8. Safe Management of Pacemakers and other implanted devices

8.1 Various types of implanted devices need careful consideration to ensure safe and appropriate care after death (see Box 5 for types of devices).

8.2 Guidance on management of cardiovascular implanted electronic devices (CIEDs) in people towards the end of life, during cardiopulmonary resuscitation and after death has been developed by the Resuscitation Council (UK), British Cardiovascular Society and National Council for Palliative Care (Pitcher, D., Soar, J., Hogg, K. *et al. Heart* 2016; **102**:A1-A17).

8.3 If a patient with a CIED dies suddenly and unexpectedly, early interrogation of the device by a cardiac devices physiologist should be considered to seek information about cardiac rhythm and device behavior immediately prior to death. This may help to establish the mechanism and cause of death.

8.4 Implantable Cardioverter Defibrillators must be deactivated before post-mortem examination and/or before any attempt is made to remove the device, to avoid the risk of a shock to the person carrying out the procedure.

8.5 Battery-powered electronic and other devices may explode when heated to a high temperature, and must therefore be removed if the deceased person is to be cremated. A current list of potentially hazardous implants (this may change in future) is included in Box 5 (below). If removal is necessary prior to cremation, this is generally carried out by the funeral director according to the family's instructions.

Box 5: Implants that can cause problems during cremation include:

- Pacemakers
- Implantable Cardioverter Defibrillators (ICDs)
- Cardiac resynchronisation therapy devices (CRTDs)
- Implantable loop recorders
- Ventricular assist devices (VADs)
- Implantable drug pumps including intrathecal pumps
- Neurostimulators (including for pain and functional electrical stimulation e.g. sacral nerve stimulators, dynamic graciloplasty)
- Bone growth stimulators
- Hydrocephalus programmable shunts
- Any other battery powered implant
- Expandable intramedullary nails (e.g. Fixion nails)
- Radiotherapy – see section 7.

8.6 Any known implants that would present a risk during cremation must be recorded in section 2 of the Deceased Adult Inpatient Notification Form by the healthcare professional who has confirmed the death in accordance with NHS Lothian policy. The form must be transferred and remain with the deceased person at all stages until it is ultimately given to the funeral director (or other person) who collects the deceased person.

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8.7 The doctor completing the Medical Certificate of Cause of Death is required to record the presence, or otherwise, of such devices on the MCCD in box DH2 to the best of his or her knowledge and belief. They should also be able to respond to queries from mortuary staff or cremation authorities regarding any known devices.

8.8 Mortuary staff will not usually remove devices as this is an invasive procedure for which express consent is required from the nearest relative or executor. If a family decides not to use a funeral director and devices need to be removed prior to cremation, the Mortuary may be able to assist. Deactivation, removal, handling and disposal of devices must be carried out in accordance with local policy and procedures.

8.9 ECG Departments can provide advice and send an appropriate pre-addressed container for returning pacemaker-type devices. It is illegal to send contaminated devices and equipment through the post.

8.10 Contact details for ECG Departments:

RIE: 0131 242 1814 (ext 21814)
WGH: 0131 537 1852 (ext 31852)
St John's: 01506 523851 (ext 53851)
RHSC: 0131 536 0625 (ext 20625)

8.11 Orthopaedic joint replacement implants and dental mercury amalgam do not need to be removed.