Medico-legal report
Addendum 28.1.12

Adam Strain

Dob: 4th August 1991
Dod: 28th November 1995

Prepared on behalf of:

THE INQUIRY INTO HYPONATRAEMIA RELATED DEATHS
Chairman Mr John O'Hara QC

By:

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I have been asked to provide a supplementary report based on the following further information which has been sent to me in the weeks since I prepared my initial report:

1. Statement of Dr Armour dated 29.11.11 and autopsy report Dr Armour (undated)
2. Report of Dr Mirakhur dated 18.12.11
3. Review of CT scans with Dr Anslow
4. Brain Images from Autopsy

1) Statement of Dr Armour dated 29.11.11 and autopsy report

Two points are relevant to the Neuropathology:

1.i Brain weight

1.i.a 21 (e) Explain how the figures for brain weight of 1,320g and/or 1,302g relate to the recorded fixed brain weight of 1,680g. It is my view that the above weight is probably an error. During fixation the brain increases in weight from between 5 and 10% with the fixed weight being 1680g. As I described massive cerebral oedema it is my view that the fresh weight of the brain was more likely to be 1520g.

1.i.b I agree with Dr Armour that it is likely that there has been an error in one of the brain weights. Her suggestion of 1520g as the likely fresh weight would be considerably above that normally expected for a boy of this age which is between 1290 -1310g. This supports the argument that the brain was swollen in its fresh state. However, this is based on an assumption as Dr Armour admits there was an error. We do not have reliable evidence from the post mortem examination of the precise degree of brain swelling at death, the brain was not described and no brain weight is included in the autopsy report.

1.ii Ligation of left internal jugular vein

1.ii.a 3bii My autopsy report clearly states where I identified the suture. For the avoidance of doubt I refer you to page 4 of the autopsy report under the heading internal examination of neck. There was a suture on the left side of the neck at the junction of the internal jugular vein and the subclavian vein. This is in consistent with the above.

1.ii.b 12 (a) Describe and explain in detail why you reported that there was a "ligation of the left intemal jugular vein". I have previously answered this question. The left internal jugular vein was ligated. I refer you to my post mortem report on the internal examination and specifically internal examination of neck on page 4.

1.ii.c Dr Armour concludes in her autopsy report that ligation of the left internal jugular vein together with a catheter on the right side would reduce cerebral perfusion and exacerbate the effects of cerebral oedema. I agree with the principle that increased venous pressure in its own right would indeed contribute to reduction in tissue blood supply by causing a local increase in tissue pressure in those areas of the brain with compromised venous drainage.

1.ii.d Her report is unclear on this matter. She writes (page 4) *"INTERNAL EXAMINATION OF THE NECK. There was no evidence of congestion or obstruction of the major blood vessels or the carotid arteries and jugular veins." "There was a suture in situ on the left side of the neck at the junction of the internal jugular vein and the sub-clavian vein"*

1.ii.e There are several points which need to be addressed and are not clear from the wording of the autopsy report.

1.ii.e.1 Was the suture causing venous obstruction?

It is impossible to answer this question from the description given. Dr Armour writes that there was no congestion or obstruction of the jugular veins but that the left internal jugular vein was ligated. These statements are not consistent with one another.

1.ii.e.2 How long had the suture been present?

1.ii.e.2.i The venous system is relatively plastic and if a vessel is obstructed compensatory processes occur with time. The vessel above the ligature will initially dilate. Alternative venous pathways such as the paravertebral plexus will be recruited. Eventually, if these pathways are insufficient, collateral channels will develop to circumvent the obstruction. In veins obstructed by clot, a new channel will develop within the obstructed part to allow blood flow to be restored through it. Dr Armour does not describe any such reactive processes so I assume the ligation was recent.

1.ii.e.2.ii If the suture had been present for months or years I would expect it to have been at least partly resorbed and for there to have been a fibrous reaction to it. Sutures are usually designed to generate a tissue reaction which causes them to be resorbed and their remnants become buried in reactive fibrous tissue. Indeed it can be very difficult to identify old sutures. If this suture was readily seen it would suggest that it was recent.

1.ii.e.2.iii Further investigations could have been made. The timing of the ligation could have been explored if the suture and its surrounding tissues were sampled for histology.

2) Report of Dr Mirakhur dated 18.12.11

2.i Dr Mirakhur did not prepare a formal report and has no recollection of examining this brain, spinal cord or histological slides. Her report does not add any further helpful information.

2.ii Dr Armour's report is confusing on this issue. She writes that the *"brain, spinal cord and histological slides were seen by Dr Mirakhur."*

2.iii Brain and spinal cord: Dr Armour's report suggests that the whole brain and spinal cord samples were either transferred to Dr Mirakhur to examine or that Dr Mirakhur went to Dr Armour's department or to the mortuary to see them. In the first instance I would expect that there would have been records of the tissue being transferred. If Dr Mirakhur made an informal visit to see the specimens she may not have made a note, or not recall the visit.

2.iv Histological slides: Tissue sections for histological examination are prepared on glass slides and are small and readily transportable. It is common practice to take such slides to a colleague to ask for an informal opinion. I assume that this may have been what happened and that Dr Mirakhur may have given an opinion which she no longer recalls but did not provide a formal report.

2.v The procedures seem less than satisfactory and this is not the standard of practice which would be expected today. Tracking of tissues and samples from them are far more rigorously controlled and since 2004 have been monitored by the Human Tissue Authority.

2.vi I do not know how closely Dr Armour and Dr Mirakhur worked together. If Dr Armour sought the weight of Dr Mirakhur's opinion to support her conclusions it would have been better practice, as well as a matter of professional courtesy, to give Dr Mirakhur the opportunity to express her opinion formally and to produce a signed report.

2.vii Indeed, in a case such as this where the cause of death was thought to have been in the brain and was potentially the result of a hospital procedure (surgery and anaesthesia) best practice would have been to ask a neuropathologist to undertake a formal and complete brain examination. This is particularly important as Dr Armour was not at the time fully qualified as a consultant pathologist. I am surprised that her report was not countersigned by a consultant supervisor.

3) Review of CT scans with Dr Anslow

3.i I have spoken to Dr Anslow and reviewed with him the CT scans of Adam Strain dated 27.11.95. I believe that Dr Anslow will issue a separate report.

3.ii CT scan dated 27.11.95

3.ii.a This scan shows generalised and acute brain swelling. The normal fluid spaces around and beneath the brain have been effaced. .The ventricles are just discernible; the occipital horns remain patent. The hindbrain is particularly swollen and there is no space around the brainstem. Dr Anslow will provide a formal description. On 6.1.12 Dr Anslow wrote *"I have seen the scan of 7th July 1995. It is a normal contrast enhanced scan. The CSF spaces are normal. It is even more certain that the second scan shows swelling."*

3.ii.b This is the most important evidence of brain swelling in the immediate post-operative period. A previous brain scan acts as a normal control. Although it was taken 4 months earlier it is likely to reflect the state of the brain just prior to surgery as there were no clinical indications of any change in condition, neurological abnormality or altered behaviour to suggest that swelling had occurred in the period prior to surgery.

3.ii.c The post-operative scan was taken at 1415 on the day of surgery, just over two hours after surgery ended. It is the most accurate reflection of the state of the brain immediately after surgery.

3.ii.d The autopsy findings, in contrast, reflect the changes at the time of death which occurred 24 hours after surgery. During this 24 hours Adam was nursed on a ventilator and I presume that he was receiving treatment for his brain swelling. A number of secondary effects may have taken place in the brain; the swelling may have led to ischaemia which exacerbated the already severe swelling. On the other hand continuing and aggressive therapy for the swelling could have reduced the swelling by the time death occurred. These progressive secondary effects make the post-mortem assessment of brain swelling far less accurate than the CT scans.

3.ii.e Further, the brain scan avoids any potential errors in weighing the brain and difficulties in the pathological assessment of brain swelling which were noted in my report.

4) Brain Images from Autopsy

Since issuing my report in October 2011 I have received a CD with 20 photographs of the brain, fresh and fixed.

4i The external appearances of the brain at the vertex show mild swelling with compression of sulci but the shape of gyri is generally relatively well preserved. At the base of the brain the cerebellar tonsils are haemorrhagic and appear damaged. This is the result of herniation of the tonsils through the foramen magnum, an aperture in the base of the skull. This is an indication of severe brain swelling.

4ii The temporal lobes of the brain are splayed and I cannot be sure, if there is parahippocampal grooving which is another sign of severe brain swelling.

4iii Slices have been taken in the coronal plane. These show compression of the lateral ventricles but they remain patent, particularly posteriorly. In some slices gyri are flattened and sulci compressed, in others the gyri are better preserved.

4v Pictures of the cerebellum show this to be extremely swollen, no spaces are seen between the folds of the cerebellar cortex. This indicates severe swelling.

4va Comment

These pictures give a much better account of the brain than the two photographs reproduced in Dr Arnour's publication, which were the only two available to me when I prepared my first report. There is clearly brain swelling but this is most severe in the hindbrain (cerebellum and brainstem) where swelling has caused damage to the cerebellar tonsils. The swelling in the cerebral hemispheres appears of a lesser degree but is not as easy to assess.

4vb In terms of clinical significance the swelling of the hindbrain and associated compression of the brainstem is critical. The brainstem contains the centres vital to consciousness, cardiac function and respiration .The brain photographs reflect the imaging findings and show the hindbrain to have been severely swollen, while this is not quite as apparent in the cerebral hemispheres. As noted in my first report the most accurate reflection of brain swelling is considered to be brain weight.

5) Conclusions:

- CT scan findings make it clear that Adam's brain was swollen within two hours of the end of surgery.
- I remain unable to explain the large difference between fresh and fixed brain weights except by an error in weighing either the fresh or the fixed brain.
- Neuropathological examination of the brain tissue has not revealed a cause for the brain swelling.
- No significant hypoxic-ischaemic injury was seen.

Waney Squier

January 28th 2012

Appendices & References

1. Guidelines on autopsy practice; Report of a working group of The Royal College of Pathologists September 2002
    - 1A: Contents and Summary
    - 1B: Main Document
    - 1C: Appendix 10 Forensic Examinations
2. Forensic Pathology Services Pounder, D BMJ 2002 324 1408-9
3. Code of practice and performance standards for forensic pathologists (jointly produced with the Home Office Policy Advisory Board for Forensic Pathology) Nov 2004
4. Report of Dr Anslow. I have spoken to Dr Anslow on 27.1.12. He will forward his report separately.

RESPONSES TO SPECIFIC QUESTIONS

4. To the extent to that you feel able to do so, please provide a description/your comments on the following as an introduction to the section and the context for some of the points that you make:

I have answered these questions from my experience as a general and later neuropathologist. Detailed guidelines for autopsy practice were published by the Royal College of Pathologists in 2002 and parts have been updated since. I am not experienced in Forensic Pathology, but have appended the appropriate Forensic Pathology guidelines from 2004.

(i) The process of carrying out an autopsy:

(a) What does it involve

There are three types of autopsy: - those performed for medical interest and those performed on the direction of the coroner and those with suspicious circumstances, when there will also be police involvement. Medical interest autopsies require the consent of the next of kin; in forensic cases consent of the next of kin is not required unless any examinations are made which are beyond the requirements of the Coroner.

More detail is available in the Guidelines on autopsy practice published by the Royal College of Pathologists. The relevant sections are appended.

An autopsy involves the full external and internal examination of the deceased with sampling of tissues for examination under the microscope as deemed necessary by the pathologist sat the time. Autopsies are usually carried out with the assistance of a mortuary technician who may help to remove organs and weigh them and to reconstruct the body afterwards. The pathologist is responsible for making decisions about which tissues to sample and which further tests may be required. Further tests include submission of samples for biochemical or microbiological study and retention of body parts such as the eyes, brain and spinal cord for further specialised examination. Autopsies should ideally be performed as close as possible to the time of death as the tissues tend to degrade during storage, even at low temperatures in a refrigerator.

The brain cannot be satisfactorily examined at autopsy as it is soft in its fresh state and if cut tends to collapse making examination extremely difficult. Normal practice is for the brain to be removed, weighed, examined and photographed at the time of autopsy. It is then placed into formalin, a chemical which alters the proteins in the brain making it firmer and easier to handle and preventing bacterial action and tissue breakdown and putrefaction.

Detailed recording of the findings at the time of autopsy is of great importance as the body will be not be available later and any further reference to the autopsy will depend on the contemporaneous records. Extensive photography is helpful in generating this record.

The autopsy report is usually made up of two parts: a record of the findings made at autopsy, which in some cases is diagnostic and final. This report can be written and signed as soon as the autopsy is complete. In most cases a second report will be issued in which the microscopic findings are included as well as any specialist reports on additional studies such as microbiology or neuropathology. This may take several weeks to complete.

(b) Who should perform it

The autopsy should be performed by a doctor who is qualified in medicine and who has specialised in pathology. Some autopsies are now performed by two pathologists for example a paediatric and a forensic pathologist in cases of unexpected infant death. This allows the specialised expertise in the relevant branches of pathology to be brought to bear in a particular case.

(c) What grade of clinician should perform it (including in a case such as this), ie Senior Registrar, Consultant

It is normal practice in teaching hospitals for trainee doctors to undertake autopsies; it is an essential part of their training. Indeed in many departments the workload may depend on the assistance of trainees. Coroners autopsies should be performed under the supervision of a registered specialist consultant pathologist. (This is dealt with in paragraph 4 of the attached guidelines)

The degree of supervision will depend on the experience of the trainee, in the early days trainees need supervision and instruction in the practical aspects of the autopsy. With increasing experience a supervisor will use his discretion as to how much supervision is needed. It would be considered good practice for the findings to be demonstrated to the supervisor at the end of the autopsy, which allows the supervisor to assist the trainee in reaching diagnostic conclusions, to keep a check on the autopsy technique and to train the junior doctor for professional examinations

(d) Whether, if a Consultant is not performing the autopsy, a Consultant should nonetheless be involved in some capacity and if so how and in what circumstances

A minimum requirement is that the autopsy report should be co-signed by the supervising consultant. He has the opportunity to check the content of the report and to see that all due procedures have been carried out and that an appropriate diagnostic conclusion is reached. The conclusions of the report are the responsibility of the supervising pathologist.

In some departments I understand that even registered consultants request a colleague to read and countersign their reports as a form of quality assurance.

(e) How the clinical history should be obtained (especially where there is an Inquest and the conduct of the treating clinicians may be under question)

The clinical history may be obtained by details on a request form, from the hospital case notes and from discussion with clinicians involved in the case. Any scans and X-rays should be available to the pathologist. In a complex case such as this consultation with the clinicians would be expected prior to the autopsy. Where there is a question regarding the conduct of the treating clinician it would today be most unusual for the autopsy to be performed in the same hospital. It would be normal for the body to be removed to another hospital so that there can be no question of conflict of interest.

(f) What input there should be from other disciplines or specialisms (including in a case such as this) and how that should be sought

The pathologist performing the autopsy must be aware of his/her limitations and be ready to consult specialists for assistance with certain parts of the autopsy. If the autopsy is being performed in a large general hospital mortuary it is often possible to ask a specialist colleague to come to the autopsy room to view the tissues in question. If this is not the case the pathologist should remove and preserve the tissue in such a way that it can be fully examined by the specialist. The fresh tissue should be described weighed and photographed before fixation. The specialist can be asked for assistance after the autopsy is complete if the tissue is appropriately preserved.

(g) Who should be present (including whether the clinicians whose conduct may be under question) and for what purpose

In a complex case it is advisable that the supervisor be present at the autopsy at some point, but particularly to view the findings and advise on specialist referral. It may be helpful as well as educational to invite the radiologists and the treating clinicians to attend. The benefit is mutual; the clinicians can appraise the pathologist more fully on the clinical questions which need to be answered and the pathologist may be able to show the clinicians the nature of the pathology and the cause of the patients illness and demise.

(ii) The structure and content of an autopsy report:

(a) Whether the grade of clinician performing the autopsy should be shown on the Report

Yes

(b) Whether it should have been reviewed by a Consultant Pathologist and if so how any such 'involvement' of a Consultant should be shown (ie whether by a counter signature)

The supervisor should be named and should countersign the report.

(c) Whether the source of the clinical history and background information should be disclosed in the report

Yes

(d) Whether the fact that advice/input from Consultants in other disciplines was sought should be identified (ie Drs. O'Hara and Bharucha)

Yes

(e) **Whether and how the input from Consultants in other disciplines should be identified, cited and used (ie Dr. Mirakhur and Professor Berry)**

In a complex case such as this specialist assistance should have been sought formally and the reports of those specialists included as signed reports within the final pathology report.

(f) Whether the Report should be dated (eg including for both the pre brain fixation part of the Report and the post-fixation part if written at different times)

Yes. These questions are all covered in the RCPath guidelines, but the answers are a matter of common sense rather than requiring formal guidelines.

5. Please provide your comments on the process of the autopsy performed by Dr. Armour on Adam and the preparation of her Report. To assist, the following would seem to be the case:

5i As I am not a forensic pathologist I do not feel qualified to comment on the specific conduct of the autopsy; I can comment only in general terms and on the neuropathological aspects of autopsy practice. Guidelines for the practice of forensic autopsies were published by Royal College of Pathologists in 2004 (attached). These update previous guidelines issued in 1996. I have contacted the Publications Department of RCPath and was informed that they do not hold a copy of any earlier guidelines. The problems with the practice of forensic pathology were discussed by Professor Pounder in an editorial in the British Medical Journal in 2002 (attached).

5ii Dr Armour has taken the appropriate steps to discuss the case with relevant clinicians. She has formally requested the assistance of Professor Berry but has apparently only informally sought the help of a Neuropathologist. In a case such as this, where the brain was obviously very swollen brain and that this appeared to be the complication of recent surgery, a specialist should have been asked to examine the brain at the outset.

5iii I am surprised that Dr Armour does not make any reference in any of the documents that I have seen to seeking help from her senior colleagues, one of whom should have been responsible for the supervision of this autopsy.

I can offer no more specific comment on the process of the autopsy as performed by Dr Armour as this is not my practice or expertise.

Brain weight:

6. Dr. Armour has described the weight the weight of Adam's brain in her letter to Professor Berry as follows: *"At post mortem I found gross cerebral oedema (1,320 gms). The brain and spinal cord are fixing and a neuropathological opinion will be requested"* – Ref: 011-029-152.

(i) Leaving aside the issue of whether there is evidence to show the accuracy of the 1,320 gms figure, please provide your comments on the description of such a weight as *"gross cerebral oedema"*

6ia The most reliable guide to brain swelling has been considered to be the fresh brain weight (Hausmann 2006). The fresh weight is more reliable than the fixed weight as the process of fixation causes the brain weight to increase by a variable amount, usually between 10-12%.

6ib The weight of 1,320g cited by Dr Armour in her letter to Professor Berry is only minimally above the normal range for a boy of 4 years and certainly cannot be regarded as indicative of gross cerebral oedema; there is an inconsistency in this letter between her description of gross cerebral oedema and the weight quoted.

6ic Dr Armour suggests that this is the fresh weight as she writes *"At post mortem I found gross cerebral oedema"*. However, in her autopsy report she states under *"INTERNAL EXAMINATION HEAD Brain: To be described after fixation"*. No fresh weight is recorded and the fresh brain is not

described. These two pieces of information are required in the production of an autopsy report. Had the fresh brain been described and the cerebellar tonsillar damage noted, the description of gross oedema would have been more credible and the inconsistency of the fresh brain weight might have been noticed and addressed at the time of preparing the autopsy report. At this time there may have been contemporaneous paper records which would have allowed the mistake to be rectified.

7. **Dr. Armour states in her Inquiry Witness Statement (Ref: WS-012/2, p.11) that the reference to Adam's "fresh" brain weight of 1,302 gms in her notes was an error, leading to a correction to 1,320 gms. She also states that the "fresh" brain weight of 1,320 gms is probably an error and calculates back from the fixed brain weight of 1,680 gms that it was more likely to be 1,520 gms. However, with reference to her letter to Professor Berry in which she referred to the gross oedema and 1,320 gms, she states in her Witness Statement that: *"In my view this is the fresh weight of the brain"* (p.14). It seems that we have no reliable evidence from the autopsy as to the precise weight of Adam's brain pre-fixing.**

I agree that we have no reliable evidence as to the precise weight of the fresh brain.

(i) Is it possible to say whether the appearance of Adam's brain is consistent with the weights of 1,320 gms, 1,520 gms or 1,680 gms? If so which is the more consistent?

I had no pictures or description of the fresh brain at the time of writing my first report. Images of the fixed brain (Supplied on CD and labelled F46728) show brain swelling (described in addendum above at 4) but it would be unreliable to guess the weight of the brain. The fixed brain weight of 1680 g may be the most reliable record we have. However, the fixed weight is not as accurate as the fresh weight due to the effect of fixation in increasing the weight by a variable amount.

Having seen the brain scans with Dr Anslow, it is clear that the brain, particularly the hindbrain, was swollen after surgery and some 24 hours before death. This is the best and most objective evidence we have for brain swelling. It is likely to have persisted until death but could have been influenced by treatment which may have reduced swelling or by failure of blood supply which would have increased swelling during Adam's time on a ventilator.

(ii) Please comment on Dr. Armour's conduct and approach in relation to establishing the brain weight in the light of the fact that an Inquest was to be held at which her Report was likely to be a significant document.

Three points regarding the autopsy assessment cause concern: that the fresh brain weight was not recorded, the fresh brain was not described and it appears that Dr Armour did not consult reference charts for expected brain weight at this age. Had these procedures been carried out the inconsistency between the fresh weight and her view that there was gross cerebral oedema as expressed to Professor Berry may have been recognised sooner. I am surprised that the discrepancy between the fresh and fixed brain weights did not cause Dr Armour to question the accuracy of the weights while she was preparing her report for the Coroner.

Page 1

Ligation of left internal jugular vein

8. Dr. Armour concluded in her Report that the combined effect of the ligation of the left internal jugular vein (identified by a suture in situ) and the catheter tip of the CVP being on the right side would have reduced cerebral perfusion and exacerbated the effects of cerebral oedema. She also states in her Inquiry Witness Statement that the *"degree of impaired blood flow was insuffice[sic] to cause hypoxic change"* (Ref: WS-012/2, p.9).

(i) Please comment on the extent to which the effects of cerebral oedema was likely to be exacerbated by an impaired blood flow that was insufficient to cause hypoxic change

Increased pressure in the veins draining the brain may cause tissue swelling. This can later go on to cause tissue hypoxia and death (infarction). It is not possible to tell how much impairment of venous outflow from the brain would be required to cause swelling yet not to cause tissue hypoxia. The likelihood of tissue damage will also be determined by the duration of impairment of venous outflow. Sudden venous obstruction may cause transient tissue ischaemia, but permanent damage would not be expected if the obstruction were to be removed within a short time. On the other had very protracted obstruction will lead to development of venous bypass channels or collateral vessels which restore flow.

9. Dr. Squier has described Dr. Armour's Report has been unclear in that whilst she states that *"there was no evidence of congestion or obstruction of the major blood vessels or the carotid arteries and jugular veins"*, she also states that there was *"a suture in situ on the left side of the neck at the junction of the internal jugular vein and the sub-clavian vein"*. Dr. Armour was provided with an opportunity to address that apparent inconsistency both through her PSNI statement and her Inquiry Witness Statement and you can see her response at Ref: 093-022-063 and Ref: WS-012/2, p.10.

(i) Please comment on the adequacy of her response and her Report in that respect

In her statement of April 12th 2006 Dr Armour comments on her evidence at the Coroner's Inquest. In addition tom the citations above , on page 2 she refers to the suture in the neck and states *"The suture impaired the blood flow to the brain"*. This is misleading; the suture was described on a vein which drains blood away from the brain. The arteries carrying blood to the brain were not said to be damaged in any way. This response is not only unhelpful, but is inaccurate.

Page 2

How long had the suture been present

10. Dr. Armour stated in her evidence at the Inquest that: *"The suture had been there for some time"* (Ref: 011-010-033) and she repeated that in her PSNI statement (Ref: 093-022-063).

(i) Please comment on the totality of Dr. Armour's description of her examination and her statements on the impact of the suture, in the light of your views of *"reactive processes"*

This response does not give any indication of how long the suture had been present. Had the suture been present for weeks or months collateral vessels would have developed to circumvent the blockage. These do not appear to have been sought or described. Further the vein should have been sampled for microscopy to examine tissue reactive changes which would assist in determining how long the suture had been present.

(ii) Please also comment on the implications of this for the Report, including Dr. Armour's failure to make any further investigations to establish the timing of the ligation

Given that Dr Armour clearly considers it relevant to the brain swelling and a significant finding (commentary of her autopsy report (011-010-040), the failure to pursue the detail of the venous obstruction and its timing is surprising.

Those with clinical responsibility for the child should be made aware if Dr Armour considered that venous obstruction by a suture was a potential contributing factor in this baby's death.Detailed information regarding the timing of the suture is necessary for clinical investigation into how and when it was placed and what steps might be taken to avoid this in the future.

Page 3

Report of Dr. Mirakhur

11. You state in your first paragraph that: *"The procedures seem less than satisfactory and this is not the standard of practice which would be expected today"*. At present the documents show:

(a) During a discussion between the Coroner and Dr. Armour on 8th December 1995 (recorded by the Coroner at Ref: 011-025-125) there is reference to showing slides to Drs. O'Hara and Bharucha and obtaining an expert opinion from Professor Berry. There is no reference to showing slides to or seeking an opinion from Dr. Mirakhur

(b) There is reference to Prior to the provision of her Report, Dr. Armour wrote to Professor Berry on 22nd December 1995 stating that: *"The brain and spinal cord are fixing and a neuropathological opinion will be requested"* (Ref: 011-029-152)

(c) Dr. Armour stated in her Autopsy Report that: *"The brain, spinal cord and histological slides were seen by Dr. M. Mirakhur, Consultant Neuropathologist"* (Ref: 011-010-040). That is the same form of wording used in relation to Professor Berry

(d) Dr. Armour's position in her Witness Statement is that she showed the slides to Dr. Mirakhur for a second opinion. She also states that: *"As far as I am aware what is written in my autopsy report was concurred[sic] by her"* (Ref: WS-012/1, p.2). Furthermore she does not identify having received anything in writing from Dr. Mirakhur and claims all she has is the notes held at the Department of Pathology

(e) Dr. Armour's notes from the Department of Pathology make no reference to Dr. Mirakhur

(f) Dr. Mirakhur states in her Witness Statement that Adam's case was *"never formally referred to me or to the Neuropathology Department"* (Ref: WS-223/1, p.2).

(g) The procedure for a pathologist who is conducting a post mortem in the State Pathologist's Department requesting a neuropathological examination, was that a formal letter was sent to the Consultant Neuropathologist, the case would be issued with a reference number and a copy of the report would be retained

(h) Dr. Mirakhur's position in her Witness Statement is that at its height Dr. Armour may have asked for her "*informal opinion on histological slides*" but that she would have seen nothing else nor did she provide anything in writing (Ref: WS-223/1, p.2). She goes on to state clearly that: "*I saw Dr Armour's autopsy report for the first time on 28th October 2011*" (p.3)

You have assumed what might have happened. In the interests of clarity:

(i) Describe exactly the 'procedures' to which you refer in your statement "*procedures seem less than satisfactory*" and explain the basis upon which you have determined that those were the procedures in operation

I made reference to the procedures by which an opinion may be sought from a colleague. I referred to the reference made by Dr Armour that *"brain, spinal cord and histological slides were seen by Dr Mirakhur."*

In this case there should be a record of the tissue being sent to an expert and received by them. Dr Mirakhur says she had no such record. I have made no effort to determine what the procedures actually were at that time. However at 11(g) the procedures of the State Pathologists Department are described. I do not know what they were, nor why Dr Armour's supervisor or head of department was not making sure that staff members were following these procedures.

(ii) Describe the procedures considered acceptable as at November 1995 for a state pathologist to seek a second opinion and provide the basis of your view by reference to any:

(a) Protocols, guidelines, guidance from professional bodies

(b) Established or otherwise good practice

(c) Anything else

(iii) Please comment on the acceptability of the 'procedures' in operation in Adam's case in the light of the standards that were regarded as acceptable in November 1995

As noted above I am not a forensic pathologist and do not know what protocols were in place in 1995. I have appended the RCPath guidelines of 2004 which are the oldest I can find. I suggest you refer to a Forensic Pathologist for further guidance.

12. You refer to: "*it would have been better practice, as well as a matter of professional courtesy, to give Dr. Mirakhur the opportunity to express her opinion formally and to produce a signed report*". You also state that: "*best practice would have been to ask a neuropathologist to undertake a formal and complete brain examination*". In the interests of clarity

(i) Would it have been required or advisable in the light of the acceptable standards in 1995 to give Dr. Mirakhur that opportunity?

I believe that in the case of the death of a child shortly after surgery a detailed autopsy is mandatory. Where the cause of death is thought to have been in the brain I believe a formal Neuropathological opinion would be required, not simply advisable, then in 1995, as now.

(ii) Was it best practice to ask for such a brain examination according to the acceptable standards in 1995?

See 12i

(iii) Please comment on the implications of the Report not having being provided to Dr. Mirakhur for her comment and having been complied without the benefit of a formal and complete brain examination by a neuropathologist

By not having a formal and complete brain examination by a neuropathologist Dr Armour has taken a great deal of responsibility on to her shoulders. This is surprising as she was not yet fully qualified and appears not to have had supervision in undertaking this autopsy.

Page 3

Review of CT scans with Dr. Anslow

13. You state that: "He has given an opinion via email [of the scans dated 7th July 1995] but I have not had the opportunity to review these scans with him". We appreciate you expediting matters to get us your view pending the outcome of your review with Dr. Anslow. However:

(i) Please provide your comments on that review and finalise your report in the light of it

See above at Addendum 3

14. The Coroner refers in a letter dated 13th December 1995 to Dr. Armour getting the impression from Dr. O'Hara that some of her: *"findings of gross cerebral oedema could be explainable by the time the child was on the ventilator* (Ref: 011-027-128). You refer to the post-operative scan that was taken just over 2 hours after the transplant surgery as being: *"the most accurate reflection of the state of the brain immediately after surgery".* Dr. Armour refers in her Report to an *"emergency CT scan at 1.15pm revealed gross cerebral oedema"* (Ref: 011-010-035).

(i) Should Dr. Armour have asked for an expert opinion on the CT scans (ie those of 27th November 1995 and 7th July 1995)? Would that have been required in 1995 by either acceptable or best practice?

(ii) Please comment on the implications of the Report having been complied without the benefit of such an opinion

14 i and ii It is good practice to refer to all clinical imaging prior to undertaking an autopsy. Dr Armour may not have felt the need to get a formal Neuroradiological opinion on the brain scans but she should have at least examined the scans herself to assist in preparing her report.

15. There would appear to be a typographical error in your statement: "A number of when secondary effects may have taken place in the brain ... already severe swelling" (emphasis added).

(i) Has "when" been included in error? Please clarify the position.

"when" has been deleted

Waney Squier

January 29th 2012

STATEMENT OF TRUTH

I understand that my duty as an expert is to provide evidence for the benefit of the Inquiry and not for any individual party or parties, on the matters within my expertise. I believe that I have complied with that duty and confirm that I will continue to do so.

I confirm that I have made clear which facts and matters referred to in my report(s) are within my own knowledge and which are not. Those that are within my own knowledge I confirm to be true. The opinions I have expressed represent my true and complete professional opinions on the matters to which I refer, having studied all the relevant documents supplied to me.

I confirm that I have no conflict of interest of any kind, other than any disclosed in my report(s). I do not consider that any interest that I have disclosed affects my suitability as an expert witness on any issue on which I have given evidence. I undertake to advise the Inquiry if there is any change in circumstances that affects the above. I have no personal interest in supporting any particular point of view.

I understand that I may be called to give evidence.

Signed: Waney Squier Date: 1.2.12

Home Office

The Royal College of Pathologists

Code of practice and performance standards for forensic pathologists

Home Office Policy Advisory Board for Forensic Pathology and The Royal College of Pathologists*

In accordance with the College pre-publications policy, this document was shown to Council on 22 January 2004 and put on the College website for consultation from 26 January to 26 February. Eight items of feedback were received, which were passed back to the authors for consideration in the final drafting of this publication.

* For membership of author groups, please see Section 12 on page 23.

Prof John A Lee
Director of Publications
The Royal College of Pathologists

Further copies of this publication can be obtained from the College website at www.rcpath.org

CONTENTS

1 INTRODUCTION

This first edition of this code of practice has been developed and accepted jointly by the Home Office Policy Advisory Board for Forensic Pathology ('the Board') and The Royal College of Pathologists ('the College') to allow forensic pathologists to demonstrate high standards of professional performance using valid and acceptable criteria.

The document is directed primarily to practitioners working within England and Wales. It is hoped, however, that it will also be of value to pathologists who work outwith these borders even though they may operate in a different climate. For instance, the legal system in Scotland differs significantly from that pertaining south of the border.

The document is built upon the guidelines issued in 1996 by the Board and incorporates performance standards for the profession drawn up in cooperation with the Professional Standards Unit of the College. It will be kept under regular review and updated as and when appropriate. The most recent version of this Code will be posted on the websites of The Royal College of Pathologists and the Home Office.

The document is divided into sections, each dealing with a specific aspect of the activity of the forensic pathologist. Each section commences with a statement of the standard of practice expected of a Home Office-registered forensic pathologist. New recruits to the profession seeking appointment to the Home Office Register will be expected to display competences derived from these standards. The document then goes on to expand, where necessary, upon the way in which these standards should be maintained during delivery of the service.

The Constitution of the Board is currently being revised, with new procedures being introduced for the monitoring and regulation of forensic pathology services. The introduction of this code, along with its accompanying code of conduct, forms a major element of the new regulatory framework for the profession and will be used by the Board as a basis for procedures such as future audit exercises, or when considering the need for any disciplinary action.

The code of practice is consistent with Recommendation R(99)3 of the Council of Europe on the Harmonisation of Medico Legal Autopsy Rules, adopted by the Committee of Ministers in February 1999,[1] and takes account of the judgement handed down in April 2003 by the Court of Appeal in relation to R *versus* Sally Clark.[2]

Note on gender

Throughout this document, 'he' and 'him' are used to refer to individuals. These words are used for simplicity and consistency, and are not intended to show any gender bias.

Importance of the codes of practice and conduct

Adherence to the codes of practice and conduct will be an essential requirement of being registered by the Home Office as licensed to practise forensic pathology in England and Wales. If there are occasions on which forensic pathologists decide to depart from these codes, they must be able to justify their reasons to colleagues, to the criminal justice system and, if necessary, to the Board and the College. It is also recognised that a small number of recommendations, such as the requirement for peer review of every case, may need to be introduced gradually as resources permit.

The duties and responsibilities of the forensic pathologist

Among the duties and responsibilities of the forensic pathologist, the following elements are considered particularly important:

- personal expertise: keeping up to date with the latest methods and thinking by, for instance, actively pursuing relevant continuing professional development (CPD) programmes
- standards: accepting the use of agreed documented procedures and participating in appropriate schemes of peer review and audit
- integrity of evidence: ensuring that the integrity of evidence is not compromised
- ensuring the fair presentation of findings: presenting findings and evidence in a balanced and impartial manner, and confining opinions to those based on personal skills and experience, referring to the work of other experts in the field where appropriate
- understanding the criminal justice system: recognising the importance of the disclosure of information to relevant parties
- service provision: the pathologist will address and, where possible, meet customers' needs, including timeliness, providing relevant information and communicating effectively with police officers and others in the investigative process.

2 PROFESSIONAL STANDARDS IN FORENSIC PATHOLOGY

Introduction

The General Medical Council (GMC) is responsible for maintaining the Medical Register in the United Kingdom. First and foremost, the forensic pathologist is a doctor, bound by the principles that govern this Register. While the responsibilities of the forensic pathologist may differ somewhat from those of the majority of medical practitioners, both the Board and the College advocate the principles of good practice summarised in the GMC's publication, *Good Medical Practice*.[3] This document forms the base against which should be judged every action taken by a doctor.

The responsibilities of the forensic pathologist in respect of all aspects of his work, including audit, clinical governance, quality assurance, CPD, revalidation and research are the same as those of any medically qualified clinical pathologist. However, he also has responsibilities to the criminal justice system, including the need to offer impartial evidence, the integrity of which is not compromised, and the need to present such evidence in a manner that is acceptable to others involved in the criminal justice system. The forensic pathologist's primary duty is to the court and he must not act in any way that fails to acknowledge that duty.

The Board and the College share responsibility for setting the standards that underpin high quality pathology services. Forensic pathologists must ensure that the service they provide is of high quality and conducted in accordance with a formal service level agreement (SLA) that demonstrates a commitment to quality, transparency and accountability. It is recognised that not all deaths occur in circumstances where all the steps in this process are required, but the absence of a step does not constitute an argument for ignoring the principles inherent within the code.

The standards set out in this code must be applied by the Home Office-registered pathologist, regardless of the party instructing that individual. All pathologists have a duty to consider and investigate explanations for a death consistent with the innocence of an accused person. Where such an explanation cannot be excluded, it must be brought to the attention of the pathologist's instructing party.

The code of practice

This code sets out what is expected of the forensic pathologist in the performance of each step in the process of investigation of a suspicious death, from the initial contact from the police regarding that death to the presentation in a court of evidence relating to the death. It provides a framework within which clinical audit and performance review can be carried out to assure the quality of performance of individual forensic pathologists, as well as to facilitate the collection of evidence for the revalidation process.

Mortuary facilities

It is recognised that the forensic pathologist may have to perform autopsies within mortuaries where he has no formal contract of employment with the providers. Forensic pathologists should be satisfied that the mortuaries in which they work have facilities equivalent to the standards set out in Health Building Note (20) (NHS Estates) and the Health Services Advisory Committee's documents on safe working and the prevention of infection in the mortuary and post-mortem room. If a pathologist is not satisfied with any aspect of a mortuary, he should make these concerns known to those instructing him, such as the coroner and police force involved.

Peer review

It is important that forensic pathologists regularly consult and discuss their cases with forensic colleagues, and all accredited pathologists must have arrangements in place so that this can be done. They must also be developing systems, using face-to-face contact and electronic means, in which particular types of case (for instances, homicides, infant deaths and deaths in custody) can be peer-reviewed prior to issue of the report to the coroner and police. The value of review by peers cannot be overstressed and will be referred to throughout this document. The forensic pathologist must not work in isolation from colleagues, either within the discipline of forensic pathology or from other clinical disciplines.

Assistance from other specialists

Practitioners must have in place adequate arrangements whereby they can consult with experts in other medical specialties who may be asked to assist or advise in appropriate cases. They will be expected to have full and easy access to departments of all other branches of pathology, including secure specimen storage, to a department of radiology and to a forensic science laboratory. They should have adequate provision of modern information technology (IT), including Internet access.

Keeping up to date

Practitioners should have ready access to a comprehensive medical library, including appropriate journals. They have a duty to keep up to date and must be able to advise Counsel and others on the current literature.

Departure from the standards

Where the pathologist becomes aware of an unjustifiable departure from these standards, whether by himself or by another practitioner, that departure must be brought to the attention of the pathologist's instructing party. Where the pathologist becomes aware of repeated unjustified departures from these performance standards, he must bring such concerns to the attention of the Board.

Record-keeping

The maintenance of adequate records is vital and full notes must be kept of briefings and conferences, as well as of all work carried out, tests performed and results obtained. Pathologists' records constitute 'relevant material' under the Criminal Procedures and Investigation Act 1996 and must be retained for the minimum periods detailed in the code of practice issued under that Act.

Records must be properly indexed and archived in secure storage. There may be occasions (such as at the scene of the discovery of the body or during the autopsy) in which the pathologist may dictate notes to a tape recorder. In such circumstances, the original tapes, as well as any transcript made from them, must be retained.

When recording information gained or generated at any stage of the investigation, it is important to remember that all such material is potentially disclosable to the other parties involved in a legal action.

3 INITIAL CONTACT WITH THE PATHOLOGIST

3.1 Standard

The forensic pathologist must be readily accessible to the police in accordance with whatever conditions are set out in an appropriate service level agreement.

At the initial contact with the senior investigating officer (SIO) or his deputy, the pathologist will determine:

a) that the coroner has been notified of the death and has authorised the attendance of the pathologist

b) the nature of the case and, if known, issues raised by it

c) the requirement for attendance of the pathologist at the scene of discovery of the body

d) how the pathologist will reach the location of the briefing, should there be reasons why it may not be possible for the pathologist to make his own way there.

Discussion of these issues must be fully documented by the pathologist, with relevant dates and times.

3.2 Code of practice

It is the responsibility of the pathologist to ensure that, when on call, he can be contacted at all times. Adequate arrangements should be in place for accredited pathologists to be available to provide cover during off-duty and leave periods. Maintenance of these arrangements is the responsibility of the pathologist. Those involved in a rota system should give adequate advance notice of any changes in such arrangements to the police forces concerned.

It is also the responsibility of the pathologist to ensure that appropriate police forces and coroners are fully acquainted with all relevant telephone, pager and fax numbers. Even when not on duty, it is helpful if possible contact details are known in case there is some emergency, such as a mass disaster, in which the attendance of as many pathologists as possible may be required.

Call-out arrangements vary around the country. In some areas, the SIO or deputy may call the pathologist. In others, senior scenes-of-crime officers (SOCOs) or the coroner's officer may fulfil that role. The pathologist can reasonably expect to speak to the SIO if he wishes.

There should be no unreasonable delay in responding to a call, particularly where examination of the body at the scene is required. The police must be made aware of the time required to travel to a particular incident; this will vary from situation to situation depending on the distances

involved. What constitutes a reasonable response time should already have been agreed with the force, and will probably be encompassed in the contractual arrangements. If there is to be delay beyond this time, arrangements should be in place and adequate resources available for the provision of a suitable deputy.

On occasion, the pathologist can reasonably expect the police to make arrangements for travel, for example to avoid the pathologist having to drive a long distance. Provision of rapid transfer by the police may also be appropriate in some cases.

4 THE BRIEFING

4.1 Standard

At the briefing, the pathologist will, in liaison with the SIO, the crime scene manager (CSM) and other experts present, e.g. a forensic specialist advisor, and in the light of available information, determine:

a) where necessary, health and safety issues in relation to the scene of discovery of the body and the personnel involved in the examination of that scene

b) what evidential issues are raised by the circumstances of death and how these issues are best approached

c) what risks of contamination are posed by the circumstances of the case and what measures are required to prevent such contamination

d) the plan of approach to the examination of the scene and body

e) the best location for the autopsy and, if possible, an approximate time of arrival at that location.

The pathologist must make a detailed, dated and timed record of the briefing.

4.2 Code of practice

The pathologist must ensure that he obtains such details of the circumstances of the death as are available. He should be briefed by either the SIO or another officer delegated for this task by the SIO. This briefing should be carried out at the first available opportunity, and should certainly be done before the pathologist carries out any detailed examination of the body or the scene of the incident. The briefing should include any version of the circumstances emanating from witnesses, together with any possible explanation advanced by the suspect.

Adequate and appropriate briefing is essential if the pathologist is to obtain the maximum information from his examination. The act of carrying out the autopsy will alter the condition of the various parts of the body and, if the pathologist does not learn of possible explanations for his findings until after his examination is completed, there is a risk that the best evidence to confirm or contradict the explanation may not be available.

The pathologist will not assume that any one of the explanations that have been advanced for the death is necessarily correct. He will, however, in due course consider any explanations in relation to his own findings in order to come to properly reasoned conclusions.

It is important that the pathologist records any briefing given to him in sufficient detail, including the date and time, to enable the practitioner himself (or some other individual) to recall and understand any matter that he may have had in mind when conducting the examination. The absolute importance of proper notes is stressed throughout this code.

5 SCENE OF DISCOVERY OF THE BODY

5.1 Standard

The pathologist will:

a) agree the approach to the scene after discussion with the SIO, CSM and other personnel

b) enter the scene only by the agreed route of access, using the protective clothing agreed as appropriate to the circumstances of the case

c) determine whether any special techniques or procedures may be needed during the examination of the scene and body

d) determine what specimen recovery will take place at the scene and, in due course, take (or supervise the taking of) such samples

e) ensure the protection of any trace evidence that is not to be collected prior to removal of the body from the scene

f) determine the route of removal of the body from the scene and, if necessary, supervise the removal of the body by the funeral director or other appropriate person

g) bring to the attention of the CSM, and be prepared to give advice upon, any health and safety issue (where this lies within the pathologist's area of expertise)

h) record all data that assist in attempts to determine the time of the death

i) ensure that if it is necessary to manipulate the body during the examination, such manipulation is adequately recorded.

The pathologist must record full details of the scene and the body, and must document both his own actions and those of others that may be significant to the pathologist's examination.

5.2 Code of practice

5.2.1 Scene management

With advances in resuscitation, bodies are often immediately and quite properly removed from the scene of discovery and transferred to a local hospital. When a body is still *in situ*, however, careful consideration must be given to the need for the forensic pathologist to attend the scene. Even when a body has been removed, examination of the scene may provide useful evidence, even though the autopsy may already have been carried out.

The Association of Chief Police Officers' 'Murder manual' documentation on homicide investigation instructs that the pathologist should be informed without delay in cases of sudden or suspicious death. On receiving notification, the pathologist should develop a plan for scene

management in consultation with the SIO and/or the CSM. This will often but not invariably involve the attendance at the scene by the forensic pathologist. It is recognised that with advances in forensic scientific examination at scenes, there may be competing aspects of scene examination. Nevertheless, the forensic pathologist still has a potential role in the management of most scenes, even where they do not actually attend. When a scene has not been attended, photographs, video recordings and other imaging techniques may be useful in the subsequent briefing of the forensic pathologist.

5.2.2 Action at the scene

Prior to or on arrival at the scene, the pathologist should be briefed by the SIO or a senior deputy, ideally with other appropriate experts present. The pathologist should record the facts given to him at this briefing. Reference should be made to the notes on 'The briefing' given in section 4.

The scene will be under the control of the crime scene manager and the pathologist's approach to the body and the examination of other aspects of the scene should be undertaken only after consultation with this officer and other scenes-of-crime experts who may be present. Such discussions must include routes of access to the scene and the prevention of contamination.

Where there has been no briefing before the scene visit, all of the issues described in section 4, 'The briefing', will need to be considered before entering the scene. Attendance at the scene itself may require reconsideration of decisions made at the briefing.

5.2.3 Importance of notes

The pathologist should always record his actions and observations at the scene using comprehensive written or taped notes, including the use of sketch plans where appropriate. These records will be needed during preparation of the report and when giving evidence in court. Again, reference should be made to section 4, 'The briefing'.

5.2.4 Photography

The pathologist should advise that adequate photographs of the body are taken. If this has already happened, consideration should be given to the need for any additional photographs.

5.2.5 Position of the body

The position of the body and that of each of the limbs and of the head should be recorded, together with the relationship of the body to adjacent objects such as furniture and other articles. The state of the clothing should also be noted.

There should be no movement of the body before photographs have been taken, except as necessary for confirmation of life extinct and/or for resuscitation purposes.

5.2.6 Assessment of the time of death

Except where the body has been exposed to fire or is decomposed or skeletal, recording of the ambient temperature and, if possible (given the position of the body), the deep temperature of the body will normally be made. However, it is recognised that the latter is invasive and may interfere with the proper collection of other, potentially more important forensic evidence at the scene. The pathologist must be able to justify the lack of taking of a body temperature if the scene was attended.

The genitalia and anus should be examined and swabs taken before a thermometer or thermo-couple is introduced. If, for some reason, it is not practical to measure the body temperature at the scene, it may be recorded as soon as practicable upon arrival of the body at the mortuary. The degree, location and fixation of rigor mortis and hypostasis should be noted.

Police officers should not allow police surgeons or forensic medical examiners to make such measurements without prior discussion with the pathologist. However, providing the former are appropriately trained and experienced, their involvement may expedite the taking of a body temperature in cases where it has been deemed to be of potential importance, and where its taking will not interfere with other potentially relevant forensic evidence.

5.2.7 Other aspects of scene examination

Detailed examination of the scene of discovery of the body is usually undertaken by forensic scientists and SOCOs. However, the forensic pathologist may be required to inspect other aspects of the location and note any findings. This requirement is clearly a matter for discussion with the crime scene manager.

It may be appropriate for the pathologist and a forensic scientist to jointly examine the scene, including features such as the distribution and appearance of any bloodstains. Although the forensic scientist's report will contain detailed comment on such matters, it is the pathologist who should be directly responsible for giving an opinion upon the nature and possible cause of wounds that may be the source of the blood. The distribution of blood from any injuries may need to be taken into account by the pathologist in reconstructing the way in which injuries were likely to have been inflicted.

5.2.8 Involvement of other specialists

Occasionally, it may be appropriate to seek advice from other specialists, such as forensic entomologists or anthropologists. The pathologist must determine whether the circumstances of the incident indicate the need for other specialist advice and must make the SIO aware of that need.

5.2.9 Prevention of contamination at the scene

Only the minimum number of personnel required for efficient and safe examination of the scene should enter that scene. Where it is likely that minute traces of evidence may be important, e.g. in the use of low copy number DNA, consideration should be given as to whether the forensic pathologist has a role at all in terms of actually entering the scene. Appropriate protective clothing, as determined by the CSM, should be worn. Changes of gloves may be necessary during the investigation, particularly if exhibits are taken during the examination.

5.2.10 Taking of specimens at the scene

It is essential that no specimens be taken from the body until there has been consultation between the pathologist and the CSM. SOCOs and forensic scientists, if present, may also need to be consulted. Where the taking of certain samples is not considered necessary, these should be omitted only after obtaining the consent of the above parties.

It is often good practice to take tapings from exposed surfaces of the body and possibly from the clothing. This may be done by, or under the supervision of, the pathologist or by appropriately trained and experienced SOCOs. In cases where, for some reason, no tapings have been taken at the scene, consideration should be given to taking them in the mortuary when the body is first unwrapped.

On occasions, it may be advisable to remove some or all of the clothing at the scene.

All specimens should be taken using equipment supplied or approved by the SOCO. If clothing is to be cut, only instruments supplied by them should be used.

When deciding what material will be relevant in any particular case, the taking of samples from the following areas should be considered:

a) tapings from exposed body surfaces and uppermost surfaces of clothing (where that clothing is such that it is considered likely that trace evidence will be shed on manipulation). If clothing is not to be cut away, the manipulation of the body required to remove clothing may dislodge or contaminate trace evidence; clothing should not be removed until specimens have been taken from head and hands

b) combings of head hair, beard and moustache hair and pubic hair

c) plucked hairs from the above sites, each sample being representative of the range of hairs present at those sites

d) where objective evidence of chronic drug use is relevant to the case, a pencil thickness of head hair, cut as close to the scalp as possible and the cut ends wrapped in foil

e) a swab or swabs from the mouth and teeth

f) tapings from the hands where any foreign material is recognised; tapings must be taken before fingernail scrapings or cuttings

g) scrapings from underneath the fingernails of each hand, or fingernail cuttings, using orange sticks or scissors provided or approved by the SOCO or the forensic scientist. Sampling from hair and hands where the death may be related to firearms or explosives must be made using only a 'Gunshot residues and explosives sampling kit' approved by the relevant forensic science laboratory

h) swabs from any moist areas on the body surface where the possibility exists that such moist stains have arisen from a person other than the body. Where there is a possibility of sex-related crime, swabs will be taken from those areas considered most likely to be productive of semen or saliva (face, neck, nipples, hands)

i) a swab or swabs from the perianal skin, taken before a swab or swabs from the anus

j) a swab or swabs from vulva and low vagina, taking care to avoid contamination of the latter from the initial swabbing of the former. These swabs must be taken after swabbing of the perianal skin and anus (to avoid leakage during the course of the vulval swabbing)

k) a swab or swabs of injuries that may have resulted from contact with another individual where the skin from that individual may have been shed, e.g. swabbing of the skin of the neck in postulated manual strangulation.

In each instance, appropriate control swabs must be taken. Multiple swabs from a single area must be numbered in the order of their taking.

5.2.11 Removal of the body

When a scene has been assessed, the pathologist will often supervise the packaging and subsequent removal of the body. If trace evidence has not been collected at the scene, the hands may be placed in bags before the body is removed. If the head is to be similarly placed in a bag, it must be remembered that any open head wound is likely to shed blood into the bag during transit. This may obscure details such as the direction of dried bloodstains and render difficult the collection of trace evidence. It is often advisable to examine the head for such material at the scene.

On arrival at the autopsy room, the body should remain undisturbed, still in its wrapping or body bag, until the pathologist arrives to undertake the examination, unless any different action has previously been agreed with the SIO or designate for some specific purpose.

6 THE AUTOPSY

6.1 Standard

At the mortuary, the pathologist will:

a) ensure that the body is that for which the pathologist has authorisation to do an autopsy

b) if trace evidence was not taken at the scene, ensure that as far as practicable there is no opportunity for contamination of the body from any fixture, fitting or person at the mortuary

c) take, or supervise the taking of, any necessary trace evidence not taken at the scene

d) ensure that any manipulation of clothing once removed from the body takes place over the body wrapping, so that any evidence shed from the clothing will not be lost

e) make an examination of the body in a manner that both addresses all evidential issues that may be raised by the case and, if possible, ensures that the dignity of the deceased and ethical issues relating to the deceased and the family are accommodated

f) be able to justify all examinations having regard to the context of the case and remembering that, in a criminal investigation, there may be interested parties other than the family. One party's needs must not be accommodated to the detriment of other parties

g) note any significant features of the body that reveal something out of the ordinary, whether or not they appear immediately relevant to the cause of death

h) note if parts of the body have been examined and no abnormality found, because the negative finding may be equally significant

i) where there are findings of apparent significance that can be demonstrated visually, ensure that photographs are taken so that others can see them for themselves at a later date

j) retain any material relevant to the cause of death and/or that may assist in the resolution of issues (whether for inclusion or exclusion of possibilities) that foreseeably may arise during the investigation of the death, including those that can be anticipated at trial

k) ensure that all exhibit labels necessary to ensure the chain of custody of samples removed for evidential purposes are signed at the time required by SOCOs.

The pathologist must record full details of the autopsy and must document both his own actions and those of others that may be significant to the pathologist's examination.

6.2 Code of practice

The Board and the College recommend that all pathologists follow the *Guidelines on Autopsy Practice* published by The Royal College of Pathologists in 2002.[5]

6.2.1 Approach to the autopsy

Having equipped himself as far as he can with information about the likely issues to be resolved, the pathologist will be ready to embark upon the actual examination. He will need to note any significant features of the body where his findings reveal something out of the ordinary, whether or not this appears immediately relevant to the cause of the death. He will also need to record carefully the fact that he has examined parts of the body and found no abnormality, because a negative finding may turn out to be as significant as one that is positive.

Techniques employed during the dissection, or during any subsequent investigation, should as far as practicable be accepted and well established procedures. The pathologist must be able to defend the use of any novel or unorthodox technique both to his colleagues and to the wider criminal justice system.

Wherever possible, and particularly where it is relevant to the investigation, the forensic pathologist should have access to the medical history of the deceased before the autopsy is commenced. Where such records are not forthcoming, the pathologist will need to decide whether it would be sensible for the autopsy to be postponed until the information becomes available.

6.2.2 General considerations

Autopsies should only be conducted in mortuaries that have adequate facilities and safety procedures (see below). Where mortuary facilities are deemed to be inadequate, the pathologist should consider whether the examination should be performed at that location and, if necessary, discuss the matter with the responsible coroner. The location should have modern autopsy equipment, including accurate weighing apparatus for both organs and for the whole body. There should be access to equipment for radiological examination, and to a radiologist's opinion in due course.

The examination should not normally be conducted without the assistance of skilled mortuary technical staff. The pathologist should brief the anatomical pathology technician (APT) on the nature of the case and his tasks. An experienced APT can assist with the dissection at the discretion of the pathologist, but must be under the control and supervision of the pathologist at all times. Technical staff may, for instance, open the head under the pathologist's supervision. However, removal of the brain itself should be undertaken by the pathologist.

Continuity of identity from the scene of discovery should be carried out at the start of the examination and the formal identity should be confirmed to the pathologist if the identity is known. If unknown, it should be identified by reference to where and when it was found. The individual identifying the body to the pathologist should be recorded and mentioned in the report.

The autopsy must be carried out in a manner consistent with medical ethics and respecting the dignity of the deceased. Proper consideration must be given to the needs and wishes of relatives and others who may wish to view the body. If practicable, consideration should be given to close relatives being given an opportunity to see the body before the autopsy, but only after relevant trace evidence has been taken. Before such a viewing is undertaken, there should be discussion between the pathologist, the SIO and the family liaison officer (FLO) so that the relative is fully informed, for example, of any features that might cause distress. If the viewing is to take place after the autopsy, the pathologist should consider whether any dissection, which may render viewing of the body by relatives distressing, may be postponed to a time when all such viewings have been made.

In suspected homicides, the SIO or an appropriately designated officer will normally be present throughout the autopsy so that he can appreciate the autopsy findings and answer any questions that may arise about the circumstances of the case.

Appropriate SOCOs should also be present. It is essential that all personnel present in the autopsy room should be subject to full precautions to protect them from infective hazards and to avoid any contamination of the body or clothing. The number of individuals in the autopsy room should be kept to a minimum.

6.2.3 Involvement of other specialists

The pathologist must consider whether he has the appropriate expertise to perform an autopsy in the circumstance of that case and request the attendance of an appropriate expert if necessary. The pathologist must cooperate in an appropriate manner with such experts.

If investigation of the case requires the assistance of other specialists, for example a paediatric, cardiac or neuropathologist, it is the responsibility of the pathologist to make appropriate recommendations to the SIO or senior SOCO. If that expert cannot attend, the pathologist must seek advice from the expert to determine what material might be required for later examination and interpretation, and ensure it is recorded and/or preserved in an appropriate manner.

6.2.4 Photography

It is the duty of the pathologist to ensure that adequate photographs are taken of the whole body and of all wounds or other abnormal features before commencement of dissection. Photography in the mortuary should only be carried out under the supervision of the pathologist. Pathologists may take their own photographs, both at the scene and in the mortuary, but the report must indicate that such photographs exist. Their existence will be disclosed to the defence.

Where there are findings of apparent significance that can be demonstrated visually, these should normally be photographed so that others will be in a position to see for themselves at a later date. It will be particularly important to record the condition of the body in situations in which the examination will itself interfere with the finding and thus prevent anyone else from assessing the significance of the finding.

6.2.5 Radiology

Radiological examination should be part of the examination of all cases of suspected non-accidental injury in children and in all deaths involving firearms or explosives. It can also be of considerable assistance in the examination of badly burnt or decomposed bodies and may be appropriate in other instances. The pathologist will be responsible for advising on the need for such examination and for seeking the assistance of a consultant radiologist where necessary.

Fluoroscopy, using a portable fluoroscope, may sometimes be helpful for screening and picking up projectiles in cases of gunshot wounds and injuries from explosives.

6.2.6 Autopsy notes

Comprehensive contemporaneous notes are essential and should be taken of every procedure undertaken. Such notes may be written or dictated. Where appropriate, notes should be accompanied by diagrams.

Notes must include the time, date and place of the autopsy and the names of all those present, with an indication of the role of each one in the mortuary.

The notes or tapes must be retained as described above (see section 4, 'The briefing', and paragraph 5.2.3, 'Importance of notes'). Aside from their extreme importance to the pathologist involved, such notes may be required for peer review, audit or disclosure during criminal proceedings.

6.2.7 Removal of clothing

Any clothing on the body must be removed carefully, preferably without cutting, and placed in appropriate bags with due care to avoid contamination. This should be done after trace evidence has been removed from the rest of the body, particularly the hands (unless they are bagged). Although detailed examination of the clothing is a matter for the forensic scientist, the pathologist should check it for damage such as cuts, which may influence the conclusions to be drawn from

the examination of the body. Any such manipulation of the clothing should take place over the wrapping material so that any shed evidence is not lost. In some instances, tapings should be taken from the surface of the clothing before removal; this is usually done by a forensic scientist or SOCO. It is important in many instances that serial photographs should be taken as each garment is removed.

Adequate notes must be made of the procedure and the findings.

6.2.8 Collection of trace evidence from the body

The pathologist must ensure, if all samples have not been taken at the scene, that there is no opportunity for contamination of the body from any fixture, fitting or person at the mortuary. Samples should be taken after discussion with the SIO and appropriate experts. Only where these discussions indicate that samples are not considered necessary should they be omitted; such discussions should be documented.

Where samples may be of value, reference should be made to the list of samples noted in paragraph 5.2.10, 'Scene of discovery'.

Clearly, in some cases the autopsy is not carried out until after a period in hospital, in which case the collection of some or all specimens may be pointless.

6.2.9 Autopsy procedures

Measurements
Metric measurements should be used. Imperial measurements are still felt to be more readily understood by the court, especially in the case of larger measurements such as body height and body weight. If the imperial equivalents are not stated in the report, the pathologist must be prepared to provide them when giving evidence.

External examination
The description of the body should include age, sex, build, height, ethnic group, weight, nutritional state, skin colour and special characteristics such as scars, tattoos, etc. Notes should also include the length, colour and distribution of hair and beard; the presence or absence of petechiae in the conjunctivae and the appearance and length of the fingernails.

If not already dealt with at the scene, rigor mortis should be systematically tested for in the neck and in the extremities, if potentially of relevance to the case.

Signs of treatment should be recorded. Medical devices should not be removed from the body before the autopsy and the pathologist should endeavour to inform staff likely to handle such bodies of this requirement.

Examination of injuries
All injuries must be described by shape, exact measurements, direction, edges and angles. The location relative to anatomical landmarks and, if appropriate, the height above the heel should be measured. In cases of multiple repetitive injury, it may be appropriate to describe groups of injury.

In the case of closed injuries, such as bruising, the colour should be noted. Local skin incision may be appropriate in the assessment of bruising.

Skin reflection may be necessary in some parts of the body, but unnecessarily mutilating dissections and destructive examinations should be avoided. Any dissection that does take place must be of such type that the body can adequately be reconstructed. All dissection carried out at autopsy must be justified in the context of the case. There should be a low threshold for the examination of subcutaneous tissues of the trunk and upper limbs for evidence of bruising, particularly in dark-skinned individuals where bruising may not be apparent at the skin surface.

It is often important to dissect the face from the underlying facial skeleton. If the whole dissection is performed skilfully and carefully, the face can be replaced with little significant distortion.

Internal examination
Pathologists should adhere to the *Guidelines on Autopsy Practice* issued by The Royal College of Pathologists. [5] The standard of internal autopsy dissection must be comprehensive. In addition to the forensic aspects of the examination, careful attention must be paid to any features that may be relevant to natural disease or medical intervention.

Incisions should be appropriate in relation to the nature of the case.

The state of body cavities should be described and the amount of fluid or blood in each cavity should be measured.

All organs must be dissected and accurately and adequately described with weights. Other measurements should be recorded as appropriate.

Attention should be paid to the contents of the stomach and bladder.

Examination of the generative organs must not be omitted. The testes should be exposed and incised.

Collection of internal specimens at autopsy
The pathologist must ensure that all necessary samples are taken for toxicology and are properly preserved. He should discuss with an experienced toxicologist what specimens may be required.

Blood for toxicology should be taken from a peripheral vein. Other sites may be sampled as relevant. The site(s) of collection of blood samples must be noted.

Control samples, for example for DNA examination, should be collected and retained according to the instructions given by the responsible forensic science laboratory.

In addition, the pathologist must consider whether other types of microscopic or other laboratory examination will be necessary, and whether samples for these purposes should be taken at autopsy. In some circumstances, the pathologist will decide that tissues or organs need to be retained for later examination. In such instances, he must make appropriate arrangements, including any necessary discussion with the coroner responsible for the body.

Post-mortem histology
A histological examination should be made, by the pathologist himself/herself, of the major organs (assuming that they are not heavily decomposed) in all suspicious deaths. Histology is of value in confirming, evaluating and sometimes revising the course of natural disease processes that may have contributed to the cause of the death. Other samples should be taken for histological examination depending on the circumstances of the case, e.g. for the purposes of ageing injuries. The reasons behind any decision not to undertake a histological examination must be adequately recorded, in order that the pathologist may be in a position to defend this decision if required.

Health and safety issues
The pathologist has a role in advising on health and safety in the post-mortem room. However, it is recognised that other professionals present will be expected to follow their own guidelines and the pathologist cannot be held responsible for any breaches in adherence to those guidelines by others present. The pathologist is expected to set an example in matters of health and safety.

All those involved will be expected to take very serious account of the pathologist's directions, particularly when dealing with a recognised or potential high-risk case.

Any autopsy room used for the examination should reach accepted safety standards and hold (or at least be working towards) CPA (UK) Ltd or equivalent accreditation. A properly trained APT should be in attendance.

The Health and Safety Executive's (HSE) view is that any autopsy where 'infective disease cannot safely be excluded' should be treated as a high-risk case, and this will include a high proportion of suspected homicides. The pathologist should take careful account of local standard operating procedures.

Retention of material after autopsy
Unnecessary or ill-considered retention of material removed at autopsy has caused considerable distress to bereaved relatives, and the pathologist must consider very carefully whether such material needs to be retained and for what purpose. At present, in criminal cases, retention is referred to in Rule 9 of the Coroners Rules 1984, which states:

"A person making a post-mortem examination shall make provision, so far as possible, for the preservation of material which in his opinion bears upon the cause of death for such period as the coroner thinks fit."

The Criminal Procedure and Investigations Act 1996 states that any material obtained in the course of a criminal investigation and which may be relevant to the investigation should be retained until the end of criminal proceedings and following completion of any appeals procedure. In general terms, this may be interpreted as the release from detention of a person convicted of homicide.

Certain organs can only be fully examined if they are retained after the autopsy is otherwise completed. For example, the brain will usually be fixed in cases in which there may be some brain abnormality, such as following head injury. It should be the duty of a police representative (for example, a family liaison officer) or the coroner or his officer, to explain the reason for this to the appropriate relative.

Clear guidance on this topic has been issued by The Royal College of Pathologists.[6]

The pathologist must document what material has been retained and inform the coroner through locally determined procedures. It should also form part of his report.

Any materials retained must be kept in secure storage and under suitable conditions. Its whereabouts must be properly recorded and indexed in order to ensure easy access.

Consideration should be given to making a listed exhibit of any material from the autopsy that it is essential to retain.

7 THE PATHOLOGIST'S AUTOPSY REPORT

7.1 Standard

The pathologist will:

a) produce a formal report that will record:

   i) the information the pathologist received in advance of the autopsy

   ii) that the data justifying decisions and actions taken at the examination of the scene and the body has been retained

   iii) all investigations made either personally or by submission to a laboratory for report

   iv) conclusions and an explanation for those conclusions. Where unusual features are found but are concluded not to be relevant, the pathologist must explain why the finding has been discounted

   v) the reasoning underlying why, where findings are susceptible of alternative explanations, one explanation is favoured

   vi) the reasoning that supports conclusions, detailing all material drawn upon to support that reasoning, including reference to pertinent and current literature

   vii) all samples that have been retained by the pathologist, whether or not these have been assigned police exhibit references

b) have in place a peer review procedure, whereby another pathologist scrutinises the report to ensure that it conforms to the requirements given above. (For the time being, this report will be limited to certain categories of case, i.e. homicide, deaths in custody, infant and child deaths, and other high profile cases as required.) Where such peer review reveals significant disagreement, this must be communicated to HM Coroner and the SIO

c) produce the report as quickly as is possible with regard to the complexity of the case and within an agreed timescale, depending on the investigations and expertise required

d) make the SIO and/or Crown Prosecution Service (CPS) aware of a provisional timetable for the production of the report in complex cases, to allow them to meet the requirements of s51, Crime and Disorder Act 1998

e) consider additional information revealed by investigations after the provision of a report and, where necessary, produce a supplementary report incorporating that information and drawing further conclusions

f) ensure that the detail within any report reflects standards and minimum datasets contained in relevant and current guidance.

7.2 Code of practice

7.2.1 General comments

In general terms, the report or statement must be clearly laid out, section by section, in an easily read format. The following sequence is recommended:

- report preamble
- history (see below)
- scene examination
- external examination

- internal examination
- supplementary findings and additional investigations (histology, etc.)
- commentary and conclusions
- cause of death
- note on retention of samples, and list of samples retained.

The essence of the report of an expert witness is that it should be easily read and unambiguous. The report, and in particular the commentary or conclusions section, must be intelligible and easily understood by non-medical people, so as to render it suitable for presentation in court. It should be clearly divided into sections and, where appropriate, subsections. The language should be as straightforward and as simple as possible, whilst nevertheless retaining complete accuracy and balance and being sufficiently detailed to allow other medical experts to fully comprehend the abnormality or injury being described.

It should be remembered that decisions with serious legal implications may be based partly, or even solely, on the pathologist's report. It must be sufficiently detailed to allow these decisions to be made. In view of this, it must be written in a fair and impartial manner, having taken into account all the relevant issues of the case.

7.2.2 Report preamble

The report preamble must set out the full name, age, etc. of the deceased, together with the date, time and place of the autopsy. The pathologist's name, qualifications and appointment must be stated.

In order to properly identify all the circumstances surrounding the autopsy, the report should also include the names of:

- the coroner on whose instructions the autopsy is being performed
- the person identifying the body to the pathologist
- any senior police officers and/or medical observers present
- the names of police photographers, scenes-of-crime officers or any other persons present.

7.2.3 History

The pathologist should summarise in his report the information that he was given before the autopsy was performed, and should identify the sources of such information. The inclusion of background information, such as the deceased's duration in hospital and/or the treatment given prior to death, can be of considerable assistance to those reading the report, whether lawyers preparing a case for court or medical colleagues who may be asked to comment.

Much of this information is likely to have been provided to the pathologist during his initial briefing; it will also come from the deceased's medical history. Proper recording of this information is essential and reference should be made to section 4, 'The briefing', and paragraph 5.2.3, 'The importance of notes', above.

The inclusion of a history has been discouraged by certain coroners. The Board does not regard this as satisfactory and considers it essential that the pathologist's report be complete and able to stand alone. However, it is recognised that the history is essentially 'hearsay evidence', rather than reflecting the pathologist's own experience of the case, and the report should make quite clear the status of this information.

7.2.4 The scene of the death

The record of the scene visit must include a note of the date and time of arrival at the scene, a note of the location and a general description of the locus and the body.

A note must be made of recordings taken (e.g. environmental and body temperatures) and of any samples, etc. taken prior to removal of the body.

7.2.5 External appearance of the body

It should commence with a note of the state of the body as received in the mortuary and a description of the presence of any bloodstaining, etc. An inventory must be made of the clothing as it is removed from the body. Within this section should be a note of the height, weight and build of the individual. The presence and extent of rigor mortis should be tested for and noted if relevant. The position of hypostasis should be recorded.

Mention should be made of the hair, eyes, ears, nose, mouth, scars, tattoos, fingernails, etc., even if these are normal. Negative findings, e.g. the absence of petechiae in the eyes in suspected strangulation, are just as significant as positive ones.

7.2.6 Injuries

Injuries, no matter how trivial, must be described in detail using recognised terms, with measurements given. The position of injuries must be described with reference to appropriate anatomical landmarks and in some instances with reference to the height above the heel. The description must include the type of injury and an indication as to whether it is of recent origin. A numerical identification system may be particularly useful where reference is to be made to specific injuries in other parts of the report. It may be helpful to record the injuries on an outline body chart, as this may assist the pathologist and others in any subsequent discussion of the case.

A separate section of the report dealing specifically with injuries may prove to be the easiest way of recording these findings, including both external and internal features. It is best to describe the major injuries first and/or to group injuries according to type or anatomical location.

7.2.7 Internal examination

The internal examination must follow the recommendations in the College's *Guidelines on Autopsy Practice.*[5] For ease of reading, the report should be divided into sections, each with an appropriate subheading.

Particular attention should be given to those organs that are diseased or injured. Also included would be the presence or absence of skeletal injuries, e.g. skull fractures. Where features out of the ordinary are found and the pathologist concludes that they are not relevant, the reasons for discounting these findings must be explained.

In addition to a full description of all the major organs, their weights should be recorded. Descriptions should be objective.

7.2.8 Supplementary examinations

Included in this section would be the results (if they are available) of toxicological analyses, X-rays, neuropathology, histology and the results of any other tests or examinations that were carried out.

Where test results or any other finding is included in the report, it must be made clear (wherever the work is that of another person) who has made the finding or produced the results.

7.2.9 Commentary and conclusions

In this section, the pathologist should attempt to explain in easily understood language the cause and mechanism of death, as well as other relevant findings. This must be set out clearly and in a comprehensive manner to allow interpretation of the information by the police, coroner, Crown Prosecution Service and Counsel. The opinions expressed must be fair and unbiased and under no circumstances should be written to assist one side rather than the other. No information that may have a significant bearing on the death should be excluded, for instance in order to shorten or simplify the report. When giving opinion, the pathologist must state clearly where that opinion is based on his own work and where it relies heavily on the work, pathological findings, test results, etc. of others.

A good, well thought out commentary will be invaluable in many circumstances in allowing the Crown Prosecution Service to decide whether to proceed with a prosecution. This may have significant ramifications, e.g. in facilitating the release of a prisoner in custody or preventing a potential miscarriage of justice. There may also be financial implications if a decision is taken not to proceed with a case.

Where appropriate, comments should include details such as the amount of force likely to have been used, the type of weapon, the direction of injuries and the probable rapidity of death. In circumstances in which an assessment of the likely time of death is required, it must be given with adequate and defensible margins.

The conclusions reached following an examination should be clearly set out in the report and it would usually be appropriate to give the reasons for reaching these conclusions. It is also important to give some indication of the limits of reliability of such conclusions, and possible alternate explanations or opinions should also be given. Where features out of the ordinary are found and the pathologist concludes that they are not relevant, the reasons for discounting these findings must be explained.

From the scientific findings, the pathologist may be able to construct a picture of the sequence of events that occurred. However, the pathologist must clearly state how much of this is speculation. Should the findings suggest more than one picture of the sequence of events, then all the relevant scenarios must be stated.

7.2.10 Cause of death

This should be given in the usual manner as prescribed by the Registrar General, i.e. 1(a) .... , due to 1(b)...., II....etc. Since this system may not be familiar to lawyers and others who will read the report, it may be important to elaborate on this information, for instance in the conclusion section of the report and, if appropriate, when giving evidence in court.

If, having considered all the evidence, no cause can reasonably be found for the death, then the pathologist must record it as 'unascertained'.

7.2.11 Retention of samples

The report must clearly indicate what material has been retained and submitted for further scientific examination, e.g. blood samples, swabs, etc. If these items are exhibited, the exhibit number must be noted in the report.

It is essential to include a list of any organs, such as the brain, retained for further examination, together with a note indicating where they are stored.

If no organs are retained, a simple statement to this effect in the report is beneficial.

7.2.12 Final check

Before the report is signed and issued, the pathologist must check it for errors such as typographical and grammatical mistakes. Simple mistakes, such as the substitution of 'left' for 'right' or 'millimetres' for 'centimetres', may significantly alter the interpretation of a finding by the reader. Furthermore, a poorly presented report with multiple errors gives the impression of a lack of care or interest in the completion of the report and, by inference, in the conduct of the autopsy and in the interpretation of the findings.

7.2.13 Time of submission of the report

The report must be submitted to the coroner and a statement made to the police as soon as is practically possible. In some instances, it is appropriate to submit a preliminary report, detailing as far as possible the expected timing of pending interim and final reports. If there is to be a significant hold-up, the reasons for this should be given and explained. Normally, delays should only be those occasioned by the need for time-consuming special investigations, such as toxicology, neuropathology or cardiac pathology. Routine histology should not be a reason for significant postponement of a final report. However, it is preferable that the report should be as detailed and comprehensive a possible, even if this does cause some delay in its completion. In most instances, this will be more helpful to the user than the issue of multiple supplementary reports or statements.

7.2.14 Disclosure of information to the defence

There is a duty on the pathologist acting for the Crown to notify the police and the Crown Prosecution Service of the existence of any 'unused' material. Such material may, in certain circumstances, be disclosed to lawyers acting for the defendant in a criminal trial. As well as samples taken at autopsy, such material will include notes made during the course of the examination, reports and the first drafts of statements. If a pathologist is in doubt as to what constitutes 'unused' material, and what his duties are with respect to such material, advice must be sought from the Crown Prosecutor.

The overriding duty of the pathologist is not to mislead the Court, and to ensure that all findings are disclosed to the CPS and prosecuting Counsel.

8 CONFERENCES AND OTHER SUBSEQUENT ACTION

8.1 Standard

The pathologist will:

a) attend any conference called by the police or CPS to discuss the pathologist's report or other issues involved in the case.

b) explain clearly all findings and their interpretation in the context of the case

c) consider alternative explanations, test alternative hypotheses, draw conclusions and give advice based on the facts of the case and established scientific principles

d) state what is required before additional conclusions can be drawn and demand that those requirements are fulfilled before any additional conclusions are drawn

e) identify, clarify and summarise areas of agreement and disagreement

f) seek feedback to determine whether those involved understand the outcomes of the consultations.

The pathologist must record all relevant information and discussions accurately and comprehensively.

9 THE PATHOLOGIST AND THE DEFENCE

9.1 Standard

The pathologist will:

a) make every attempt to attend any additional autopsy made by a pathologist retained on behalf of any person charged in relation to the death (the 'defence pathologist')

b) make available to that defence pathologist, with the approval of HM Coroner, a copy of any report

c) ensure that the existence of all the material in the pathologist's possession – and any report arising from any further investigation – is, with the approval of HM Coroner, disclosed to any defence pathologist.

9.2 Code of practice

Although this code has been written primarily from the standpoint of the pathologist acting for the Crown, practitioners should also be aware of the needs of lawyers who may be called upon to defend an accused person.

Where a second autopsy is to be carried out, the Crown pathologist should share all the information that he has obtained, whether or not he has concluded that it provides an explanation for the death. The initial autopsy may have caused changes to the body that will obscure findings made during the course of that examination. It may also prevent the observation of other significant features. There is also a clear responsibility to avoid any interference with the body unless it is necessary to reach a proper understanding of the death.

In order to facilitate an autopsy examination conducted on behalf of the defence, the pathologist acting for the Crown must ensure that all specimens retained following the first autopsy have been preserved under the best possible circumstances. These specimens must be made available to the defence pathologist. If they are retained after any defence examination, possession of these exhibits must remain with the Crown pathologist unless otherwise directed by the Court or by agreement with the CPS. The pathologist acting for the Crown should be given the option to attend any examinations conducted on behalf of the defence.

If, during the second autopsy, a previously unrecognised finding is discovered by the second pathologist, this should be recorded as appropriate and discussed with the pathologist who carried out the first autopsy.

Home Office-registered forensic pathologists will themselves, on occasion, be called on to act for the defence. While the circumstances may be different, in that the pathologist will usually be examining a body on which an autopsy has already been performed, as far as possible the same high standards must be applied to any examination undertaken.

10 ATTENDANCE AT COURT

10.1 Standard

The pathologist must:

a) ensure that he is well prepared prior to attendance at court to give evidence

b) ensure that all documentation relevant to the case is brought to court

c) ensure that appearance and behaviour conform to acceptable professional standards

d) deliver evidence in an audible and understandable manner

e) give evidence consistent with the contents of the written report

f) deal with questions truthfully, impartially and flexibly

g) identify questions that are unclear and clarify these before offering a response

h) give answers to technical questions in a manner understandable by those who have no technical or scientific training

i) differentiate between facts and conclusions drawn from those facts, and ensure that any such conclusions lie within his or her field of expertise

j) consider additional information or alternative hypotheses that are presented and, where warranted, modify conclusions already drawn

k) where it appears that a lawyer has misunderstood or is misstating evidence, ensure that the court is made aware of that misunderstanding or misstatement.

10.2 Code of practice

Pathologists must ensure that they are appropriately prepared prior to attending court to give evidence. A copy of the pathologist's autopsy report, together with all contemporaneous notes, should be taken to the court. The evidence must be objective and fairly presented and attention must be drawn to any areas of speculation. Proper and objective consideration must be given to any interpretations or conclusions fairly raised by the defence, particularly if they are supported by their own expert opinion.

The role of the expert witnesses is not to provide evidence that supports the case for the Crown or for the defence. Opinions must be objectively reached and have scientific validity. Witnesses must make it clear which part of their evidence is fact and which is opinion. The evidence on which that opinion is based must also be available.

Facts may emerge during the course of an investigation, sometimes even during the course of the trial, which may make the pathologist modify a previously held opinion. The pathologist has a duty to give any new facts due consideration and ensure that his or her evidence remains objective and unbiased. If previously held conclusions can no longer be substantiated, any change of opinion must be promptly and clearly stated, irrespective of any possible embarrassment. Delay will not only potentially harm the administration of justice but will reflect adversely upon the reputation of the pathologist.

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12 MEMBERSHIP OF AUTHOR GROUPS

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than boys and girls from heterosexual families. Lack of knowledge about these children and their parents in the light of a growing number of child custody cases involving a lesbian mother prompted the first wave of studies in the 1970s. This early body of research focused on families where the child had been born into a heterosexual family and then moved with the mother into a lesbian family after the parents' separation or divorce. Regardless of the geographical or demographic characteristics of the families studied, the findings of these early investigations were strikingly consistent. Children from lesbian mother families did not show a higher rate of psychological disorder or difficulties in peer relationships than their counterparts from heterosexual homes. With respect to gender development, there was no evidence of confusion about gender identity among these children, and no difference in sex role behaviour between children in lesbian and heterosexual families for either boys or girls.[4 5]

A limitation of the early investigations was that only school age children were studied. It was argued that sleeper effects may exist such that children raised in lesbian mother families may experience difficulties in emotional wellbeing and in intimate relationships when they grow up. Further, they may be more likely than other children to themselves adopt a lesbian or gay sexual orientation in adulthood, an outcome that has been considered undesirable by courts of law. To address this question, a group of children raised in lesbian mother families in the United Kingdom was followed up to adulthood.[6 7] These young adults did not differ from their counterparts from heterosexual families in terms of quality of family relationships, psychological adjustment, or quality of peer relationships. With respect to their sexual orientation, the large majority of children from lesbian families identified as heterosexual in adulthood.

In recent years, attention has moved from the issue of child custody to whether lesbian women should have access to assisted reproduction procedures, particularly donor insemination, to enable them to have children without the involvement of a male partner. The findings from studies of these families, where the children grow up without a father right from the start, indicate that the children do not differ from their peers in two parent, heterosexual families in terms of either emotional wellbeing or gender development.[8–11] The only clear difference to emerge is that co-mothers in two parent lesbian families are more involved in parenting than are fathers from two parent homes.

A limitation of the existing body of research is that only small volunteer or convenience samples have been studied, and thus mothers whose children are experiencing difficulties may be under-represented. Nevertheless, a substantial body of evidence indicates that children raised by lesbian mothers do not differ from other children in key aspects of psychological development. On the basis of this evidence it seems that the American Academy of Pediatrics acted not out of political correctness but with the intention of protecting children who are likely to benefit from the legal recognition of their second parent. At present in the United Kingdom, lesbian women are individually eligible to adopt children, whether living with a partner or not. However, members of parliament have recently voted to allow unmarried couples, whatever their sexual orientation, to adopt children jointly.

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Forensic pathology services

Quality must be guaranteed

Forensic pathology services are an essential part of systems of investigating deaths worldwide. In England and Wales these forensic services, the entire death investigation system, and the coroner service are currently under review. Forensic pathology in Britain has had chronic problems as an orphan specialty excluded from the NHS at its inception and now largely ejected from the universities. Today the 35 or so pathologists accredited by the Home Office are contracted to police forces to support the investigation of suspicious deaths and homicides. About half are in full time private practice. They also provide autopsy services to local coroners, but most of the 120 000 coroner's autopsies performed annually are carried out by NHS pathologists as an approved form of private practice.[1]

The chronic problems of the forensic pathology service have now precipitated a review by the home

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office. There has also been a recent flurry of scandals. The conviction of the serial killer Dr Harold Shipman, the furore over the retention of organs at autopsy, and the inquiry into the cutting off of the hands of victims in the Marchioness disaster[2] all exposed failings in the death investigation system. Australia is facing similar problems,[3] and there has already been a review of the coroner service in the Republic of Ireland.

The Alder Hey organ retention scandal showed that monitoring physicians' performance is necessary to ensure good practice. In clinical pathology the setting of standards and peer review through external quality control is normal practice, but this is not the case with much of forensic pathology. There is little hard data on the quality of medicolegal autopsies in England and Wales because there is no system of audit. The confidential inquiries into maternal deaths and into perioperative deaths have identified some deficiencies,[4] but these audits involve a select and small percentage of the coroner's total caseload. There are some general indicators to suggest that quality may be poor. Coroner's autopsies are done in mortuaries, in which there is recognised underinvestment.[5] These facilities rarely have *x* ray or fluoroscopic equipment, stereomicroscopes, alternative light sources, or other modern equipment. Guidelines from the Royal College of Pathologists allow mortuary technicians to dissect bodies and remove organs in the absence of the pathologist.[6] Linked to this practice is the large number of autopsies performed in a very short time by some pathologists. For a whole time pathologist the recommended workload for medicolegal autopsies ranges from 300 to 600 a year, depending on the proportion of suspicious and other challenging cases. Caseloads of pathologists that exceed these figures inevitably raise the question of how quality is maintained and assured. The current system of "fee per item of service" in the absence of enforced standards is an invitation to bad practice. Coroners should not allocate excessive numbers of autopsies to individual pathologists, and the total caseloads of pathologists should be monitored.

There are international guidelines and standards specifically for medicolegal autopsies,[7,8] and the Home Office issues guidelines on autopsies of suspicious deaths to its accredited pathologists. By contrast the autopsy guidelines of the Royal College of Pathologists encompass both hospital and medicolegal autopsies, to the detriment of the latter, and the statutory format for a coroner's autopsy report is woefully inadequate.[9] After appropriate standards have been set there will still be problems in auditing medicolegal autopsies. The autopsy is destructive, the body is disposed of, and the pathologist creates the only record. Requiring that pathologists follow a protocol, and include detailed negative findings in the report to show that they have done so, is an approach applied in Austria and Germany since the 19th century. In Finland a computerised database enables comparison of individual pathologists' practice using these reports.

Pathologists who work for the Home Office might be expected to do better than those who work for the NHS, but there are problems here also. Their work is subject to only limited audit by the Home Office. There is also a natural reluctance to question their competence in an individual case. They are, after all, qualified, accredited by the Home Office, experienced, and well tested in the courts. Apprehensions about the impact of an allegation of incompetence on previous criminal convictions and public confidence in the criminal justice system may influence the approach of the police and the legal authorities. This is claimed to have been the case with respect to a senior South Australian forensic pathologist.[10] Pathologists who work for the Home Office can and do make serious errors. The Criminal Cases Review Commission for England and Wales is uncovering errors by pathologists. A recent trial of a dentist and an anaesthetist for the manslaughter of a 5 year old due to gross negligence folded when the pathologist admitted making a diagnostic mistake.[11] Pressure groups such as Miscarriages of Justice Organisation, Innocent, and Inquest have asked that the existing lack of quality assurance in forensic pathology be addressed. At present the Home Office has no effective mechanism to withdraw the accreditation of allegedly incompetent forensic pathologists, as the collapse of its first disciplinary hearing illustrates.[12]

Currently in England and Wales there is no clear organisational responsibility for the oversight of forensic pathology services to coroners and the police. The Home Office review of forensic pathology services is considering their management by an executive agency. This would place management within a government department but at arm's length and operating as a business. If implemented, this would be a welcome first step. The creation of a National Board of Forensic Medicine in Sweden in 1991 had a noteworthy impact in establishing uniform standards throughout the country. A new forensic medicine agency for England and Wales could achieve the same, but will first need to address the accumulated problems of half a century of neglect.

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The Royal College of Pathologists

Guidelines on autopsy practice

Report of a working group of
The Royal College of Pathologists

September 2002

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This document was placed for consultation on the Fellows and Members Area of The Royal College of Pathologists website from 10–30 April 2002. 27 replies were received. These were forwarded to the Working Party who found them very useful in preparing this final draft of their report, although inevitably some contentious issues remain.

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3 There is wide variation in autopsy performance and reporting practices, related to inconsistent operation of the Coronial system across England and Wales, and lack of clarity in the law on human tissues. As there is an ongoing consultation over these important issues, it is not possible rapidly to move to a set of universally agreed 'best practices'. In these Guidelines, the distinction is made between 'best practice' (i.e. may do) and 'acceptable practice' (must do). Autopsy standards should continue to rise by example.

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5 Sub-specialisation in diagnostic histopathology and cytopathology is proceeding, and raising the standards of reporting in line with the demands of clinicians and the public. The same trend should continue in autopsy practice (it already exists for paediatric and forensic practice, and to some extent in neuropathology). Increased audit and input into clinical governance from autopsy data will require a more focused approach from pathologists. Pathologists will need to recognise their limitations in expertise and be more prepared to seek assistance in difficult and unusual cases.

6 Autopsies on patients with significant communicable (infectious) diseases cause many problems in mortuaries, and performance practice is highly variable over the UK. These Guidelines provide a rational approach to infectious cases with protocols for risk assessment and reduction.

7 The job plans, working practices and status of Anatomical Pathology Technicians (APTs), who are vital contributors to the autopsy service, need review and regulation. These are not addressed in detail in these Guidelines, but APTs must be brought into a regulating body as a profession allied to medicine.

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1 REMIT

1.1 In 1998, The Royal College of Pathologists commissioned a Code of Practice for autopsies in the UK. The original scope was:

- legal and ethical aspects
- standards for health and safety
- autopsy reports
- autopsy and audit
- the role of Anatomical Pathology Technicians (APTs)
- aspects of medico-legal autopsies.

1.2 It is evident that the adult autopsy has not received the same attention within the College as has surgical pathology and cytopathology in the last two decades, and that there are strains in the relationship between the medico-legal system, hospitals and pathologists.

1.3 The following Guidelines draw on previous work by The Royal College of Pathologists and other organisations in the UK and abroad. The College's organ retention guidelines were published in March 2000 and are being revised; this aspect is not addressed in detail in these Guidelines.

1.4 Training in autopsy pathology is becoming more problematic as the number of consented autopsies continues to decline. This is not addressed in detail in these Guidelines; another College committee is considering the issue.

1.5 Recently, attention is being paid to 'minimally invasive autopsies', which include:

- post-mortem magnetic resonance imaging (MRI) as replacement for autopsies
- percutaneous needle biopsies of specific organs after death
- laparoscopic investigations post-mortem with tissue sampling
- 'mini-autopsies' where extensive organ sampling or organ removal can be performed through a limited incision (e.g. 15 cm long in the upper abdomen).

1.6 Apart from the MRI analyses, the intentions are to increase the number of consents for examinations, albeit limited, by causing less distress to the next of kin compared to the standard autopsy. The College welcomes proper studies of these proposed procedures, with formal validation. Where such a minimally invasive procedure would be sufficient to answer a specific question posed by clinicians after a death in hospital, such alternatives should be considered by the pathologist when advising clinicians who are seeking consent for autopsy.

1.7 A later edition of these Guidelines will include sets of minimum recommended histology samples for standard clinicopathological conditions. Furthermore, recommended non-histology sample sets needed for diagnosis in certain cases will be outlined (i.e. samples for toxicology, microbiology, serology, haematology and clinical biochemistry).

1.8 Remuneration aspects of the medico-legal autopsy are not included in these Guidelines. Such considerations will figure in the Home Office Review of Coroner Services and debate over the new consultant contract.

2 THE IMPORTANCE OF THE AUTOPSY AND OVERVIEW OF THESE GUIDELINES

2.1 Our understanding of disease and developments in medical practice over the last 150 years has depended crucially on autopsy findings. In the UK, the rates of consented autopsy of adults have declined markedly over 30 years, whilst the number of medico-legal autopsies is roughly constant. In England and Wales each year, about 130 000 autopsies are performed. The great majority of these are on adults and, of those, more than 90% are authorised by a Coroner. Most of the fetal, perinatal and paediatric autopsies are consented autopsies and increasingly are performed by specialist histopathologists.

2.2 As The Royal College of Pathologists of Australasia states: "The autopsy is an investigation which, amongst other things, has major public and private therapeutic consequences. This concept can get lost in the reduction of the autopsy to the limited purpose of finding the cause of death and filing the report. An autopsy is a significant event, and the community has a right to expect that systems are developed, with community input and understanding, to ensure that the substantial potential benefits are being realised and that it is not meeting only narrowly defined needs".

2.3 The autopsy is a professional activity that requires extensive knowledge and technical ability in order to identify and interpret important findings within a wide range of clinical contexts. The central role of the medico-legal autopsy in the investigation of death necessitates the highest possible standards of practice. Similarly, the clinical autopsy represents one of the few occasions when clinicians elect to submit their management of patients to detailed assessment by other doctors. Many studies published have shown significant discrepancies between ante-mortem and post-mortem diagnoses – a situation that has not essentially changed in a century.

2.4 Pathology has been at the forefront of the introduction of quality control into medicine and it is time for formal quality control in autopsy practice. Although the basic technique of the autopsy has not changed, it still has a vital role in 21st century medicine as a means of studying new disease entities, evaluating new therapies and providing information to families of the deceased. The strengthening of clinical governance and audit has, in principle, enhanced the status of the autopsy. The confirmation of a 'known' clinical diagnosis is no less important than the demonstration of discrepancy between ante-mortem and post-mortem diagnosis; both are essential to confidence in clinical diagnosis and the accuracy of investigations performed in life.

2.5 The teaching of medical undergraduates and postgraduates through the autopsy still has an unrivalled impact and immediacy.

2.6 It is important that the autopsies that are undertaken now are performed to high standards and that there is consensus among pathologists, their employers and the public over what those standards comprise. The comprehensive reviews of pathology practice extend also to the autopsy: there is need for review and a formal set of guidelines on autopsy practice.

2.7 Practice guidelines represent recommendations that identify a range of voluntary strategies for the management of a specific problem and that also allow for practice variations due to individual circumstances. Standards differ from guidelines in that practice variation is not expected. Variation in autopsy practice is to be expected as each autopsy involves the incorporation of substantial patient-specific information, and the product is the answer to patient-specific questions about that death. Thus, practice guidelines rather than standards are desirable. However, The Royal College of Pathologists holds that in certain aspects – for example, autopsy reports – there are certain minimum standards (minimum datasets) that should be followed.

3 CONSENT ISSUES

3.1 Since the organ retention issue became public, most hospitals have redrafted their autopsy consent forms and refined the consent procedures to make them more informed. A model consent format was issued with The Royal College of Pathologists' March 2000 organ retention guidelines. NHS national-use consent forms relating to consented and Coronial autopsies on children and adults have been 'piloted' and the results are now under discussion.

3.2 Obtaining consent for the autopsy, and conveying information on the issues related to the autopsy, must be in the context of a properly resourced hospital-based multidisciplinary bereavement service, tailored to the local circumstances.

3.3 This service should be available to families involved with Coroners' autopsies as well as to consented autopsies although, where an independent autopsy and/or inquest may be required, the Coroner should take the lead in liaising with the family.

3.4 The pathologist should be a core member of the bereavement service to ensure that:

- all staff are aware of the ethical and legal framework within which they work when dealing with the deceased and their next of kin. This includes the duty of doctors to notify the Coroner of certain categories of death
- the content of relevant information leaflets is complete and accurate
- the pathologist is available, if required, to meet with families to discuss issues surrounding consent, the autopsy and its results and consequences
- the induction and education of health professionals involved in the service is assured
- the bereavement service is audited.

3.5 A guiding principle should be that 'the family comes first' as the autopsy has the potential to play an important role in bereavement counselling. When the family's needs are met, wider issues such as the donation of organs and tissue for later education and research can be raised (and may be raised by the family first).

3.6 The family should be aware that the autopsy itself is often only the first step in the investigation of a death. They need to know that further investigations and clinicopathological correlation are often required before they can expect to have a full discussion with the deceased's clinicians. Feedback to the family must be presented as an option if they wish it. The realistic timeframe within which this is expected to happen should be made clear. The family should be informed that tissue slides and blocks from the autopsy will be archived in departmental files.

3.7 Before commencing a consented hospital autopsy, the pathologist must be satisfied that a form setting out the wishes of the relatives of the deceased has been completed, and he or she must abide by those wishes. If it appears to the pathologist that those wishes are incompatible with addressing the questions that the autopsy seeks to answer, he or she should point this out to the health professional who obtained the consent and seek clarification, or consider contacting the relatives directly. If it is not possible to provide the information required within the parameters of the consent, the pathologist should decline to perform the autopsy.

3.8 Where it appears to the pathologist, whether from the clinical history or from additional findings at autopsy, that the death should be reported to the Coroner or Procurator Fiscal, the pathologist should ensure that this is done, to permit the Coroner the opportunity to assume jurisdiction.

3.9 Where the Coroner (or Procurator Fiscal) requests the pathologist to carry out a post-mortem examination and it appears to the pathologist from the information available to him or her (but not necessarily to the Coroner) that, in fact, the death does not fall within the Coroner's jurisdiction, then the pathologist must discuss that case further with the Coroner, and he or she may decline the request to perform a post-mortem examination, pointing out that a consented post-mortem examination would be more appropriate.

3.10 Where it appears to the pathologist that an autopsy will add nothing of significance to the Coroner's inquiry, other than to obtrude on a family's grief, then the pathologist should discuss the case with the Coroner. He or she should decline to perform the autopsy unless the family is content for the autopsy to continue.

3.11 **Photography**

In medicine and pathology, there are three main purposes to photography:

- for treatment (e.g. monitoring leg ulcers)
- for medical education, teaching, documentation at autopsy, etc.
- for public domain usage, including publication.

Anonymity of images or appropriate consent is critical; this is important given the emphasis laid on distribution of images from autopsies for purposes of external quality assurance (EQA) and education.

The General Medical Council (GMC) has recently produced guidance regarding all types of recordings of patients, carried out for any purpose. The relevant sections are reproduced hereon:

> "'Recording' means originals or copies of video and audio recordings, photographs and other visual images of patients. A 'recording' does not include pathology slides containing human tissue (as opposed to the image of such a slide), or CCTV recordings of public areas in hospitals.
>
> "Part 2: Recordings for which permission is not required
>
> Paragraph 5. You do not need to seek separate permission to make the recordings listed below. Nor do you need consent to use them for any purpose, provided that, before use, the recordings are effectively anonymised by the removal of any identifying marks...
>
> - images taken from pathology slides...
> - images of internal organs...
>
> "Paragraph 6. Such recordings are unlikely to raise issues about autonomy and will not identify the patient. It may nonetheless be appropriate to explain to the patient, as part of the process of obtaining consent to the treatment or assessment procedure, that a recording will be made.
>
> "Part 3: Recordings for which permission is required
>
> Paragraph 8. When conducting a hospital post-mortem examination, you must seek permission from a close relative or carer before making any recording from which the deceased may be identifiable. If the death is the subject of a medico-legal investigation, the proposed recording should be discussed with the Coroner or Procurator Fiscal (in Scotland) who has authorised the investigation.

"Paragraph 24. You must not make recordings for use in publicly-accessible media without written permission, whether or not you consider the patients to be identifiable. 'Publicly-accessible' media includes medical journals. The only exceptions to this are outlined in Part 2 above."

4 MEDICO-LEGAL ASPECTS AND AUTHORISATION

4.1 General Coronial issues

4.1.1 The Guidelines address these issues in the particular context of the Coronial system of England and Wales. While much of this section will apply to Scottish practice, there is no specific effort to examine or to comment on the Procurator Fiscal system.

4.1.2 In the year 2000, 124 500 autopsies were performed in England and Wales after authorisation by a Coroner. Some 37% of all deaths (a rising proportion) were reported to a Coroner, and of these, 62% (a falling proportion) resulted in an autopsy.

4.1.3 Between 1995 and 1998, The Royal College of Pathologists, the Department of Health for England and Wales, the Coroners' Society and the Home Office consulted on aspects of the Coronial system that pertained to autopsies. The draft document has been reviewed and informs these Guidelines.

4.1.4 The autopsy in the current Coronial system is performed primarily to identify unnatural and violent death, and the pathologist has a crucial role in assisting the Coroner in determining the need for inquest and the formulation of cause of death.

4.1.5 The interaction of the Coronial system with hospital deaths, for example determining what categories of hospital deaths are 'unnatural' and require inquest, is both complex and subject to large variations across England and Wales. Clinical governance is an emerging factor in this equation, which must be explored thoroughly in the forthcoming Home Office Review of Coroner Services. The autopsy is frequently a crucial component in the investigation of such deaths and the pathologist must perform the autopsy to the highest standard and be aware of both the importance and limitations of his role.

4.2 The pathologists who perform Coronial autopsies

4.2.1 All Coronial autopsies should be performed by, or be under the supervision of, histopathologists on the GMC specialist register. Trainees (GMC-registered) need to have exposure to Coronial autopsies: they should be able to do them under the supervision of a trained histopathologist, with the Coroner's agreement. The supervising pathologist is responsible for the conclusions drawn from the autopsy.

4.2.2 Pathologists trained abroad who have not taken the MRCPath examination, or whose eligibility for specialist registration has not been considered by The Royal College of Pathologists, must have their competence in autopsy practice considered carefully by the Appointments Committee for any post that includes Coronial autopsies as part of the job description.

4.2.3 Pathologists should hold contracts with the hospitals in which they perform autopsies via the Coroner, to satisfy health and safety requirements.

4.2.4 When a new pathologist is authorised to perform Coronial autopsies, there must be an up-to-date CV on the Coroner's (and Procurator Fiscal's) files. The College will also have a list of pathologists with Certificates of Completion of Specialist Training (CCST); this may become particularly relevant if future generations of trained pathologists opt not to be examined in and perform autopsies. Ideally, those involved in medico-legal autopsy work would have a further qualification in forensic pathology.

4.2.5 Histopathologists performing Coronial autopsies should have formal links or contracts (honorary or otherwise) with institutions such as hospitals or medical schools, in order to ensure that histopathological and other laboratory facilities are available, so that a case may be investigated fully. Such laboratories should be accredited, preferably by Clinical Pathology Accreditation (UK) Ltd (CPA) or another organisation accrediting to similar standards.

4.2.6 Certain categories of autopsy should be performed by histopathologists with training and expertise in specialised areas. If necessary, such expertise should be called in for a second opinion. The pathologist must recognise the limitations of his expertise and, if a case goes beyond those limitations, must seek the assistance of an appropriate accredited or experienced specialist. The pathologist must point out to the Coroner where the autopsy examination requires special skills and should decline to perform any autopsy for which he or she does not possess those skills (see Section 10, Specialised autopsies).

4.3 An 'approved list' of pathologists for different categories of autopsy

Coroners have the right to choose any registered medical practitioner they want to perform a particular autopsy. The Royal College of Pathologists believes that Coroners must use histopathologists with adequate training and experience in autopsy work and be encouraged to call upon particular specialists for particular types of autopsy. The Coroner's usual pathologists can advise on the right specialist where appropriate. The College should consider the development of a list of specialist pathologists and making this available to Coroners.

4.4 Where Coroners' autopsies are performed

4.4.1 For in-hospital deaths of adults, the autopsy should usually be carried out in the same hospital mortuary to facilitate communication between pathologists and the clinicians who looked after the patient in life. The clinical team should be informed by the Coroner beforehand of the time and place of the autopsy, so they have the option to attend. For logistic reasons, perinatal and paediatric autopsies are frequently referred to a regional specialist centre.

4.4.2 Where it is thought desirable that the pathologist performing the autopsy should not be a Trust colleague of the clinicians involved (Coroners Rules 1984, rule 6), i.e. there may be a conflict of interest, a choice is to be made: an 'outside, independent' pathologist possessing appropriate skills may come to the hospital or the body may be transported to another appropriately equipped mortuary for autopsy by the appropriately skilled 'independent' pathologist.

4.4.3 Whatever arrangements are made, it is important that good communication occurs between the clinician and the pathologist both before the autopsy, ensuring that the pathologist is fully informed of the clinical problem, and after the autopsy, ensuring that the clinician is fully informed of the pathologist's findings and has an opportunity to discuss them with the pathologist. It is recognised that discussion of the autopsy findings is subject to consent of the Coroner – recent advice to Coroners, and case law, favour such discussion (see Section 5, Audit: the autopsy in clinical practice).

4.4.4 Where the pathologist is aware of circumstances about the death that raise the possibility that an interested party in the death might wish to be present, the pathologist should not perform the autopsy without the assurance from the Coroner that the parties have been given the opportunity to be represented at the autopsy and have declined.

4.5 Facilities available for performing Coronial autopsies, including ancillary investigations

4.5.1 It is recognised that antiquated mortuaries which do not meet modern design and safety standards make it difficult for safe and high quality autopsies to be performed.

4.5.2 Coroners' autopsies should not be carried out where appropriate facilities are not available.

4.5.3 All autopsies should be performed in modern, well-designed facilities meeting current health and safety standards.

4.5.4 Mortuaries must be adequately equipped with basic facilities for measurement, dissection and weighing. Additional appropriate equipment must be available for some specialised autopsies.

4.5.5 Facilities should be available for taking and storing specimens for microbiology, toxicology and chemistry, as well as histology samples.

4.5.6 CPA (UK) Ltd should continue to develop standardised criteria for mortuary accreditation, including public mortuaries.

4.5.7 Coroners are encouraged to use accredited mortuaries. Pathologists must bring to the attention of the Coroner any defect in mortuary premises which prevents safe performance of a high quality autopsy.

4.6 The standard of Coronial autopsy performance and reports

4.6.1 The standard of the autopsy should be the same as if it were a consented autopsy, in that it must satisfactorily address the clinicopathological problem presented by the death. Necessarily, the level of detail will differ between a straightforward, sudden death from heart disease and a death following complex medical and surgical procedures with intensive care effects.

4.6.2 Limitations may be placed by the authorising Coroner in terms of the extent of organ examination, e.g. some religious groups wish the minimum disturbance of the body, subject to obtaining an accurate cause of death. These must be observed, but if more extensive examination is deemed necessary by the pathologist, he or she should inform the Coroner of such and recommend further process. If the pathologist feels that those limitations will not permit proper pathological investigation, he or she should decline the request to perform the autopsy.

4.6.3 The depth of analysis, including the use of histology (see Section 9, Autopsy histology), needs to be agreed formally between the Coroner and pathologist. The degree of reliance upon gross findings only to determine the cause of death must be appropriate to the case. Where the cause of death cannot be given without full histopathological sampling, this must be done after informing the Coroner and, through him or her, the relatives. If organs need to be retained for diagnosis, this will be agreed with the Coroner, who informs the next of kin. If additional organ retention for teaching or research is desired, the next of kin needs to be consulted for consent, the Coroner also consenting whilst he or she is in possession of the body. Subsequent disposal of organs needs to be agreed with the next of kin and the Coroner (see The Royal College of Pathologists' guidelines on organ retention).

4.6.4 Coroners' autopsies should be reported to the same high standards recommended in the College's existing guidelines, and those now described in these Guidelines (see Section 8, Autopsy examinations and reports). The provision of a quality service to the Coroner includes audit of that service.

4.6.5 The present short *pro forma* used by many Coroners is too restrictive if it is rigidly adhered to but, with current information technology (IT) and word processing, it is capable of expansion to give a more satisfactory report consistent with the College recommendations.

4.7 The distribution of Coronial autopsy reports

The pathologist's report to the Coroner is the property of the Coroner but, as best practice, should be received by the consultant responsible for hospital care, the patient's general practitioner and other doctors and parties with a legitimate interest – i.e. fulfilling clinical governance requirements. Ideally, the information should be fed back to the next of kin. There may be particular reasons, such as an inquest or possible criminal proceedings, why a

particular report should be kept confidential, but such cases should be the exceptions rather than the rule. These practices need to be agreed with the Coroner beforehand.

4.8 Unsatisfactory Coronial autopsies

There is widespread dissatisfaction with the present medico-legal system and its operation under the existing Coroners Act and Coroners Rules. In particular, the increasing prominence of clinical governance in hospital practice runs contrary to many of the practices demanded by Coroners. Some of the practical factors that lead to less than satisfactory autopsies include the following points.

4.8.1 Lack of adequate information before autopsy. The Coroner has no power to order the production of medical records for the pathologist but, in practice, when a medico-legal autopsy is performed in the hospital of the patient, the records are available. Hospital IT networks include increasing ranges and types of medical record databases. Access to these can be important in providing information that was not available to the Coroner's officers authorising autopsies.

4.8.2 Formal arrangements between Coroners and Trusts concerning medical records should be made. Practices such as the removal of bodies from hospital to public mortuaries without the accompanying clinical notes may lead to pathologists being inadequately informed of important information. Similarly, deaths in the community may be followed by autopsies where relevant information (from general practitioners and hospitals) has not reached the pathologist. Minimum information sources available to the pathologist must include the name and contact number of the relevant hospital doctor (consultant and junior), the general practitioner if known, and of the next of kin if known. Pathologists should consider contacting the next of kin, via the Coroner's officer, to ascertain important facts if queries arise at the time of autopsy.

4.8.3 There should be a minimum dataset of information presented for deaths in the community, in addition to the usual identifiers and place of death. These include:

- the precise circumstances of the death
- the medical history and prescribed medications
- recent hospital admissions with details of location and lead clinician
- known or suspected use of alcohol or other recreational drugs
- occupation
- phone number of the patient's general practitioner.

4.8.4 Performing too many autopsies within a time period available, resulting in insufficient attention to problematic cases. These include hospital cases such as post-operative and intensive care deaths, where careful inspection of records, dialogue with clinicians, post-mortem histology and the results of pre-mortem investigations and biopsies may all be relevant. These Guidelines cannot specify the proper number of cases per working session, because it depends so much on case mix and on the degree of assistance available from APTs and from trainees (if available). However, review of data on workloads is increasingly part of regular appraisals of medical staff, and autopsy reports are used for internal audits. Heads of services and departments, and consultant colleagues, will be making judgements on whether individual pathologists are performing autopsies in such a manner that the resulting information is unsatisfactory.

4.8.5 Lack of audit. Where pathologists' reports are unlikely to come under a peer review, there may be a tendency for standards to fall. Both Coroners and Health Service statistics need high quality, adequately audited autopsies.

4.8.6 Attitudes of pathologists, Coroners and Coroners' officers. Pressure to provide a rapid and plausible natural cause of death may lead to inadequate investigation of cases which may be more complex than appears at first sight. The greater time and expense involved in the proper investigation of such cases, particularly with histology, may not be of value to the Coroners but is needed by the Health Service, the public interest and, importantly, bereaved

families. Clinicians and other interested parties who receive inadequate reports from autopsy examination lose faith in its value. Such deficiencies have been commented on in reports from The National Confidential Enquiry into Perioperative Deaths (NCEPOD), Confidential Enquiry into Stillbirths and Deaths in Infancy (CESDI), the Confidential Enquiries into Maternal Deaths and the National Sentinel Clinical Audit on Epilepsy-related Death.

4.8.7 Freelance pathologists working independently without attachment to NHS or university departments are working for Coroners in some areas. This is acceptable if the processes of continuing professional development (CPD) and regular appraisal are in place and the mortuary facilities are subject to CPA (UK) Ltd inspection.

5 AUDIT: THE AUTOPSY IN CLINICAL PRACTICE

5.1 The introduction nationally of clinical governance potentially boosts the significant role for the autopsy in hospital and general practice. However, much has changed in the decade since the 1991 joint working party report on the autopsy and audit. The proposed sampling at autopsy of 10% of general hospital deaths where there was no specific clinical demand, for example, is now inconceivable; apart from the continued decline in numbers of consented autopsies, the Human Rights Act 1998 would prevent such action.

5.2 One area of autopsy practice of great significance for hospitals is perioperative death. Only 31% of perioperative deaths reported to NCEPOD in 1999/2000 had an autopsy, and 84% of those were medico-legal. Major discrepancy from the pre-mortem clinical diagnosis was found in 23% of cases. Histology was done in less than one third of cases, probably because of actual or perceived restrictions under Coroners Rule 9 (on the retention of tissue). Absent or uninformative clinical history was a feature of one fifth of the autopsy reports, and less than half the reports included an adequate clinicopathological correlation. The recommendations within the latest NCEPOD publication (2001) to improve the quality and usefulness of perioperative death autopsies are congruent with the Guidelines presented here.

5.3 Another area of concern is maternal death. The latest confidential enquiry (2001) documents an unacceptable number of autopsy reports as 'deficient' or 'appalling' in quality, particularly in London. The most likely reason adduced is that such autopsies are often performed as medico-legal cases, in public mortuaries, by pathologists without experience or interest in maternal death, without liaison with clinicians and with the main intention of excluding forensic causes of death. Again, many autopsy reports from epilepsy-related deaths have been described as inadequate by the National Sentinel Clinical Audit.

5.4 The Royal College of Pathologists affirms that the autopsy provides valuable audit insights into the nature and clinical management of disease, which clinical colleagues, hospitals, general practices and other health institutions should seek whenever possible. Consistent performance and documentation of a high quality autopsy are pre-requisites for quality clinical governance pertaining to mortality.

5.5 Recommendations

5.5.1 Autopsy request forms must provide an adequate clinical summary, identify specific clinical problems, identify known or suspected infection risks and provide a telephone number of a clinician who knows the case. Where there is not clarity, prior discussion between clinician and pathologist will elicit the clinical questions being addressed and enable appropriate informed consent to be sought from relatives.

5.5.2 Autopsy request forms should be accompanied by the case notes, and by the diagnostic images where possible.

5.5.3 All autopsies should be carried out with thoroughness appropriate to the case and the clinical questions raised, and reported to a similar standard, be they hospital consent or required by law, done in a hospital mortuary (ideally CPA-accredited) or a public mortuary. The pathologist should have the appropriate specialist expertise or, at least, the ability to document and preserve the information that a specialist would require to give an opinion on the case.

5.5.4 All autopsies required by law, whether in hospital mortuaries or public mortuaries, should be performed in a manner which allows reports to be written at least to the minimum standards set down in these Guidelines.

5.5.5 Coronial autopsies on patients who die in hospital should, if possible, be performed in the hospital mortuary to enable closer communication with clinicians (see Section 4.4, Where Coroners' autopsies are performed).

5.5.6 Discussions with the Coroner on the issues of clinical governance are required. Current advice to Coroners, legislation and case law favour advance disclosure of autopsy findings to interested parties. Coroners should be encouraged to agree to the use of their autopsy reports in clinical audits.

5.5.7 All autopsies should be performed by consultants or trainees under consultant supervision. Trainees with insufficient autopsy experience must not be left unsupported to perform difficult cases.

5.5.8 One or more members of the clinical team should attend the autopsy or at least a demonstration of the major findings. If clinical work prevents this, a telephone conversation should be held the same day to discuss the results.

5.5.9 If the case involves a perioperative or peri-intervention death, it is often advantageous to have the operator (surgeon, interventional radiologist, cardiologist, etc.) assist in the autopsy dissection. Clarification and documentation of the often complex procedures and morbid anatomical results is more important than any potential conflict of interest if an adverse clinical event is thereby recognised.

5.5.10 If evidence of an adverse clinical event is identified during the autopsy (e.g. intravenous lines misplaced and causing significant haemorrhage, a perforated viscus) and is considered to be a significant factor in the death, the relevant clinician (if not already present) should be invited to come to the post-mortem room to witness and discuss the findings. Description and imaging should be accurate and complete. In such an event, the Coroner or Procurator Fiscal should be informed if the investigation of death is not already under that jurisdiction.

5.5.11 Means of recording autopsy gross and microscopic images – by digital camera, video and transparency film – should be encouraged for greater dissemination of clinical information, subject to appropriate consent (see Section 3.11, Photography).

5.5.12 An interim report of the gross findings and provisional conclusions or, if possible, the final report should be sent to the consultant in charge within five working days. In Coronial cases, the permission of the Coroner to disseminate such reports to clinicians must be established.

5.5.13 Diagnostic or confirmatory histopathology should be done in all cases, subject to the requirements of the Human Tissue Act 1961 and the instructions of the Coroner (see Section 9, Autopsy histology).

5.5.14 The final complete report requires a minimum set of information (see Section 8, Autopsy examinations and reports). It should be issued within one week of the date when the results of all further investigations have been received. A record must be kept of all the parties to whom the report is sent; in Coronial cases, such distribution must have the agreement of the Coroner.

5.5.15 In time, the autopsy report should be part of the hospital pathology IT record, available for inspection on hospital IT monitors by the same medical constituency permitted to view

surgical biopsy reports. It should incorporate SNOMED or similar coding of diagnoses if the hospital system is appropriately set up. The relevant Coroners must be consulted on IT archiving of autopsy reports and agree to the process.

5.5.16 There should be regular mortality meetings within clinical directorates that include the active participation of pathologists where autopsies have been performed. These meetings, and the cases discussed, should be minuted and the records retained for audit checks. The medical directors of hospitals should encourage mortality meetings through clinical governance. Discrepancies between clinical and autopsy diagnoses should be discussed openly at such meetings.

6 HEALTH AND SAFETY – INFECTIONS

6.1 Infection risks are common in the mortuary and autopsy suite. Health care workers rightly expect protection from hazardous infections in their working practice, but complete elimination of the risk of acquiring a significant infection at work is not possible. The aim is to reduce the risk as far as feasible within the resources available whilst maintaining a service to patients, clinicians and medical institutions. If a significant infection risk is encountered, there are protocols for prophylaxis, treatment and counselling available. The emphasis here is on risk assessment, establishment of protocols for dealing with all anticipated circumstances, and raising the level of universal precautions. The forthcoming revised document from the Health Services Advisory Committee (HSAC), *Safe working and the prevention of infection in the mortuary and post-mortem room*, has been consulted in draft form for these Guidelines.

6.2 The issues addressed in these Guidelines include:

- the classification and stratification of the hazardous infections that may be encountered
- the development of standard protocols to minimise the risk of infection from all cadavers
- the assessment of risk on a case-by-case basis, including the issue of pre-autopsy testing for infections
- the development of protocols to deal with the more commonly encountered hazardous infections, and with rare but dangerous infections
- the unresolved question of whether pathologists in all properly resourced mortuaries – hospital and public – should perform infectious autopsies (particularly Hazard Group 3) or whether specialist centres should be established regionally to deal with them.

6.3 There are other, non-infectious, risks to health care workers in the mortuary. These include electrical safety, radiological hazards, manual handing and chemical substances hazardous to health. These are regulated in standard hospital and national protocols (e.g. COSHH), and are not considered in these guidelines.

6.4 Acquisition of infection

Infections in the mortuary can be acquired by these five routes:

- percutaneous inoculation
- inhalation
- ingestion
- skin contamination without inoculation
- contamination of mucosal surfaces (eye, mouth, nose).

The main practical concerns are blood-borne viruses and inhaled virulent pathogens such as M. tuberculosis.

6.5 Classification of pathogens

The Advisory Committee on Dangerous Pathogens (ACDP) categorised infectious agents into four Hazard Group (HG) categories, according to:

- their virulence as infections
- their transmissibility and ability to cause epidemics
- their preventability (e.g. by vaccine or prophylactic chemotherapy)
- their treatability.

For mortuary workers, the significant groups are HG#3 and 4, and the interpretation of pathologists' and APTs' responsibilities, accountabilities and protocols for safe practice have caused many problems for hospitals, mortuaries, staff and Coroners. HG#2 infections are more common in clinical practice and have also raised concerns in autopsy practice.

6.6 Hazard Group 2 infections

6.6.1 The agents include antibiotic-resistant organisms such as methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE), food poisoning, Salmonella spp and other enteric pathogens, and Leptospira spp. The most likely route of transmission of these biological agents in the post-mortem room is by hand to mouth. Good hygiene procedures, including proper hand washing, should prevent their transmission. Inoculation of staphylococci, meningococci and streptococci is also possible, but reduced to a minimum by standard modern universal precautions.

6.6.2 Regarding autopsies on patients with meningococcal infection, with the low risk of inhaled infection during the procedure, advice from occupational health (OH) units and departments of infection is against vaccination of mortuary staff and pathologists. Wearing a mask appropriate for a tuberculosis autopsy provides sufficient protection and additional antibiotic prophylaxis can be considered on a case-by-case basis.

6.7 Hazard Group 3 infections

6.7.1 These are caused by 'biological agents that can cause severe human disease and presents a serious hazard to employees; it may present a risk of spreading to the community, but there is usually effective prophylaxis or treatment available'.

6.7.2 The HG#3 agents that may be encountered in the post-mortem room in the UK are listed in Appendix 1, Hazard Group 3 pathogens. Many are only imported and are extremely infrequent in practice, but they need to be categorised so that appropriate action may be taken in the event of an autopsy being required. The most frequent are tuberculosis (TB), human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV).

6.8 Hazard Group 4 infections

These are caused by 'biological agents that cause severe human disease and is a serious hazard to employees; it is likely to spread to the community and there is usually no effective prophylaxis or treatment available.' This group includes the viral haemorrhagic fevers (VHF), for which there are no current vaccines: Marburg, Ebola, Lassa fever, Congo-Crimea haemorrhagic fever. Other agents in this category are smallpox (only kept in restricted laboratories, with no wild infection since the late 1970s) and Nipah virus infection (not yet formally classified in HG). VHF infections are not endemic in the UK. Such cases are (for the moment) rarely imported into the UK, with less than one case recognised per annum on average.

6.9 Pre-autopsy screening of cadaveric blood for Hazard Group 3 pathogens

6.9.1 HBV, HCV and HIV – the major blood-borne HG#3 pathogens of concern – can be determined with accuracy in post-mortem blood samples. This contentious issue is clouded with the issues of permission to test and appropriate safety practices in the mortuary.

6.9.2 In many centres, there has been regular testing of apparent high-risk cadavers for the blood-borne viruses HBV, HCV and HIV. This particularly pertains in the Coronial system where certain persons are regarded as 'high risk' through behavioural and ethnic characteristics. However, these infections also occur in non-'high risk' groups, rendering any scheme that does not test nearly every cadaver imperfect in detecting potentially hazardous infection. HBV vaccination is now universal for all mortuary staff in both hospital and public mortuaries, and finding serological evidence of HBV infection in a cadaver is no reason to refuse to perform an autopsy.

6.9.3 Where the role of the autopsy is to determine the causes of death, any appropriate tests for infection may be performed where that infection relates to the cause of death. If HIV and HCV infection are part of the cause of death sequence, no consent from anyone is required. If the autopsy is required by law, the Coroner or Procurator Fiscal should be consulted, since this is an additional test and there may be funding issues. For example, if a patient dies of pneumonia or a cerebral lesion and underlying HIV is a serious possibility on clinical and demographic grounds, the pathologist can test blood for HIV infection without specific permission from next of kin; the only absolute contra-indication to such testing would be if the patient had, during life, expressed a wish not to be so tested and the autopsy is a consented one. If a patient dies of cirrhosis, then HBV and HCV tests are appropriate if they have not already been performed.

6.9.4 The GMC guidelines in *Serious communicable diseases* are clear, as are those in the HSAC's *Safe working* draft guidelines. Both are congruent with the following recommendations.

- A pathologist may test for any infection that appears relevant to the cause of death, using post-mortem samples, in medico-legal cases. In consented autopsies, the next of kin should be informed of the process and the result.
- If a health care worker is injured during an autopsy, the deceased may be tested for suspected infection – when there is 'good reason' to suspect that infection.
- There is no justification for blanket pre-autopsy testing of cadavers for a range of serious communicable diseases (SCD) as a protection for staff under the (spurious) justification of seeking diagnostic information before the autopsy. If the autopsy reveals evidence that leads to suspicion of a SCD, then testing takes place. If there is no such evidence, and the presence or absence of a possible SCD in apparently 'higher risk' patients does not affect or inform on the pathological cause of death, then there is no strict justification for testing. It is implicit in this guidance that reasonable universal precautions are used for autopsies.
- Where the diagnosed SCD is part of the chain of events in the cause of death, whether under Parts I or II of the standard death certificate, this information must be presented and recorded. The public health information outweighs the private concerns of relatives. This particularly applies to patients with HIV/AIDS, when relatives often wish the information not to appear on the death certificate.
- Next of kin who may be at risk from a SCD should be informed of a positive diagnosis of SCD in a cadaver if it is discovered at or after autopsy. For practical purposes, the pathologist informs the Coroner, the clinician who requested the autopsy or the consultant in communicable disease control (CCDC) of the presence of a previously unsuspected or unconfirmed SCD (see Appendix 4, Notification of infectious diseases). It is up to the Coroner, clinician or CCDC to provide this information to the relevant next of kin, perhaps via the general practitioner or appropriate contact tracing unit.

6.10 Pre-autopsy assessment of Hazard Group 4 (VHF) risk in a cadaver

The ACDP's publication on management of VHF and the HSAC's *Safe working* document specifically state that autopsies on such cases are not to be done in the UK because of the risk of infection, the relatively high mortality and the lack of totally effective chemotherapy. If an autopsy is deemed necessary for clinical or medico-legal reasons, it should be referred to a specialist centre, where appropriate protocols have been developed. But there needs to be a procedure for dealing with suspected cases of fatal VHF, which happen several times a year in the UK, and where the diagnosis has not been established nor excluded prior to death. In these cases, the Coroner will be informed since the cause of death is unknown. It is important to confirm or exclude VHF quickly. Recommendations are given in Appendix 2, Guidelines for assessing presence of Hazard Group 4 pathogens in a cadaver.

6.11 Standard procedures for all autopsies and for Hazard Group 3 cases

6.11.1 The last 20 years have seen an upward trend in the application of safety and hygiene precautions during all autopsy procedures. Whilst a proportion of cadavers with a SCD will be known prior to autopsy, not all will and there are now effective and cheap universal precautions that will protect against inadvertent infection to a high level. There is no epidemiological evidence base from the mortuary to prove the point (incidents being uncommon), but cut-resistant gloves should protect against blood-borne virus infection and fine-filter masks should protect against the risk of tuberculosis. Where appropriate facilities for performing high-risk autopsies are available, a refusal to perform an autopsy purely because of perceived risk of exposure to a SCD would have to be justified.

6.11.2 Pathologists and APTs should wear the following for all adult autopsies:

- surgical scrub suit
- waterproof or water-resistant disposable gown (e.g. Tyvek) that completely covers the arms, chest and legs
- plastic disposable apron to cover chest, trunk and legs
- eye protection or plain unventilated visor
- face mask to protect the mouth and nose from direct splash contamination, if visor is not worn
- disposable paper hat (optional)
- gloves: outer latex over neoprene cut-resistant gloves
- rubber boots with reinforced toe-caps.

6.11.3 Apart from hand and respiration protection, for which there are higher levels of protection (see Appendix 3, Protocols), these standards reduce to an acceptable level the risk of infection from cadavers with HG#3 infections, even when they are not known prior to the autopsy.

6.11.4 It is recommended that:

- mortuaries draw up protocols for dealing with infectious cadavers, along the practical lines indicated in the protocols in Appendix 3, Protocols. The pathologist has a duty, under health and safety legislation, to minimise risk to those who may be involved in handling a cadaver during and after autopsy. All staff working in the post-mortem room during the examination of a high-risk case need adequate training in mortuary techniques and safety procedures for such cases
- in a well-equipped mortuary with adequate ventilation, where the recommendations in this document are followed, the risk of infection from HG#3 cases is so low that refusal to perform an autopsy on the grounds of 'risk of infection' is illogical, if not unethical. However, if the pathologist considers him or herself insufficiently experienced or practised in specific infectious cases to derive the necessary clinicopathological conclusions, there is a strong case for referring the autopsy to a centre with the appropriate experience

- a separate high-risk infection suite is ideal but not essential for performing high-risk autopsies
- a circulator (a third person working alongside the pathologist and APT, remote to the actual procedures at the autopsy table and who assists with communication, arranging specimen removal, providing clean instruments and photography) is ideal (best practice) but not essential for high-risk cases
- trainee pathologists should gain experience of these cases and assist when they are deemed technically competent and safe in handling infected tissues and instruments. Whilst the HSAC's *Safe working* draft document states that the number of people involved in high-risk autopsies should be limited to three, flexibility is necessary for training purposes; this also applies to training anatomical pathological technicians
- pathologists decide themselves on whether to follow the *Safe working* document in cases of Creutzfeldt-Jakob disease in enclosing the entire head within a large plastic bag during use of a bone saw (see Appendix 3.4, Creutzfeldt-Jakob disease)
- appropriate vaccination schedules be given to pathologists and APTs:
  - the following vaccinations to be routine, with logbooks held in the occupational health unit documenting the completion of the appropriate schedules and antibody titres where appropriate: hepatitis A and B, BCG, poliomyelitis, diphtheria and tetanus
  - meningococcal vaccination; not recommended, see paragraph 6.6.2
  - in centres where there are many patients coming from resource-poor countries overseas (e.g. London, near international airports), we also recommend vaccination against yellow fever and rabies.

6.12 The notification of infectious disease cases

Under the Public Health (Control of Disease) Act 1984 and the Public Health (Infectious Diseases) Regulations 1988, the doctor who suspects that a patient suffered from a notifiable disease has a responsibility to report the case to the local consultant in communicable disease control (CCDC). This applies to the pathologist who makes the previously unsuspected diagnosis. Report forms are available from the CCDC and the hospital's department of infection/microbiology will assist the pathologist in this task. The current list of notifiable diseases is given in Appendix 4, Notification of infectious diseases.

7 AUTOPSY EXAMINATION OVERVIEW

7.1 These Guidelines are not the place for a detailed description of the actual autopsy process and physical technique. Many illustrated journal and book texts are available. However, a brief summary is appropriate as a guideline towards good practice.

7.2 Patient notes and consent forms must be inspected carefully, particularly in relation to clinical questions that the autopsy must address and possible limitations placed on the examination by relatives.

7.3 The identity of the cadaver must be confirmed, by inspection of patient label bands on the arm/leg, before commencing any dissection.

7.4 Intravenous (IV) lines and devices

If the patient has died with tubes, IV lines, cannulae, etc. inserted, the cadaver should come to the mortuary for autopsy with all these medical devices *in situ*. Nursing staff may wish to remove them prior to transfer, but hospital clinical governance guidelines must make clear those circumstances where such medical devices must not be removed, and specify

permissible means of facilitating viewing and preventing dislodgement or leakage, to minimise risks to health and safety.

7.5 Dissection

7.5.1 The pathologist should not commence the examination prior to the provision of a full clinical history, or of details regarding the circumstances of a death in the community. Where an inadequate history is provided by the Coroner, the pathologist should explain what further information is required and decline to perform the autopsy until it is available.

7.5.2 After identification and external examination by the pathologist, the body is opened by the pathologist or APT. The standard 'Y' incision with *in situ* dissection of the neck structures is recommended as best practice for basic examination of both sexes; but the vertical line incision of the lower neck is acceptable for cases where detailed examination of the neck structures is not critical. The internal organs may be removed individually, together in a single block or in four main blocks (thoracic, intestines, other abdominal and pelvic). Organs often overlooked at autopsy include testes, breast and intestines. Unless the examination requires alternative approaches to demonstrate specific pathological processes, the pelvic floor should be left intact. The internal female genitalia should be removed with a short cuff of vagina and rectum. Sites of complex recent surgery are best examined with the appropriate clinician present.

7.5.3 The precise order in which individual organs and systems are dissected is not important, but the method of dissection must be governed by the need to demonstrate and document accurately and completely the pathological conditions that are relevant in the specific clinical circumstances. This may require modification of normal dissection routines and delay the final dissection until the demonstration of autopsy findings. All major organs (heart, lungs, brain, liver and kidneys) should be dissected in order to facilitate examination of the blood and lymphatic drainage in addition to relations with adjacent structures. These organs should be separated and weighed. If permitted and clinically relevant, fixation of the intact brain, followed by a detailed examination by a neuropathologist, produces a higher detection rate of abnormalities.

7.5.4 Pathologists should have a full repertoire of special dissection techniques to enable examination of unusual sites. Examples include:

- spinal cord
- vertebral arteries
- temporal bone
- sino-nasal block
- orbital contents
- cervical spine
- cardiac conducting system
- peripheral nerves
- long bones and joints.

7.5.5 Specific consent must be obtained for any potentially disfiguring procedure in a hospital consent autopsy; in a medico-legal autopsy, such procedures should not be performed without explanation to relatives and should be made after opportunities for viewing have been taken.

7.5.6 Awareness of how to obtain appropriate samples for biochemical, microbiological and toxicological analyses is important. Specific appendices are being developed to cover common scenarios, but general guidance is available in the literature.

7.5.7 Aspects of practical autopsy performance relevant to fetal and perinatal deaths, maternal deaths, sickle cells deaths and neuropathological cases are indicated in other sections and appendices of these Guidelines.

7.6 Completeness of the autopsy

7.6.1 There is a body of opinion among pathologists that favours voluntary limitation of the procedure when a grossly obvious and apparently satisfactory cause of death is found during evisceration and dissection. The prime example is not to examine the skull and brain if an incontrovertible cause of death is identified elsewhere. Consented and Coronial autopsies are both affected, the intention being to reduce unnecessary incisions and reduce concern among the next of kin.

7.6.2 As best practice, the College stands firmly for as full examination as possible within the agreed consent and Coronial authorisation. Where an autopsy is considered necessary after proper investigation of the circumstances of the death, that autopsy should be a high quality examination, which addresses all the questions that may be raised by the death. Routine brain examination is discussed further in Appendix 5, Minimum datasets and best practice for examinations and reports on internal organs.

7.7 Reconstruction of the body

The reconstruction of the body should be of a high standard so that it will not leak and can be viewed after autopsy without distressing the next of kin. The body must not be used for the disposal of clinical waste; it must contain only material from the body and material required for its reconstruction. The pathologist is ultimately responsible for the quality of the reconstruction, and should ensure that the APTs who, in most cases, perform the task are adequately skilled.

8 AUTOPSY EXAMINATIONS AND REPORTS: MINIMUM STANDARDS AND DATASETS

8.1 In 1993, The Royal College of Pathologists published *Guidelines for post mortem reports*. These new Guidelines replace the 1993 edition and also incorporate guidelines that have emerged in the last five years from the College of American Pathologists.

8.2 The autopsy report clearly should inform the clinician, Coroner, general practitioner and pathologist. The format must be flexible and widely comprehensible. The extensive use of IT means that, within an institution, reports may be standardised, with minimum data entry sections. They must also be typewritten or printed, not handwritten.

8.3 A single standard should be applicable to all autopsy examinations, whether funded by the National Health Service, Coroner or Procurator Fiscal. One current difference between these types is in the frequency of histological examination (see Section 9, Autopsy histology). All autopsy reports should achieve a basic minimum dataset. Whatever the level of complexity of the case, the report must address and, if possible, answer the clinical questions posed.

8.4 **An autopsy report will normally include:**

- demographic details
- clinical history and how it was obtained
- how consent to autopsy was obtained, and any limitations to the examination
- indication of attendance of clinicians at the autopsy
- external examination
- internal examination
- histology report – if histology was taken

- other analytical results (toxicology, microbiology, etc.), including significant negative results
- summary list of pathological findings and a clinicopathological commentary
- cause of death, using the Office of National Statistics (ONS) format.

8.5 General comments

It is envisaged that these Guidelines should serve for all hospital, Coroner and Procurator Fiscal autopsies, other than Home Office cases. The report should be typewritten on a form of adequate size. Pre-printed, single-page forms impose excessive brevity.

8.6 Timing of autopsy reports

8.6.1 A provisional report, to include at least a preliminary cause of death (where possible), a summary of the major findings and details of what has been retained and what further investigations are necessary, should be sent out within five working days of the autopsy. Any conclusions and cause of death at this stage are tentative and may be modified. The histological findings, the result of toxicology and microbiology (where indicated) with the commentary/conclusions and cause of death should be sent out as soon as possible, within one week of the availability of the outstanding investigations.

8.6.2 However, best practice is that (at least in adult cases) autopsy histology should be treated similarly to surgical biopsy histology and prepared promptly; then, when other investigations are not required or are not the rate-limiting step, the complete report is sent out within one week of the autopsy.

8.6.3 In perinatal deaths, more time may be needed and the usual interval between the autopsy and the meeting to convey the information from the autopsy to the parents is six weeks.

8.6.4 The final document should contain all the material issued initially, since experience shows that isolated supplementary reports are easily lost. A copy of the signed consent form (for hospital autopsies) should be kept by the pathologist with the final report in the department archive.

8.7 The autopsy report

The following must be written in the autopsy report; optional items are listed separately.

8.7.1 Demographic details:

- autopsy sequential number
- surname and forename
- hospital or A&E department number
- name of general practitioner and/or hospital consultant
- sex, age and date of birth
- date of death
- date of the autopsy
- next of kin or person giving permission for autopsy
- type of autopsy: Coronial or consented
- which Coronial jurisdiction
- name of the pathologist responsible for the autopsy
- place of the autopsy, unless provided by a header on the printed report
- persons present during the autopsy
- details of those persons to whom the report is to be sent:
  - Coroner or Procurator Fiscal
  - general practitioner
  - hospital consultant (including A&E department head)
  - other relevant hospital staff (e.g. intensive therapy unit staff, anaesthetist)
- date of the initial report and (if appropriate) date of the final report.

8.7.2 Optional demographic details:

- home address of the patient
- mortuary registration number
- NHS number of the patient
- Coroners' case number
- means of identification, e.g. name tag, and the name of the person who made the identification.

8.7.3 Type of autopsy:

- complete
- limited (with exclusions indicated)
- specialised (see Section 10, Specialised autopsies).

8.7.4 Clinical history:

- all autopsy reports must include a clinical history to make clear the context of the autopsy. The history comprises a summary of present illness in chronological order, and the circumstances of death. The past history often explains the findings. It is the pathologist's responsibility to be satisfied that a reasonable account has been obtained, and mere reference to notes or letters is not an adequate substitute. Absence of, or difficulty in obtaining, clinical information should be recorded. The source of clinical information (medical records, Coroner's officer only, etc.) should be recorded. Pre-mortem clinical and laboratory investigations should be quoted where relevant, including significant negative results. The pathologist should make clear that the history is his or her understanding from whatever sources, and that confirmation or clarification should be sought from those responsible for the care of the patient (see Section 4.8, Unsatisfactory Coronial autopsies)
- many Coroners specifically do not want a history or detailed history incorporated into the main body of an autopsy report. This is not best practice, but it is acceptable for the received clinical history in Coronial cases to be archived with the report but not copied into it. A better, practical option is to place the clinical history, including information that the pathologist has discovered, at the end of the autopsy report with a page-break so that it is effectively detachable when reports are being distributed to other parties, e.g. relatives.

8.7.5 External description:

- external appearances – sex, age, weight (kg), height (cm); weight and height are essential for perinatal and paediatric autopsies and best practice for adult cases
- ethnicity – e.g. Caucasian, African, Afro-Caribbean, Indian subcontinent, Chinese, Japanese, South American Indian; if uncertain, describe the skin and hair
- measurements of significant surface features, scars, operation sites, bruises, etc. with a clear description of the site, including diagrams or photography if necessary. The presence or absence of injuries to the eyes, genitalia and anus should be recorded
- infant/neonatal/fetal deaths require additional measurements, studies of dysmorphism, placental studies and X-ray (see Appendices 6 and 7)
- (optional) radiology and photography before the autopsy should be considered. Note the need for consent for making and using images from which the patient may be identifiable (see Section 3.11, Photography).

8.7.6 Internal organs examination – minimum datasets:

- as best practice, the College stands firmly for as full an autopsy examination as possible within the agreed consent and Coronial authorisation for several reasons: the underlying significant clinical pathology may not be apparent until all organs have been removed and examined; if limitation becomes habitual, it leads to de-skilling and when examination of such organs does become critical, unfamiliarity may blunt

analytical discernment; where trainee pathologists are present, it reduces their opportunities to practise and learn

- as best practice, comment should be made on the items listed in Appendix 5, including whether or not they have been examined. In routine practice, it is acceptable to summarise rather than particularise, but essential to include clinically important negative findings (e.g. patent coronary arteries in patients with suspected cardiac cause of death)
- sites of recent operations and procedures must be fully explored and recorded; the state of anastomoses and suture lines must be recorded
- the routine examination of brains is considered in Appendix 5
- organ weights should be recorded. In all cases, record the weight of the heart, lungs, kidneys, spleen, liver, and brain. Where relevant, thyroid, parathyroid and adrenal glands are weighed.

8.8 Histology and other investigations

8.8.1 Indicate whether material has been taken for histology.

8.8.2 Indicate what other material has been saved, i.e. toxicology, microbiology, etc.

8.8.3 Record organs retained for further study or other purposes, with reference to the person giving consent, and a note of how ultimate disposal is to be effected.

8.8.4 Record tissues sent to any third party for further investigation, such as genetic analysis.

8.8.5 State if no material has been retained.

8.9 Summary of findings

This is a list of the significant pathological lesions present. It is desirable to code these for future retrieval, e.g. using the SNOMED coding system.

8.10 Clinicopathological correlation

8.10.1 This is probably the most important part of the autopsy report for the clinician and often the Coroner, and the section that is read first.

8.10.2 A clinicopathological commentary must be written in the light of all the information available; the length will be determined by the type and complexity of the case. If material has been referred to an outside specialist pathologist, summarise his or her observations in the commentary.

8.10.3 The major clinical problems must be correlated with the pathological findings and, where possible, a brief narrative given of the sequence of events that led to death. In Coronial cases, this may be provisional if the clinical history is not fully known to the pathologist (see Section 8.7.4, Clinical history).

8.10.4 New pathological lesions are indicated with explanation of how these illuminate the clinical observations. It should be made clear which findings are incidental to the death and of no clinical import.

8.10.5 Any inconsistencies in the findings or a still uncertain pathogenesis of the final events are presented and steps to be taken, such as further opinions, mortality and audit meetings, are indicated.

8.10.6 Discussion with the responsible clinicians will yield optimal clinicopathological correlation, but frank discrepancies or disagreements must be noted.

8.11 Cause of death

8.11.1 The cause of death, for adults and children over 28 days of age, must be given in the standard form required by the Office of National Statistics (ONS).

8.11.2 The underlying cause of death should be the lowest completed line in Part I, such that conditions placed above it are 'due to' that pathology. Part II includes pathology, unrelated to that in Part I, which contributed toward death, but should not be used as a basket for all the minor pathologies found at autopsy.

8.11.3 For stillbirths and live-born children dying within 28 days of birth, there is a different standardised format for the cause of death. The form of the statement is:

"a. Main diseases or conditions in fetus/infant
b. Other diseases or conditions in fetus/infant
c. Main maternal diseases or conditions affecting fetus/infant
d. Other maternal diseases or conditions affecting fetus/infant
e. Other relevant causes."

8.11.4 If the patient died following an operation and that procedure was directly or indirectly contributory to the death of the patient, the fact and type of the operation must be included in the cause of death (under Part I or II, according to relevance) and the date of the operation given (date/month/year).

8.11.5 If the autopsy is limited, it may not be possible to give an ONS cause of death, and this must be made clear in the report.

8.12 Communication

8.12.1 Failure of information to reach its intended recipient is a cause of misunderstanding between pathologists and those persons they serve.

8.12.2 The report must be presented and printed to a high standard.

8.12.3 The time taken for reports to be issued and delivered should be audited.

9 AUTOPSY HISTOLOGY

9.1 The importance of taking histology samples from autopsies is evident to pathologists as an adjunct to diagnosis. Training requirements in autopsy histopathology interpretation are predicated on learning from correlating clinical, gross and relevant histopathological features.

9.2 As best practice, sampling of all major organs for histology in all autopsies is recommended. This is not possible if the Coroner or person consenting to autopsy will not sanction this (see Section 3, Consent issues). There is wide variation in Coroners' approaches to histology: a few encourage routine tissue sampling for completeness of the record; others do not permit histology unless mandated by the need to open an inquest (Coroners Rules 1984, Sections 9 and 12; Coroners Act 1988, Section 20(4)); most sit somewhere in between. Discussion with Coroners is critical, emphasising the present and future significance of full investigation and documentation.

9.3 Certain conditions are even better recorded by gross photography than by histology, and this may become a preferred adjunct in those cases, subject to consent (see Section 3.11, Photography). Examples are ruptured abdominal aneurysm, cardiac tamponade and perforated viscus.

9.4 The taking of material that does not 'bear upon the cause of death' (e.g. for use in teaching, EQA and research) is not permitted in Coronial autopsies unless the next of kin has given consent. Initial approval has to be provided by the Coroner when still in possession of the body, and he or she may then instruct his officers to approach the next of kin, or allow the pathologist to approach the relatives directly; bereavement officers should also facilitate this process. Once the Coroner ceases to possess the body, the next of kin may be approached for tissue retention for any reasonable purpose.

9.5 Guidelines for consented hospital autopsies

9.5.1 In all consented autopsies where permission has been so granted by the next of kin, tissue samples should be taken from all major organs. This will confirm the macroscopic diagnosis, refine the cause of death and assist in clinical audit and the training of pathologists.

9.5.2 The extent to which such tissues may subsequently be used for anonymised research, EQA and other laboratory and educational purposes should have been clarified at the time of consent for autopsy, according to local circumstances. In principle, all cases should come into this category and the local research ethical committee (LREC) may need to be informed or consulted (see The Royal College of Pathologists' *Transitional guidelines* publication).

9.5.3 The degree of sampling will vary from case to case: for perinatal autopsies, it is standard practice to take samples from all the main organs on a protocol basis; for adult autopsies, the extent will be determined by the pathology and the degree of interest in the case.

9.5.4 If permission for histology has been granted that includes the possibility of future research applications in a known area (e.g. HIV disease), consideration should be given to standardisation of sampling so that a large and comparable tissue database can be built up.

9.6 Guidelines for autopsies required by law

9.6.1 It is essential to consult with the Coroner (or Procurator Fiscal) as to histology sampling and work within the agreed remits. This should be done on a general basis to cover most anticipated types of cases, with case-by-case discussion of unusual cases as they arise.

9.6.2 The Coroner will usually agree to taking histology samples when such is essential to make a diagnosis, where the distinction between natural and unnatural cause of death has yet to be made and an inquest may have to be opened. Where discussion of the case with the Coroner does not permit sampling which the pathologist feels necessary to give an accurate cause of death, the pathologist should make clear both that the cause of death may not be accurate and the reasons for that outcome. If in advance of the autopsy, discussion with a Coroner indicates to the pathologist that retention of material that may be relevant to the investigation will not be permitted, the pathologist should decline the request to perform the autopsy.

9.6.3 Sampling the pathological organs whose histology will support the main diagnosis or diagnoses in all Coronial autopsies enables review of the diagnosis if there is a subsequent challenge. This would apply to cases where the diagnosis is grossly evident and, in the view of the majority of pathologists, would not normally require histology samples to make or confirm the diagnosis. The Coroner may refuse permission to consider this sampling, but it constitutes best practice.

9.6.4 The College recommends taking histology samples in cases where the type of lesion is evident and there is a natural cause of death but sampling would provide a more accurate categorisation of the pathology (e.g. the histological type of lung cancer). Some Coroners believe this goes beyond the strict interpretation of the Coroners Rules and Act and sampling may not be permitted by the Coroner. However some Coroners do not object, provided that the relatives have been informed and they do not object.

9.6.5 Ideally, all tissue blocks and slides from all autopsies should be archived as part of a permanent medical record. Because of recent public concern over organ and tissue retention, some Coroners expect pathologists to dispose of, or return (where requested), slides and blocks made for histological diagnosis once the cause of death is established and the case 'closed', with or without an inquest. If the Coroner requires this, the pathologist should discuss the implications: archiving this material allows a later review of the case, should questions regarding diagnosis be raised by interested parties in the death, and audit of pathological services to the Coroner can be done.

10 SPECIALISED AUTOPSIES

10.1 Surgical and diagnostic histopathology is increasingly specialised, with more departments organising the work so that pathologists concentrate on a limited field, usually related to specific organs although also by technique (e.g. cytopathology). Most autopsies come under the category of general autopsy pathology and are deemed to be within the capability of adequately trained pathologists who are also able to assimilate and learn from new cases.

10.2 However, there are cases where a more specialised approach, such as pertains in diagnostic histopathology, may be more appropriate in the interest of obtaining a more accurate cause of death and advancing clinical governance. Some of these deaths are recognised to be the prerogative of specialist pathologists who have specific accreditation (e.g. Home Office forensic practitioner licence) or members of an EQA-linked group of specialists (e.g. perinatal and paediatric pathologists). These already include:

- fetal, perinatal and paediatric deaths; also, unexpected deaths in childhood require a pathologist with a special interest and training in paediatric pathology. Where child abuse may be involved, or death is in suspicious circumstances, a pathologist with a forensic training should perform the autopsy and this individual should have experience in paediatric autopsies. Ideally, a forensic and a paediatric pathologist perform the autopsy together to provide a combined report
- suspicious/homicide deaths; autopsies on deaths in suspicious circumstances should be carried out by pathologists accredited by the Home Office.

10.3 There is a case for the autopsy of patients who are considered to have died from the following categories of death to be directed to local or regional pathologists with a special interest in the area:

- maternal death;it is considered preferable that the regional College assessor in maternal mortality or a nominated experienced deputy should perform the autopsy
- perioperative complex cardiac surgery, especially paediatric cardiac malformations
- complex neurological diseases; certain cases require specialised neuropathological techniques and should be performed by a neuropathologist. This may include patients with known or suspected CJD, unusual progressive neurodegenerative or inherited neuromuscular disease, congenital malformations, and patients who have died following complex neurosurgical procedures. These cases may be referred to a regional neuropathology department for post-mortem examination, or a neuropathologist may be invited to the hospital in which death occurred to perform the examination.

10.4 The following categories do not necessarily need specialist activity, though reference may be made to specialists to assist in the interpretation of the gross and microscopic findings. Specialists in other fields such as toxicology, pharmacy, and microbiology are also often helpful in elucidating a case.

The categories are:

- industrial diseases (e.g. pneumoconiosis, asbestos-related death)
- HIV/AIDS and tropical infectious diseases, other HG#3 infection cases (e.g. tuberculosis); suspected HG#4 deaths (viral haemorrhagic fever) (see Section 6, Health and safety – infections)
- perioperative liver and other transplantation procedures
- head injury fatalities
- Alzheimer's and related dementing disorders
- suspected overdose with illicit drugs (drugs of abuse)
- death in epilepsy
- suicide
- deaths from accidents
- sickle cell deaths.

10.5 In all these cases and circumstances, if the autopsy is required by law, the practices of the Coroner (or Procurator Fiscal) in the use of pathologists may be a constraining factor, it being more convenient to utilise the on-site pathologists rather than request one with more experience in a particular type of case. This indicates the need for discussion between pathologists and the Coroner concerning local practices.

10.6 The important point is that if an 'uncommon condition' autopsy is to be performed by a pathologist not familiar with that condition, the autopsy and its documentation must be detailed and accurate and the appropriate, properly preserved samples taken for analysis (histology, whole organs if appropriate and, for example, metabolic pathology/clinical biochemistry samples). The case can then be reviewed by a specialist. If, after discussion with the specialist, the pathologist feels that he or she is unable to perform and document the autopsy to the standard necessary, the pathologist should – if the autopsy has been requested by the Coroner – advise the Coroner that the autopsy is best performed by the specialist.

10.7 The College anticipates, and supports, the likelihood of increasing specialisation in autopsy pathology in order to improve the standard and usefulness of information gained from the autopsy in unusual and complex cases.

10.8 Fetal, perinatal, neonatal and infant deaths

Practice in this field has changed markedly over the last five years, partly in relation to the problems over organ retention. There are many older and recent guidelines on how to examine and report on fetuses and children. Guidelines are listed in Appendices 6 and 7.

10.9 Neuropathological cases

Guidelines for detailed examination of the central nervous system (CNS) in neuropathological cases are given in Appendix 8, Neuropathological cases. Also included are specific guidelines for the optimal examination of persons dying with epilepsy and advice on the formulation of the death certificate.

10.10 Maternal deaths

10.10.1 Deaths occurring during pregnancy or within 42 days of childbirth are classified as maternal deaths and should be notified to the UK Confidential Enquiries into Maternal Deaths. Those resulting from obstetric complications of pregnancy, labour and the puerperium are termed 'direct' maternal deaths, whereas those due to disease which pre-dated or occurred during pregnancy, but were aggravated by the pregnancy, are termed 'indirect'. 'Fortuitous' deaths are due to causes not related to or influenced by pregnancy. The Enquiry is also

interested in 'late' deaths, occurring up to one year following delivery, although at present these are not formally included in the statistics of maternal mortality.

10.10.2 Conduct of the autopsy

Maternal deaths are now so few that individual pathologists may have little personal experience of the problems involved: there are about 100 per annum in the UK. The proper conduct of a maternal autopsy calls as much for routine good pathological practice as for special expertise, but an awareness of certain common obstetric problems is essential. Pathologists should refer to the article and the Confidential Enquiries' reports cited in the Bibliography. The assistance of an obstetric pathologist, neuropathologist or other specialist should be requested whenever appropriate. Guidelines on the specific disorders found in maternal death are listed in Appendix 9, Maternal death.

10.11 Forensic pathology cases

Guidelines on forensic pathology practice have recently been published by The Royal College of Pathologists. These are presented in Appendix 10, Forensic examinations. The Home Office Policy Advisory Board for Forensic Pathology's practice guidelines, published in 1966, are under review.

10.12 Adult cardiac cases and perioperative deaths

Guidelines on autopsy following cardiac surgery in adults are expected from European initiatives in 2003.

10.13 Sickle cell disease deaths

Major pathology occurs in patients with the following three sickle cell phenotypes: HbSS, HbSC, HbS-β-thalassaemia. Less commonly, patients with sickle cell trait die as a result of their condition. Medico-legal experience indicates that pathologists have problems in evaluating sickle-related deaths. Guidelines are outlined in Appendix 11, Sickle cell disease.

11 ANATOMICAL PATHOLOGY TECHNICIANS

11.1 Guidelines were approved by The Royal College of Pathologists' Specialty Advisory Committee on Histopathology in 1995 and are here modified as recommendations concerning the role of Anatomical Pathology Technicians (APTs) in evisceration and dissection of cadavers. It is apparent that the degree of delegation of dissection of cadavers to APTs by pathologists varies considerably. Many APTs are highly skilled in dissection and their skills should be encouraged and used. But concern has been raised that excessive delegation, particularly dissection taking place before the pathologist arrives, destroys signs that should be observed by the pathologist and impairs the value of the autopsy. This has been the case in Coronial autopsies performed in public mortuaries.

11.2 APTs who assist at Coroners' and consented autopsies should hold the Certificate or the Diploma of the Royal Institute of Public Health (RIPH), or be in a recognised training post under the supervision of a qualified APT.

11.3 Under no circumstances should an APT commence opening the body before the pathologist has checked the identity, and examined the external surface, of the body nor until the pathologist is satisfied that there are no suspicious circumstances, that the death has not occurred in relation to recent surgery and that there are no allegations of suboptimal care.

11.4 Ideally, the pathologist should personally make the main skin incision and remove the organs (with the assistance of the APT) so that all the body cavity features and all abnormalities are seen and palpated. This particularly applies to post-operative deaths, suicides, accidents and perinatal deaths.

11.5 Because of pressure of work, this procedure will not be adopted everywhere. Delegation of evisceration to a skilled APT is acceptable. The profile of APTs is changing and they are encouraged to be more skilled. APTs may assist at or perform eviscerations, on the direction of the pathologist, after the latter has studied the history and made a full external examination. The pathologist should be immediately available should there be unexpected findings or unusual anatomical arrangements; when an APT encounters such findings, he or she must not continue until the pathologist has assessed the appearances.

11.6 The APT should not dissect individual organs from the tissue blocks as such procedures may result in the loss of important material, e.g. pulmonary thrombo-embolus, tumour embolus in renal vessels, anatomical relationships following gastro-intestinal surgery, etc.

11.7 The APT may reflect the scalp, saw through the calvarium and expose the dura. Only after prior consultation with the pathologist should the APT remove the brain.

11.8 The spinal cord may be removed by the APT in the presence of the pathologist. Other procedures, e.g. stripping the dura or removing samples of bone marrow from the spinal column, may also be carried out by the APT. These latter procedures may be carried out unsupervised once the pathologist is satisfied as to the competence of the APT, but the pathologist should be immediately available should any problems arise.

11.9 If there is a significant paediatric or perinatal autopsy workload within a mortuary, a specific APT (with RIPH Certificate qualification as a minimum) should have the responsibility for coordinating the paperwork, autopsy data, radiology (if required), histology samples and viewing by relatives. It is not appropriate for APTs to open the bodies of fetuses, infants or young children.

11.10 There must be full agreement between the responsible pathology consultant(s) and the APTs as to protocols for accepting, performing autopsies on and releasing cadavers with known or suspected HG#3 infections (see Section 6, Health and safety – infections). Ideally, the APT should be at RIPH Diplomate level of experience.

11.11 There is a fresh initiative to prepare for formal state registration and self-regulation of APTs, linked with the Institute of Biomedical Sciences (IBMS) and the RIPH.

12 AUDIT OF THE AUTOPSY

12.1 In any evaluation, the autopsy procedures should themselves be scrutinised. As the CESDI, NCEPOD and Confidential Enquiries into Maternal Deaths reports and personal experience iterate, there is a small proportion of autopsies performed and/or reported inadequately, so that clinical questions are not addressed or answered satisfactorily. Coroners also provide evidence that they are aware of deficiencies in autopsy performance, but may not feel qualified to address and remedy these deficiencies. Within hospital settings, inadequate autopsy practice becomes evident through mortality meetings (if they are held), but this can be a slow process.

12.2 Means to evaluate formally the quality of autopsies are being introduced into practice, with The Royal College of Pathologists' Professional Standards Unit leading in general pathology. Formal audit in forensic pathology has been in place for several years.

12.3 **Indicators of autopsy performance include:**

- the demographic data in the report
- the timeliness and distribution of reports
- the completeness of body and organ descriptions (minimum datasets), in the context of the request for the autopsy and the clinical questions posed
- histology – its use and relevance
- the quality of the clinicopathological correlation that summarises the autopsy report
- the adherence to consent including tissues and organ retention.

12.4 **The means by which and by whom the autopsy may be evaluated include:**

- self-assessment and review of past cases
- feedback from stakeholders: clinicians, Coroners, general practitioners and families
- mortality meeting audits
- internal peer review: paper report, slide and image reviews
- regional EQA schemes and peer review of reports, images and slides
- direct observation by peers
- the frequency and nature of complaints, via the hospital Quality Unit.

12.5 The College recommends that pathologists and departments should pursue such processes to open up the autopsy to proper audit. Regular autopsy EQA participation should become part of clinical governance standards, as occurs in paediatric practice. It can be included with the regional EQA schemes that operate for diagnostic histopathology.

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www.cesdi.org.uk

Institute of Biomedical Science
www.ibms.org

National Confidential Enquiry into Perioperative Deaths
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National Sentinel Clinical Audit of Epilepsy-Related Death
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The Royal College of Pathologists
www.rcpath.org

The Royal Institute of Public Health
www.riph.org.uk

UK Confidential Enquiries into Maternal Deaths
www.doh.gov.uk/cmo/mdeaths.htm

In future, Confidential Enquiries will be organised under the National Institute of Clinical Excellence
www.nice.org.uk

A10 Forensic examinations

A10.1 The practice of forensic pathology is considered to comprise both non-suspicious deaths where a post-mortem examination is requested by HM Coroner and suspicious deaths where a post-mortem examination under the auspices of HM Coroner is performed with a view to providing evidence for a criminal investigation. A department of forensic pathology should have easy access to departments of all other branches of pathology, a department of radiology and a forensic science laboratory. Where possible, all these departments should conform to the code of practice set out by the appropriate medical royal college or other supervising body.

A10.2 Any post-mortem examination carried out by the forensic pathologist should be conducted in accordance with guidelines issued by The Royal College of Pathologists and the Home Office Policy Advisory Board for Forensic Pathology, except where deviations from those guidelines can be justified. It is considered best practice that evisceration of bodies for forensic post-mortem examination is carried out by the pathologist; evisceration may be delegated to the mortuary technician only in 'non-suspicious' deaths where the pathologist is satisfied by personal inspection of the body that that delegation is safe and appropriate and that evisceration is performed in the presence, and under the personal supervision, of that pathologist.

A10.3 The pathologist must ensure that any decision to retain human material at post-mortem examination has been discussed with and ratified by the Coroner; it is the responsibility of the Coroner to make the retention of human material known to the next of kin of the deceased, to determine their wishes about disposal and to make those wishes known to the pathologist; the pathologist must be prepared to justify a decision to retain human material and to explain that decision to the next of kin. The pathologist must have a system of recording what human material has been retained, the authorisation for that retention and the date and method of disposal.

A10.4 It may be that the forensic pathologist will have to perform post-mortem examinations within a mortuary with the 'providers' of which – be they NHS Trust or local authority – he or she has no formal contract of employment. It is not unreasonable, however, for the forensic pathologist to be satisfied that those mortuaries in which he or she may work are equipped to, and have working practices fully observant of, standards set out in the HSAC's *Safe working* document and, if not so satisfied, to make concerns known to the Coroner that such a mortuary is not a suitable place for the practice of post-mortem pathology.

A10.5 The forensic pathologist may bear the responsibility for the safety of other personnel present at a post-mortem examination and, therefore, should conform to the health and safety procedures extant in the mortuary where that examination proceeds: where no such policy is in existence, the forensic pathologist should insist upon demonstration of the adequacy of the facilities for safe post-mortem examination and, if not assured of their presence, should refuse to conduct the examination at that mortuary.

A10.6 Easy access to relevant literature – be it printed or electronic – is no less essential to the forensic pathologist than it is to any other branch of pathology: the head of a department of forensic pathology should ensure that that access is provided and that, where appropriate, that literature is consulted to substantiate opinions expressed.

A10.7 It is accepted that the forensic pathologist may act as 'agent' for HM Coroner and may be under 'contract' with a police force, but the forensic pathologist must not act in any way that is not in accordance with the GMC's *Good Medical Practice* nor in any way which may be regarded as a failure to acknowledge that the pathologist's primary duty is to the court, rather than to any party to court proceedings. It is expected that a department shall have in

place a mechanism by which difficulties encountered in their relationships with mortuaries, Coroners and police forces with whom they may work can be addressed and resolved.

A10.8 The responsibilities of the forensic pathologist in regard to clinical governance, quality assurance and research are no different in kind from those of the histopathologist. The forensic pathologist may be better placed to provide training in post-mortem practice to all those persons who may be concerned with such practice, be they pathologists in training, mortuary assistants or scene-of-crime officers, and a department must be willing to provide such training. Where the forensic pathologist provides such training for trainee pathologists and mortuary technicians, there should be a formal 'record of training' documenting what training has been given and when a satisfactory level of proficiency has been attained.