



## **Skeletal Survey for Suspected NAI, SIDS and SUDI: Guidance for Radiographers**

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### **Summary**

Summary: SCoR is grateful to members of the Association of Paediatric Radiographers for producing this guidance document which will be invaluable for managers and radiographers involved in imaging in the event of Suspected Non-Accidental Injury, Sudden Infant Death Syndrome and Sudden Unexplained Death in Infancy/Childhood

### **Foreword**

This document has been produced by The Association of Paediatric Radiographers (APR) and The Society and College of Radiographers (SCoR) following publication of Guidance for Radiographers Providing Forensic Radiography Services<sup>(1)</sup> and Standards for Radiological Investigations of Suspected Non-accidental Injury<sup>(2)</sup>. The aim is to provide further support, practical advice and information to all radiographers involved with imaging suspected Non- Accidental Injury (NAI), Sudden Infant Death Syndrome (SIDS) and Sudden Unexpected Death in Infancy/Childhood (SUDI). This guidance should be read alongside further advice relevant to imaging children contained in The Child and the Law: The Roles and Responsibilities of the Radiographer which was published in 2005<sup>(3)</sup>.

Since children are legally considered to be those under 16 years of age in Scotland and under 18 years in the rest of the UK, this document defines children in the same way and this document has relevance for imaging all up to 16 years (Scotland) or 18 years (England, Wales and Northern Ireland). However, in practice it would be extremely rare to perform a skeletal survey on children over the age of two years as other imaging techniques may be initially more suitable.

For a child who may have suffered abuse, imaging may be essential if patterns of trauma that are consistent with NAI are to be detected. In children under the age of two years, a full skeletal survey should always be performed; older children will be discussed on a case-by-case basis<sup>(2)</sup>.

Information on all child deaths (under 18years) will be reviewed by a Child Death Overview Panel<sup>(4)</sup>. This process is mandatory in England, but processes in Scotland, Wales and Northern Ireland will differ. An unexpected child death will be investigated following the principles set out in the Sudden Unexplained Death in Infancy<sup>(5)</sup>.

Although skeletal survey imaging for suspected NAI is a forensic examination there are areas in which practical and clinical considerations will produce additional considerations to those recommended in the Guidance for Radiographers Providing Forensic Radiography Services<sup>(1)</sup>.

Information gained from performing investigations into suspected NAI may present child protection

issues not only for the child under investigation but also other siblings. Safeguarding children is the responsibility of all professionals(6). This document offers advice towards a suggested protocol for all staff who are involved with children and their families and/or guardians.

## Introduction

The forensic radiographic skeletal survey is the principal radiological investigation in suspected child abuse. Images are frequently presented as diagnostic evidence in child protection cases, criminal proceedings and other types of litigation.

The high technical standards required for a skeletal survey place very significant demands on the imaging department(2). The examination is time consuming and may be distressing for all concerned. Consideration and support should be given to the radiographers, nurses and other healthcare staff responsible for the child's welfare while in the imaging department. This is a difficult examination and every effort should be made to put the child and parents/guardians at ease.

In performing forensic skeletal surveys, radiographers should be aware of the following legislation and guidelines:

- Guidance for Radiographers Providing Forensic Radiography Services(1).
- The Child and the Law: The Roles and Responsibilities of the Radiographer(3).
- Sudden Unexplained Death in Infancy(5).
- Standards for Radiological Investigations of Suspected Non-accidental Injury(2).
- Ionising Radiation (Medical Exposure) Regulations (IR(ME)R) 2000(7). In addition, all staff must follow their own local rules written under IR(ME)R.
- Additional legislation is available from the Scottish Government Health Department, Welsh National Assembly and Northern Ireland Department of Health and Social Services.

## Definitions

The main areas for which a paediatric forensic skeletal survey may be required are:

1. Suspected Non-Accidental Injury (NAI) in live children.
2. Sudden Infant Death Syndrome (SIDS) formerly known cot death.
3. Sudden Unexpected Death in Infancy/Childhood (SUDI).

The forensic NAI skeletal survey may reveal unsuspected injuries which require medical treatment. These images provide essential information to aid clinical decision-making, particularly with respect to identification of unsuspected fractures and underlying skeletal disorders.

The forensic post mortem skeletal survey of a child is routinely recommended(5) and may provide evidence to support the investigation into circumstances surrounding an unexplained death.

## Suspected NAI Skeletal Survey in Children - A Recommended Protocol

The forensic skeletal survey is an essential part of any investigation into suspected non accidental

injury and images of the highest quality are required to aid diagnosis.

Two radiographers working together should carry out the skeletal survey(2) and one of these should be specifically trained in paediatric forensic techniques. The skeletal survey should be performed in accordance with departmental and employing authority protocol.

## Out of Hours NAI Skeletal Survey

Suspected NAI skeletal survey should not routinely be performed out of normal departmental working hours. Owing to the inherent technical difficulties and legal responsibilities, a skeletal survey should be performed when there is a full complement of radiographic and radiological staff to image and report the examination(2).

If, due to exceptional circumstances, (for example, if there is concern for siblings who remain with the potential abuser) a survey is required out of hours, this must be discussed with the on-call consultant radiologist and radiographer. A child referred for a suspected NAI radiographic examination out of hours will have areas of acute injury imaged in the normal way, as part of the routine investigation of an injured child.

Investigation of acute injury may include ultrasound (US), Computed Tomography (CT) or Magnetic Resonance Imaging (MRI). These requests will be discussed with the on-call radiologist and radiographer.

## Referral

All referrals should be made by the patient's medical consultant who would be appropriately experienced. An NAI skeletal survey request fulfilling IR(ME)R requirements will be accepted from the medical consultant or from a doctor acting on their behalf.

The consultant radiologist/radiographer responsible for reporting the survey should discuss the case with the referring consultant before proceeding with the examination. Justification of the examination rests with the IR(ME)R practitioner and must adhere to IR(ME)R 2000(7) . Follow up imaging should be documented following the same protocols.

## Consent

Parents/guardians of the child must fully understand the extent and nature of the skeletal survey prior to examination and informed consent must be obtained. Informed consent must be obtained by the referring paediatrician, and documented in the child's medical record. However it is recognised that in some circumstances a court order may be required.

If consent is declined the skeletal survey request will be referred back to the patient's medical consultant, who may apply to the court or local authority for consent(8). Parental/guardian consent must be verbally reaffirmed by the examining radiographer(s). Where there are language difficulties, translation services must be used prior to, and during, the examination.

## Preparation

The examination should be carried out in a designated room with the necessary paediatric immobilisation and distraction equipment. Two radiographers working together should carry out the skeletal survey(2) and one of these should be specifically trained in paediatric forensic techniques.

Prior to the examination, and in accordance with departmental protocol and IR(ME)R procedure, the examining radiographer(s) must correctly identify the child.

A nurse, healthcare professional or social worker must be present during the examination to assist, and act as witness.

Parents/guardians or foster carers may also assist during the examination including parents under the age of 18 years.

A full explanation should be given to the parents/guardians or foster carers and staff acting as witnesses to ensure that they understand the examination and what may be expected of them.

The examination is lengthy and may be distressing for both child and parent(s). If either of the parents feel they do not want to be present, another family member or healthcare professional may assist in their place.

There may be occasions during the imaging procedure when the parents/guardians or foster carers may become difficult or obstructive. It may become necessary for the radiographer to stop the procedure and explain the situation to the referrer, and document the actions taken.

## Documentation

During the documentation and imaging processes, continuity of evidence must be ensured at all times(1).

- All radiographer(s) who perform a forensic NAI/SUDI/SIDS examination must record their radiographic details on the Radiology Information System (RIS) and/or the radiology request form.
- All other witnesses present during the examination must also be documented by name and position on the RIS and/or the radiology request form.
- It is best practice to document projections, exposure factors and dosimetry, which can be used as reference for subsequent imaging. Examples of two suggested Imaging Records are attached in Appendix A.
- It is necessary that radiographers performing the examination are identified, either from the RIS record and/or by initials annotated onto digital images. Analogue hard copy images should be initialled using an indelible marker.
- Prior to the child leaving the department, all radiographic images should be checked by a consultant paediatric radiologist, or designated radiologist/paediatric radiographer who will decide if further views are required(2).

## Imaging

The NAI skeletal survey must be carried out following the Standards for Radiological Investigations of Suspected Non-accidental Injury(2) and imaging department guidelines and protocols.

- Adherence to the ALARP and IR(ME)R principles are paramount in all paediatric radiography.
- Repeat projections, as appropriate, are recommended after 11-14 days(2) to evaluate known or suspected injuries and must be documented as above with IR(ME)R justification.
- Neuro-imaging, CT (brain and bone windows) is the method of choice in the acute phase(2).
- All digital and analogue images must contain the following details:
  1. Correct patient identification; name and date of birth
  2. Correct radiographic side markers
  3. Because of authentication of evidence, it is recommended that primary markers be used within the collimated radiation field. Where ever possible, the side marker should not be placed over any area of soft tissue.
  4. If a side marker is not visible during digital acquisition, the examining radiographer must immediately annotate the image. If a side marker is not visible following analogue acquisition, the examining radiographer must immediately identify un-marked images using an indelible or punch marker.
  5. Date and time of examination.
  6. During digital acquisition of images, radiographer(s) must follow a documented pathway of recording the radiographers performing the examination and may annotate their initials onto each image. Analogue images must be initialled using an indelible marker.
- All imaging, along with the original Imaging Record if used, must be securely stored and its location documented.
- Recommended retention of children and young people's images is as follows: until the patient's 25th birthday, or if the patient was 17 at conclusion of treatment until their 26th birthday, or until 8 years after the patient's death if sooner. Scotland: until the patient reaches the age of 25, or 3 years after death if earlier. In litigation cases, records reviewed 10 years after file closed. Once litigation has been notified, images should be stored until 10 years after the file has been closed(9).
- Changes to image headers (patient demographics etc) on digital images archived to PACS, to be securely stored as the electronic pathway is fully traceable. Annotations are not, therefore radiographers must follow the imaging guidelines 1-6 above.
- Analogue or digital copies may be requested by the investigating police officer or for review by an expert witness and may be collected in person by the investigating officer. Digital copies (CDs) which are to be sent offsite must be made using encryption software and sent in accordance with departmental and employing authority protocol. Full details of all copies must be noted on the patient's departmental RIS record and documented according to departmental protocol.

## Child Protection Responsibilities

*"Child protection training is essential for all health professionals engaged in services for children. It is not an optional extra"*

**Barry Capon, chair, independent enquiry into the death of Lauren Wright 2002(8).**

Staff should be familiar with section 3 of The Child and the Law (SoR 2005) (2).

Inter-agency communication is vital to promote the welfare of children and is the responsibility of staff within the statutory, independent and voluntary sectors(6).

It is important that all staff be given training to feel confident and competent in reporting child protection concerns through the correct channels. Some members of the imaging workforce, for example, sonographers may be overlooked when child protection is given and it is important to include them as they may well become aware of a possible child protection issue during the imaging process.

If any member of staff observes anything untoward during a child's examination, the appropriate

staff must be informed. This might include any of the following:

- Disclosure to a member of staff by the child or a relative.
- Marks not previously noted such as a bruise, bite, or burn.
- Inappropriate behaviour or language from an accompanying adult/sibling.
- Inappropriate handling of the child by an accompanying adult/sibling.

Staff may feel uncomfortable reporting such details but protection of the child is paramount and it is the duty of the radiographer to report and document concerns as follows:

- If in Accident and Emergency or in-patient – inform nurse in charge of ward/department or referring consultant or on-call paediatrician and make a contemporaneous note of doing so.
- If Out-patient/GP referral – child must not leave the hospital until following staff have been informed: named nurse for child protection or the senior paediatric nurse on duty.
- Staff must record written details of their observations as described in local child protection protocol. This information will then be recorded in the patient's medical record.

## Sudden Unexpected Death in Infancy (SUDI) or Sudden Infant Death Syndrome (SIDS) Forensic Skeletal Survey

Forensic Skeletal Surveys provide evidence that informs the investigation of SUDI and SIDS cases. "The post mortem procedure should routinely include a full radiological skeletal survey, reported on by a radiologist with paediatric training and experience" [\(5\)](#).

In performing such examinations, radiographers should be aware of the Guidelines for the Provision of Forensic Radiography Services [\(1\)](#) and follow local imaging forensic protocol.

Forensic Skeletal Surveys for SUDI/SIDS should normally be performed by the employing authority to which the cadaver is taken by the police as part of their initial process. However, there may be occasions where this does not happen. In this circumstance, the cadaver will be taken to a hospital where appropriate paediatric forensic pathology services are available. If the death is suspicious and the Home Office pathologist does not have paediatric experience, it is recommended that they should work alongside a paediatric pathologist or one with paediatric experience [\(5\)](#).

Any items of clothing/jewellery etc removed during the examination must be returned with the cadaver.

## Out of Hours SUDI/SIDS Skeletal Survey

These examinations are not normally performed during out of normal working hours and a radiographer has no obligation to perform cadaver examinations.

If, due to exceptional circumstances, a post mortem and skeletal survey are required out of hours, radiographers trained in paediatric and forensic techniques, in accordance with local employing authority protocol, should perform the skeletal survey.

Employing authority protocol should contain a register of forensic radiographers willing to perform out of hours skeletal survey examinations.

## Referral

- Requests for cadaver examinations are authorised by the coroner.
- A fully completed imaging request for an NAI skeletal survey will be accepted from a consultant paediatrician, consultant radiologist, coroner or nominated coroner's officer

## Documentation

During the documentation and imaging processes, continuity of evidence must be ensured at all times(1).

- It is necessary that radiographer(s) who perform a forensic NAI/SIDS/SUDI examination are identified, either from the RIS record and/or by initials annotated onto digital images. Analogue hard copy images should be initialled using an indelible marker.
- All other witnesses present during the examination must also be documented by name and position on the RIS and/or the radiology request form.
- It is best practice to complete an Imaging Record to document projections, exposure factors and personnel (an example of which is seen in Appendix A).
- Prior to the cadaver leaving the department, all radiographic images should be checked by a consultant paediatric radiologist, or designated radiologist/paediatric radiographer who will decide if further projections are required.

## Imaging

Due to the need for high quality diagnostic images it is recommended that wherever possible these examinations are performed within the imaging department.

Patient dignity and religious observances should be respected at all times. Maximum discretion within the imaging department is essential for timing and choice of suitable examination room.

Employing authority control of infection guidelines must be followed.

- The SIDS/SUDI skeletal survey must be carried out following the Standards for Radiological Investigations of Suspected Non-accidental Injury(2) and imaging department guidelines.
- It is recommended as best practice that, whenever possible, two radiographers perform the skeletal survey and at least one radiographer should be trained in paediatric/forensic techniques.
- The coroner's officer or a police officer assigned by the police senior investigating officer may act as a witness for these examinations. This is particularly important over weekends and bank holidays.
- During the examination a mortuary assistant, pathologist or police officer must also be present as a witness and to confirm cadaver identification. Her/his name and position must be recorded on the request form and/or RIS.

All digital and analogue images must contain the following details:

1. Correct patient identification; name and date of birth.
2. Correct radiographic side markers.

3. Because of authentication of evidence, it is recommended that primary markers be used within the collimated radiation field. Where ever possible the side marker should not be placed over any area of soft tissue.
  4. If a side marker is not visible during digital acquisition, the examining radiographer must immediately annotate the image. If a side marker is not visible following analogue acquisition, the examining radiographer must immediately identify un-marked images using an indelible or punch marker.
  5. Date and time of examination.
  6. During digital acquisition of images, radiographer(s) must follow a documented pathway of recording the radiographers performing the examination and annotate their initials onto each image. Analogue images must be initialled using an indelible marker.
- All imaging, along with the original Imaging Record if used, must be securely stored and its location documented.
  - Recommended retention of children and young people's images is as follows: until patient's 25th birthday, or if the patient was 17 at conclusion of treatment until their 26th birthday, or until 8 years after the patient's death if sooner. Scotland: until the patient reaches the age of 25, or 3 years after death if earlier. In litigation cases, records reviewed 10 years after file closed. Once litigation has been notified, images should be stored until 10 years after the file has been closed(9).
  - Changes to image headers (patient demographics etc) on digital images archived to PACS, to be securely stored as the electronic pathway is fully traceable. Annotations are not, therefore radiographers must follow the imaging guidelines 1-6 above.
  - Analogue or digital copies may be requested by the coroner, investigating police officer or for review by an expert witness and may be collected in person by the investigating officer. Digital copies (CDs) which are to be sent offsite must be made using encryption software and sent in accordance with departmental and employing authority protocol. Full details of any copies must be noted on the patient's departmental RIS record and documented according to departmental protocol.
  - If required during post mortem the analogue/hard copy images should be made available to the pathologist, who on completion should return them to radiology for storage.

## Radiologist Report

The Kennedy Report (Sudden Unexpected Death in Infancy(5) makes it clear that all NHS Hospital Trusts have a duty to provide an appropriate reported radiographic examination prior to post mortem(2).

## Appendix A

[Download 'Suspected NAI/SIDS/SUDI Skeletal Survey Imaging Record'](#)

[Download 'NAI SKELETAL SURVEY Radiographer Imaging Record'](#)

## References

1. SCoR Guidance for Radiographers Providing Forensic Radiography Services SCoR 2008
2. The Royal College of Radiologists and Royal College of Paediatrics and Child Health Standards

- for Radiological Investigations of Suspected Non-accidental Injury RCR, RCPCH 2008
3. SCoR The Child and the Law: The Roles and Responsibilities of the Radiographer SCoR 2005
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  5. The Royal College of Pathologists and The Royal College of Paediatrics and Child Health Sudden Unexpected Death in Infancy RCR, RCPCH 2004
  6. Department of Health National Service Framework: Every Child Matters; Working Together to Safeguard Children DH 2006
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1. Department of Health Children Act DH 2004
2. The Child Protection Companion (1st Edition) – The Royal College of Paediatrics and Child Health London April 2006
3. The Royal College of Paediatrics and Child Health – Child Protection Companion April 2006 section 5.1.4

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