboratories, backed up by national reference laboratories, is maintained with levels of staffing and other resources sufficient to ensure they have the capacity to respond appropriately to outbreaks such as this".

SUMMARY AND RECOMMENDATIONS

29. In conclusion, it is necessary for me to make only three recommendations. These are

[1] That wider publicity should be given to the dangers of contracting a deadly infection through heroin injecting (see para 10);

[2] That further research required to be carried out into the use of clindamycin in the treatment of suspected anaerobic infections (see para 16).

[3] That there should be a full assessment of the manner of distribution of written information relating to any form of infection or communicable disease to nursing and medical services (see para 19).

30. I also endorse the recommendations contained in the Outbreak Management Team Report, although some of these fall outwith the scope of the Inquiry. In particular, I draw attention to, and emphasise, recommendations 5 and 8 which relate to staffing levels in laboratories and the managing of drug users in hospital (paras 24 and 29).

31. Although these recommendations are limited, I consider that the Inquiry has served several useful purposes. It has publicly determined the cause of the outbreak. It has provided an opportunity to examine the circumstances of each death in some detail. It has examined on a wider basis the overall "management" of the outbreak. It has aired, if only to a limited extent, the issue of perception of drug users about medical treatment and their possible reasons for not seeking it. Above all else the evidence should leave no one in any doubt that the same thing could easily happen again.

32. In summary, it is appropriate to conclude that the existence of a major health problem was detected as soon as it could have been, for which Dr Redding in particular is to be commended. The cause of the outbreak, which is not now in doubt, was established as early as available resources permitted. There was evidence of significant effort on the part of the police both to trace the source and provide information to "front line" agencies as to the nature of the risk. The outbreak was strategically managed as well as could be expected, and all those involved in the Outbreak Management Team are to be commended for that. With one possible exception (the case of David Cameron) the levels of skill and attention provided by the medical and nursing professions cannot be criticised. In many cases exceptional levels of competence in the effort to save life were apparent, and the expressions of sorrow that no more could have been done were, in my judgement, genuinely expressed.