

The Coroner's Autopsy: Do we deserve better?

A report of the National Confidential Enquiry into Patient Outcome and Death (2006)



NCEPOD

Foreword

NCEPOD operates under the umbrella of the National Patient Safety Agency (NPSA) as an independent confidential enquiry. The main aim of NCEPOD is to improve the quality and safety of patient care and review of autopsy reports has been a core part of previous NCEPOD studies of deaths following medical and surgical interventions.

Following a proposal from the Royal College of Pathologists, NCEPOD has reviewed, in detail, the autopsy reports produced for the coroners; this includes both deaths in hospitals and in the community. This report is timely. There has never been a comprehensive review of the autopsy process and reports produced at the request of coroners. It is the first time that NCEPOD has requested data directly from coroners and we were delighted to obtain such a positive response with 88% (121/137) of all coronial jurisdictions contributing data. We are very grateful to all those who submitted data and to those coroners and pathologists who took part as advisors.

Because of increasing disquiet with fitness for purpose of the coronial system, legislation is now being prepared to change the structure of the system. NCEPOD hopes that the results and conclusions of this study will be a major contribution to the discussion over changes to the coronial system.

Professor T Treasure

NCEPOD Chairman

Introduction

There have been concerns about coronial autopsy practice going back to at least 1970 as highlighted in the Brodrick report. Literature meta-analysis of discrepancies between clinical and postmortem diagnoses and of death certification has shown:

- little improvement in the overall rate of discrepancies between the 1960s and 2005;
- 50% of autopsies produce findings unsuspected before death;
- at least a third of all death certificates are likely to be incorrect.

The numbers of consented autopsies have declined dramatically over the last 20 years. In adult practice, coronial autopsies now comprise >95% of all adult autopsies in England & Wales and Northern Ireland.

In 2003, the Luce report on death certification and investigation in England, Wales and Northern Ireland stated:

“There is, indeed, a general lack of evidence about the utility of and justification for coroners’ autopsies on the scale on which they are practiced in England and Wales. If the 121,000 autopsies a year that are now performed were surgical procedures carried out on living people there would long ago have been an evidence base compiled to assess the utility and justification for the scale of intervention.”

No single body or department oversees death certification and coroners. The service is part local and part national. Pathologists, for the most part, operate within the NHS. Coroners are appointed by local authorities, answerable to the Lord Chief Justice and come under the Department of Constitutional Affairs. The Registrars of Death answer to the Office for National Statistics which in turn comes under the aegis of Her Majesty’s Treasury. There is no centralisation or unification of responsibility and accountability.

The major questions are:

1. What is the coronial autopsy for?

2. Is the coronial system the appropriate vehicle to carry the other roles of an autopsy which are:

- postgraduate education;
- deeper understanding of disease processes;
- answering questions from the family.

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Summary of the study and conclusions

Following review of the autopsy reports and the supporting documentation the advisors found that:

- **one in four autopsy reports was judged as poor or unacceptable;**
- **in one third of mortuaries, the pathologist failed to inspect the body before the anatomical pathology technologist commenced opening it and removed the organs;**
- **in one in seven cases the brain was not examined;**
- **in one in sixteen cases, it was deemed that histology should have been taken in order to determine the cause of death;**
- **in nearly one in five cases, the cause of death as stated appeared questionable;**
- **the extent of examination of the heart, in those with abnormalities that might be due to a cardiomyopathy (some of which are inherited), was poor;**
- **the extent of examination of patients with known epilepsy who died unexpectedly was poor;**
- **the very elderly may not have been examined as carefully as younger subjects;**
- **there was poor recording of the presence or absence of external injuries;**
- **there was poor quality of examination of decomposed bodies;**
- **there was poor communication between coroners and pathologists;**
- **there were significant gaps in the information provided to the pathologists by the coroner.**

If one quarter of all surgical procedures undertaken on the living were deemed, by peers, to be poorly or unacceptably badly done, there would be a public outcry. The fact that there is no outcry is a manifestation of the fact that families are unaware of the variable quality of the autopsy procedure.

When considering the variable quality of the current autopsy process several pathologists and coroners commented: **“What do you expect for £87.70?”** (the current fee for a standard autopsy without further investigations).



The incompleteness of many autopsies (i.e. brain not being examined), and the common practice of evisceration of bodies before the pathologist has inspected them, may come as a surprise to the public.

There is a trend to reduce histopathological examination in coronial autopsy cases. The reasons for this are several including:

- cost;
- lack of need if an acceptable registerable medical cause of death can be stated, even if it is not the most accurate cause of death;
- the workload implication for the coroner's office in communicating with the next of kin on tissue retention.

The benefits of tissue taking (better diagnosis; training pathologists; continuing professional development) need to be balanced against the downsides (as above). The public should be better informed over the implications.

The recommendations made in this NCEPOD report, if implemented, will effect positive changes for the coronial system, the pathologists working within it, and bereaved families. Since about half of all deaths referred to a coroner result in an autopsy, these changes are central to any reform of the whole system. Public money is going to continue being spent on the investigation of death, and probably the total costs will increase. The public deserves value for money.

Reform requires a consideration of the purpose for which these autopsies are performed, as well as an overhaul of the whole system, with the introduction of audit and accountability. The incorporation of pathology training needs to be more formally addressed since this is critical for future practice. Such changes involve a national debate among all the interested parties and will necessitate statutory requirements: fundamentally, what level of quality in the coronial autopsy service does the public want?

There is potentially a whole range of purposes of the coronial autopsy and examples of most were found by the advisors for this study. The range of purposes were coded by the advisors as:

A1: just to consider and exclude homicide;

A2: just to consider and exclude unnatural death;

B1: to provide an acceptable – though not necessarily correct - medical cause of death for registration purposes;

B2: to provide the correct medical cause of death and accurate data for national statistics;

B3: to provide an account of sufficient, accurate detail to address any concerns from the next of kin and to be useful to them;

B4: to provide detailed information for medical audit and explanation of events following medical interventions;

B5: to provide the basis for a publishable case report.

Recommendations

Principal

Government should consider and agree the fundamental purposes of the coronial autopsy. An ideal opportunity exists to do this during the passage through Parliament of the Bill for reform of the coroner's system as recently announced.

There should be nationally uniform criteria and standards for investigation of reported deaths. This includes the diagnostic level of investigation at autopsy and the definition of what a postmortem examination comprises.

There should be regular (independent) peer review of coronial autopsy reports and processes to maintain consistency of agreed standards and accountability, and all pathologists and coroners – in training and as continuing professional development – should review the autopsy reports and related documents of their peers.

Specific

Information available to pathologist prior to autopsy

Specific written requests for investigations, made by a coroner, should be followed, or an account rendered in the autopsy report as to why this was not addressed.

The information provided by coroners' offices to pathologists should be in a standardised format that includes an agreed minimum clinical and scene of death dataset, including date of birth and occupation of deceased. Such information should be communicated in writing.

Case history

A clinical and case history should be included in an autopsy report and should state the provenance of the information.

External examination

The height and weight should both be measured, the BMI calculated, and the data given in the report. In all deaths, the report must clearly document external injuries or the absence of such injuries.



Evisceration of bodies

Before evisceration of a body, the pathologist must inspect the body first. This is to confirm identity, to observe any external features that might modify the process of examination and to consider the possible need for a forensic examination.

Internal examination

Normally a complete autopsy should be performed, with all organs including the brain examined. Limited autopsies – upon request – should be carefully considered on a case by case basis and when complete examination is essential to determine the cause of death the pathologist must insist upon that. If an organ system is not examined, consideration and account should be made of the potential information lost, in the context of the deceased's clinical pathology.

Decomposed bodies should be thoroughly examined (i.e. external and internal examinations) to identify significant injuries, primary pathologies and co-morbidities, and toxicology should be performed as appropriate.

Tissue retention

Autopsy reports must clearly indicate whether or not tissues were retained, and what they comprise, if retained.

There should be national criteria and standards on organ and tissue retention for histopathology in coronial autopsies, in order to provide convincing evidence of the cause of death.

Deaths in persons known or suspected to abuse alcohol and/or cases associated with drug toxicity should be properly investigated.

Causes of death

Sudden unexpected deaths suspected to be related to cardiomyopathy and arrhythmias (i.e. SADS) should be investigated according to best practice autopsy guidelines.

Deaths suspected to be related to epilepsy should be investigated properly, according to the Department of Health National Service Framework for Mental Health action plan: "Improving services for people with epilepsy".

Deaths following medical interventions and complications require detailed investigation and consideration, and should not be summarised merely as (e.g.) 'ischaemic heart disease' or other underlying comorbidity. If the procedure contributed to the death, then this should be indicated in the cause of death sequence.

Clinicopathological correlation

There should be a clinicopathological correlation in each report that reviews the case and robustness of the conclusions based on the available evidence.

The mortuary

Pathologists should wear protective clothing over appropriate scrub suits, not over their day clothes.

All mortuaries should be quality accredited.

The approach to infectious disease management in mortuaries should be reviewed and standardised.



Resumé of the coronial process

What happens when someone dies

- Every death and its cause must be registered. A doctor may not know the cause of death, or there may be factors that suggest an unnatural death;
- If so, the death is referred to a coroner who then decides whether or not to investigate the case further;
- The coroner may arrange for an autopsy to be performed by a pathologist who will write a report for the coroner that gives a cause of death – the overt purpose of the coronial autopsy;
- Currently, about 55% of deaths in England and Wales are certified directly by doctors and 45% are directly referred to a coroner;
- In 2005, 22% (114,600) of the 513,000 people who died in England and Wales were examined after death through a coronial autopsy.

The coronial system

- In England, Wales, Northern Ireland and the offshore islands there are approximately 120 coronial jurisdictions (although this is a variable figure and was 137 at the time of running this study);
- The coroners are appointed by local authorities, are answerable to the Lord Chief Justice, and are managed by the Department of Constitutional Affairs;
- Coroners, the coronial system, and coronial autopsies are independent of the NHS;
- The coronial autopsy examination should identify how the deceased came by his death, in cases where an unnatural death is suspected. For most causes of deaths, the standard of proof required is only the 'balance of probability'.

Aim

The specific aims of the study were:

- To assess the quality of coronial autopsy reports in conjunction with the written information relating to the death as presented to pathologists by coroners;
- To obtain a baseline overview of the standard to which coronial autopsy reports are currently being reported, and indirectly, the standard to which they are being performed;
- To assess how issues raised by a death are being addressed in the coronial autopsy;
- To highlight the variations in practices and explore reasons for these variations (e.g. coroners' requests and expectations; pathologists' workloads; mortuary facilities);
- To evaluate the correctness of pathologists' Office for National Statistics (ONS) cause of death formulations in terms of structure and content;
- To make recommendations regarding quality of autopsy reports.

Methods

Case identification and data collection

Data were collected from a one week (7 day) retrospective period in May 2005, in England, Wales, Northern Ireland, Guernsey, Jersey and the Isle of Man. Suspected homicide cases were excluded.

Cases were identified by coronial staff from all coroners' offices in the participating countries. Data were requested from coroners' offices for each case included in the study:

- The autopsy report.
- Supporting documentation e.g.
 - written instruction to the pathologist to perform an autopsy;
 - coroner's summary report;
 - police report;
 - clinical summary or copies of medical notes.

Peer review of autopsy reports

- Twenty one currently practising coroners and 'autopsy-active' pathologists assessed the quality of individual autopsy reports, along with the written documentation that was supplied to NCEPOD by the coroners' offices;
- For each case, the advisors completed an assessment form that was based on previous NCEPOD autopsy assessment forms, the Coroners Act 1988, and the 2002 Royal College of Pathologists' Guidelines for Autopsy Practice.

Organisational questionnaire

An organisational questionnaire was sent to all mortuaries where coronial autopsies were performed in the participating countries to gather information about the mortuary facilities.

Results

Participation

1,877 cases were reported to NCEPOD from 121 coronial jurisdictions across the participating countries, equating to an 88% (121/137) participation rate.

Age and sex

The sample comprised 58% (979/1,691) males and 42% (712/1,691) females with a median age of 74 years (3 days to 101 years).

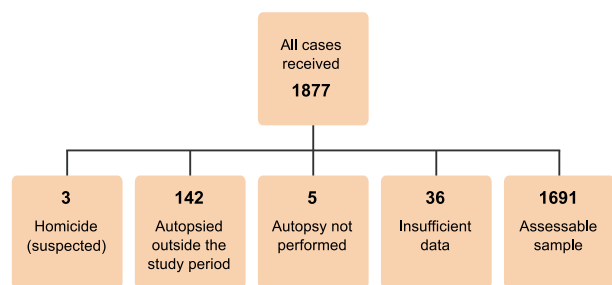
Category of death

This table represents the advisors' view as to the type of death for each case.

Category of death	n=	%
Natural cause of death in community*	929	55
Natural cause of death in hospital	351	21
Intentional self harm (suicide)	50	3
Other	55	3
Unascertained	44	3
Associated with a road traffic collision	41	2
Associated with medical intervention	20	1
Alcohol related cause of death	23	1
Natural cause of death (location not stated)	38	2
Industrial related cause of death	31	2
Associated with illicit drug overdose/poisoning	16	1
Mishap in hospital (e.g. fall)	2	0.5
Associated with fire	5	0.5
Associated with immersion	4	0.5
Sudden infant death syndrome (SIDS)	4	0.5
Multiple causes of death (including epilepsy)	78	4
TOTAL	1691	100.0

* Community refers to any place that is not a hospital, i.e. this category includes deaths in nursing / residential care homes etc.

Flow chart showing study cases and exclusion



The quality of an autopsy report

The quality of the autopsy report was judged, by the advisors, to be:

- satisfactory in 52% (873/1,691);
- good or excellent in 23% (382/1,691);
- poor or unacceptable in 26% (436/1,691).

The main factors that determined the advisors' assessment of report quality were:

- a good case history in the autopsy report;
- comprehensive external examination of the body;
- comprehensive and complete internal examination;
- taking samples for further analysis as appropriate to the case;
- providing a clinicopathological correlation that explains the death;
- giving a cause of death that corresponds with the case history and the findings at autopsy.

Supporting documentation

Just under 3,000 pieces of supporting documentation were forwarded, i.e. information that was given to pathologists from coroners.

In 53% (888/1,691) of the cases at least two pieces of supporting documentation were sent. Most commonly, it was a coroner's summary report (available for 57% of cases) or a sudden death report (available for 47% of cases).

Details contained within the supporting documentation (n=1535)

	n=	%
Deceased's date of birth	1480	55
General / treating practitioner details	1151	75
Deceased's occupation	686	45
Specific clinicopathological questions relating to the death (directed from the coroner to the pathologist)	119	8
Specific investigational requests or instructions (directed from the coroner to the pathologist)	35	2

Supporting documentation was often 'unsatisfactory' because important case information that would have been available prior to the autopsy (as noted in the autopsy report) was absent in the supporting documentation. Also:

- Alcohol abuse not mentioned;
- Drug usage, both prescribed and non-prescribed, i.e. illicit;
- Schizophrenia, dementia, epilepsy not mentioned;
- Significant medical history, including operations and diabetes, not mentioned;
- The occupation of the deceased, including asbestos exposure or previous diagnosis of mesothelioma, not mentioned;
- Not enough data on hanging or trauma related to death;
- Information just too brief or muddled;
- Information handwritten and illegible.

In the majority of mortuaries (97%, 187/193) instruction for the autopsy was either written, or were a combination of written and oral. In 2.5% (5/193) of mortuaries instruction for autopsy are given orally only.

Case history

Of all cases assessed, 79% (1,340/1,691) contained a case or clinical history within the autopsy report. Overall, the advisors rated the history to be good or satisfactory in over 89% of the reports.

Advisors commonly noted the following reasons where a history was marked as unsatisfactory. The autopsy report:

- Omitted important past medical history (including medications);
- Omitted information that was available in the supporting documentation;
- Omitted important occupational history / exposure;
- Was generally too brief, which gave insufficient details about the circumstances of the death.

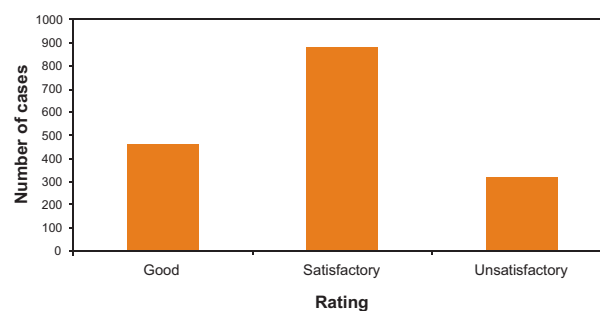
Height and weight

Overall 68% (1,148/1,691) of cases recorded the deceased's height, 55% (933/1,691) recorded the deceased's weight.

External appearance and identification features

Nearly all cases (98%, 1,658/1,691) contained a description of external appearances and some identification features.

Quality of the description of the external appearances and identification features



The advisors' reasons for grading the external description as unsatisfactory included:

- No mention of injury or trauma (or lack thereof);
- No mention of needle marks etc. in known intravenous drug users;
- Poor description of identification features;
- Inadequate or no description of surgery in cases that had recently undergone an operative procedure;
- Inadequate description of decomposed cases;
- Overall, poor, brief and no listing of important negatives in the context of the case.

Evisceration and dissection of bodies

To perform an autopsy, the body has to be opened and the organs removed for detailed examination and dissection. This is the process of evisceration; a process that is carried out either by the pathologist or by the technical staff in the mortuary.

Did pathologists see the bodies before evisceration?

- In one third, 32% (63/193) of all mortuaries, it was standard practice that the pathologist was **not** obliged to inspect the body externally before the evisceration and organ removal commences.

Opening the skull and examining the brain

- In 14% (238/1,691) of cases the brain was not examined. Approximately 80% of these cases were deaths in the community.

Decomposed bodies

Sixteen (1%, 16/1,691) cases were reported as significantly decomposed. The advisors considered that the majority of these cases were not examined and evaluated properly. The commonest scenarios were:

- Known alcohol abuse;
- Known illicit drug abuse;
- Found hanging by the neck.

Tissue retention

This includes retention of whole organs or significant parts thereof, small tissue samples for histopathology, and blood and other samples for various analytical purposes.

- Only 64% (121/188) of mortuaries had the facility to store fixed tissues and organs;
- Whole organs (or major parts) were retained at autopsy in only 10 cases (<1%, 10/1,691).

Histology

- In 65% (1,093/1,691) of cases, a positive statement was made in the report about whether or not histology was taken;
- In 19% (314/1,691) of cases, histopathology samples were taken.

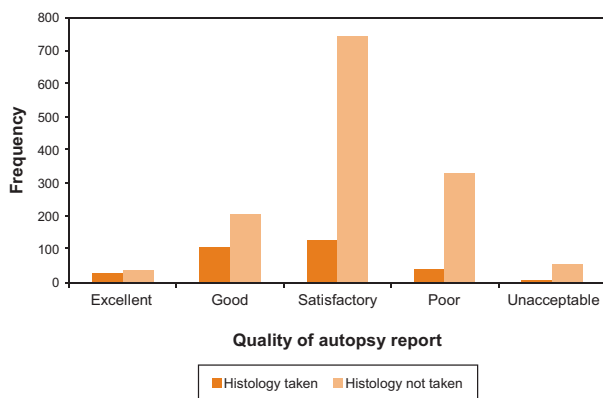
The advisors indicated the following major issues where they believed that diagnostic histopathology was important in the case but not done:

- Cancer primary diagnosis or confirmation;
- Liver – cirrhosis and/or alcohol related disease;
- Heart – cause of hypertrophy and/or cardiomyopathy;
- Tuberculosis and other pneumonias;
- Epilepsy;
- Stroke and other CNS disorders.

Did the retention of tissues affect the overall quality of the report?

A higher proportion of cases were rated as excellent or good in the cases where histology was taken.

Overall quality of the autopsy report in cases that did or did not take histology



Other samples

Other specific investigations that, in the advisors' opinion, should have been done in many cases but were not, included:

- Alcohol;
- Illicit drug toxicology;
- Glucose-related, in diabetics;
- Microbiological studies;
- Mast cell tryptase, to identify acute anaphylactic shock.

Were the listed causes of death appropriate?

Eighteen percent (310/1,691) of cases did not meet the cause of death criterion: takes "appropriate account of the clinical course and autopsy findings as presented in the report and in the supporting documentation".

There were seven specific areas where the advisors believed causes of death to be incongruent with the information available (history and autopsy examination).

- Most commonly, cardiac enlargement (hypertrophy) as the cause of death without appropriate investigations and correlation. Hypertension or a primary cardiomyopathy were possibilities that should have been pursued further;
- The others were cancer, infection, alcohol, possible suicide, perioperative deaths and epilepsy.



Children and the elderly

The overall quality of the autopsy reports in children and the elderly, compared to adults is shown in the following tables.

Overall quality of the autopsy reports in adult and child cases

	Excellent	Good	Satisfactory	Poor	Unacceptable
Adults (17 to 94)	63	307	850	364	60
Children (≤ 16)	4	5	12	1	1
TOTAL	67	312	862	365	61

Overall quality of the autopsy reports in adult cases and those aged 95 years and older

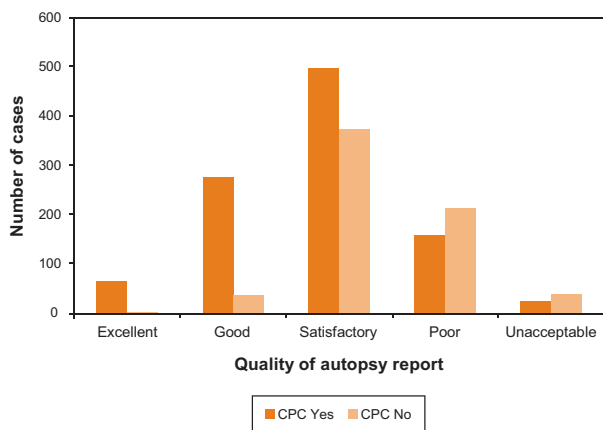
	Excellent	Good	Satisfactory	Poor	Unacceptable
Adults (17 to 94)	63	307	850	364	60
Elderly (≥ 95)	0	3	11	8	2
TOTAL	63	310	861	372	62

The advisors had concerns over the quality of autopsy examinations in the very elderly and have the impression that they are done less carefully than those on younger patients.

Clinicopathological correlation (CPC)

Sixty one percent (1,025/1,691) of the autopsy reports included a CPC, the majority of which were clearly expressed, consistent with the factual contents of the report and relevant to the circumstances of the death.

Overall quality of the autopsy reports in cases that did or did not include a clinicopathological correlation



Quality of autopsy report and the position of pathologist

Some excellent reports were prepared by specialist registrars (SpR) and other trainee pathologists. It was found, overall, that SpRs and paediatric pathologists produced better quality reports than other consultant histopathologists and Home Office (forensic) pathologists.

Mortuary workloads

The number of coronial autopsies performed in the mortuaries in the year to end-March 2005 was a median of 472 (range 4-2017).

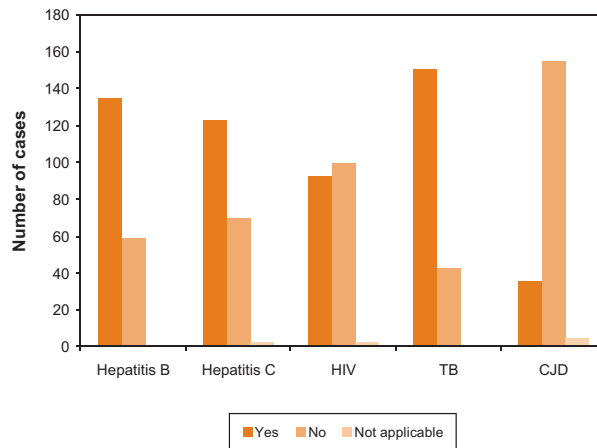
Mortuary workload



These data show that on average 10 autopsies a week were performed in 50% (98/193) of mortuaries; however there were 4% (8/193) where less than 52 a year were performed.

Infectious cases for autopsy

Not all mortuaries accept cases for autopsy that are known or suspected to be infected with serious communicable diseases. The graph shows the acceptance rates with respect to five infectious diseases.



Only three quarters of the mortuaries (150/192) would perform autopsies on persons suspected or known to have tuberculosis; for hepatitis B and C infections, the proportions are only two thirds (134/192 and 122/191 respectively); for HIV under half of mortuaries (92/191); and only one fifth (35/189) would examine a person with known or suspected CJD.

Clinical pathology accreditation

Seventy seven percent (140/183) of mortuary managers reported having clinical pathology accreditation (CPA). Twenty three percent (43/183) reported not having CPA. The remaining 10 did not know whether or not the facility had CPA.

There was a much higher percentage of local authority ('public', non-NHS) mortuaries (69%) that did not hold clinical pathology accreditation or equivalent than of hospital mortuaries (18%). It was acknowledged that CPA Ltd (UK) presently do not accredit non-NHS mortuaries.



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