Forensic Science Regulator
Overseeing Quality

The Royal College of Pathologists
Pathology: the science behind the cure

Forensic Science Regulator Guidance

The Use of Time of Death Estimates Based on Heat Loss from the Body

FSR-G-211

Issue 3

1. Purpose

1.1.1 This document provides guidance on the use of results from methods to estimate the time of death (ToD) on the basis of heat loss from the body.

2. Scope

2.1.1 There are a number of methods of ToD estimation based on different post mortem changes to the body. This guidance applies only to those based on heat loss from the body.

3. Development

3.1 Initial Consideration

3.1.1 Dr Richard Shepherd (then a Home Office registered forensic pathologist) identified an error in the content of a respected textbook in relation to the estimation of the ToD and raised this issue with the profession. That led to the matter being raised with the Forensic Science Regulator (the Regulator).

3.1.2 The Regulator sought the views of the Forensic Pathology Specialist Group (FPSG).

3.1.3 The FPSG considered not only the issues raised by the error but also the general robustness of this type of ToD estimation. This led to the production of an interim report which was provided to the Regulator.

3.2 Consultation

3.2.1 The interim report was circulated, seeking comment, to the following groups of forensic pathologists.

a. Those, in England and Wales, on the Home Office Register of Forensic Pathologists;
b. Those, in Scotland, who acted for the Crown Office and Procurator Fiscal Service; and
c. Those in the State Pathologist's Department in Northern Ireland.

3.2.2 The responses to the request were supportive of the approach proposed in relation to ToD estimation. There was some comment on the wider issue of ToD estimation that are not relevant to this document.

4. Implementation

4.1.1 Issue 3.0 of this document became effective on 22 September 2020.

5. Modification

5.1.1 This is the third issue of this document.

5.1.2 Significant changes, from the last published version, to the text have been highlighted in grey

5.1.3 The modifications made to create Issue 3 of this document were, in part, to ensure compliance with The Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018. [1]

5.1.4 The Regulator uses an identification system for all documents. In the normal sequence of documents this identifier is of the form 'FSR-#-###' where (a) the '#' indicates a letter to describe the type or document and (b) '###' indicates a numerical, or alphanumerical, code to identify the document. For example, the Codes are FSR-C-100. Combined with the issue number this ensures each document is uniquely identified.

5.1.5 In some cases, it may be necessary to publish a modified version of a document (e.g. a version in a different language). In such cases the modified version will have an additional letter at the end of the unique identifier. The identifier thus becoming FSR-#-####.

5.1.6 In all cases the normal document, bearing the identifier FSR-#-###, is to be taken as the definitive version of the document. In the event of any discrepancy between the normal version and a modified version the text of the normal version shall prevail.

[1] To facilitate compliance with the Regulations changes to the document are noted here. The following sections of the document have been changed – 3.1.1, 4.1.1. 5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.1.5, 5.1.6 and 9. The following footnotes have been altered - 1.

6. Guidance

6.1 Background

6.1.1 A considerable amount of valuable research has been performed on the subject of ToD estimation and on methods based on heat loss from the body in particular. Nothing in this guidance should be interpreted as a criticism of that research or those who performed it.

6.1.2 As is to be expected in any research projects of this type this work was carried out in carefully controlled conditions and factors which might influence the heat loss were either controlled or carefully monitored. Further, the number of bodies involved in the studies was limited (no doubt as a result of the practical issue of supply) when compared to the potential variability of the human body.

6.1.3 The result of the various pieces of research is a number of models which allow the pathologist to provide an estimate of the time period in which the death was likely to have occurred.

6.1.4 It is important to note that the models recognise that the ToD estimate can, in a proportion of cases, be inaccurate.

6.2 Application to Cases

6.2.1 The application of these models to real cases is difficult for a number of reasons. [2] There are two basic areas that cause complication.

a. The models were derived from specific sets of data and their application to any other death is, necessarily, less robust.
b. The real death will not have occurred in a controlled or monitored environment.

6.2.2 In relation to the second of these points a number of issues arise. While none of these issues prevent the use of the models from being employed, they do highlight the results may be influenced by factors that cannot be completely addressed in the model. The issues include the following.

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[2] In reporting the results of the research the authors made clear there were limitations and cases in which it would be unwise to use the model.

a. A number of factors which are relevant to the application of the model will not be known.

   i. The temperature of the body at the point of death will not be known.
   ii. The temperature of the environment at or since death will not be known.
   iii. The level of air flow over the body will not be known.

b. A number of factors will be difficult to build into the model in a case specific manner. These include the following.

   i. The impact of clothing on the cooling rate.
   ii. The impact of the environment on cooling (e.g. insulation effects provided by lying on carpets or furniture).
   iii. Potential external heat sources.
   iv. The nature of the body in the case.
   v. The potential impact of injuries/wounds to the body (e.g. large abdominal lacerations).

6.2.3 These issues must be combined with the inevitable issues of uncertainty in any measurements made (e.g. temperature or mass) and in the use of the model. [3]

6.2.4 In some cases the issue may be further complicated by there being different cooling periods or even heating/cooling periods as a result of changes in the environment.

6.2.5 The above leads to a number of conclusions.

a. In any case the pathologist cannot know, and cannot (by the use of this method) determine, the accuracy of the ToD estimate which has been made.
b. Some of the models allow a prediction with a 95% confidence limit. This does not mean there is a 95% probability the death occurred within the period provided by the model.

[3] Again lack of certainty on the mass or temperature does not prevent the models being employed but reflect variables that are not properly controlled with a resultant impact on the confidence which can be placed in the results.

6.3 Use of Results

Investigations

6.3.1 A ToD estimate may be of great value to the investigator in focusing attention on a particular period or prioritising lines of enquiry. However, the limitations of the estimate must be clear to the investigator.

6.3.2 When providing a ToD estimate to the investigator the pathologist should take the following steps.

a. The pathologist must make clear the estimate is only an estimate and the accuracy cannot be determined.
b. The pathologist must explain that the death could have occurred outside the estimated period and, perhaps, a significant period outside it.
c. Advise that the estimate should not be used to:
    i. Define the period in which death occurred;
    ii. Assign probabilities to likely periods of death; or
    iii. Include or exclude a suspect from the investigation.

Evidence

6.3.3 When providing any report or statement the pathologist should make clear the limitations of any ToD estimate provided. In essence the points listed in paragraph 6.3.2 should be covered in the statement/report.

7. Acknowledgement

7.1.1 The College and the Regulator would like to acknowledge the assistance of the following in the production of this guidance.

a. The Speciality Advisory Committee on Forensic Pathology of the Royal College of Pathologists.
b. The Forensic Pathology Specialist Group.

8. Review

8.1.1 This document is subject to review at regular intervals.

8.1.2 If you have any comments please send them to the address or e-mail set out on the Internet at URL: www.gov.uk/government/organisations/forensic-science-regulator

9. Abbreviations and Acronyms

Text	Meaning
FPSG	Forensic Pathology Specialist Group
ToD	Time of Death
URL	Uniform Resource Locator

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