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<tr>
<td>Yonsheng Gao</td>
<td></td>
<td>Clinical Terminology Specialist</td>
<td></td>
<td></td>
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<tr>
<td>Clinical Imaging Management Management Group (CIMG)</td>
<td></td>
<td>Various</td>
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<tr>
<td>Rhidian Bramley</td>
<td></td>
<td>Consultant Radiologist, RCR representative on CIMG</td>
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<tr>
<td>Maria Braithwaite</td>
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<td>Clinical Terminology Specialist</td>
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<td>Deborah Horwood</td>
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<td>Ken Lunn</td>
<td></td>
<td>Head of Data Standards and Products and Comms and Messaging</td>
<td></td>
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<tr>
<td>Paul Jones</td>
<td></td>
<td>Chief Technical Officer</td>
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1 Purpose

The document describes the use of a set of National Interim Standard Descriptions for Clinical Imaging Procedures, to support early PACS implementations and order communications prior to the introduction of fully SNOMED CT enabled applications. The document describes the principles for the composition of the list and the procedure descriptions it contains. This document should be read when reviewing the list for both initial development and on the occasion of any proposed changes. The document will also describe the processes and procedures available for updating, approving and distributing changes to the code/description set. The audience for this document are system suppliers and end users of systems.

2 Background

2.1 The NHS Care Records Service

The NHS Care Records Service (NHS CRS) will comprise a mix of national and local IT services designed to provide a cradle-to-grave NHS Care Record for each patient, which will transcend traditional care organisations' boundaries. Essential information will be held at local level across health communities, where most care is delivered. In addition, a summary of care encounters and clinical events will be held on a national data repository, the Spine - the clinical aspects of which will be held on the Personal Spine Information Service (PSIS).

2.2 SNOMED Clinical Terms Clinical Imaging Procedures subset

All structured, coded clinical information will be represented on PSIS using SNOMED Clinical Terms® (SNOMED CT). It is therefore essential that Clinical Imaging procedures are represented effectively in SNOMED CT and that the terminology is used consistently throughout the NHS CRS.

A subset of SNOMED CT concepts to describe Clinical Imaging procedures has been developed for the population of the relevant fields in the NPfIT HL7v3 messages. This National Standard list of procedures will aid consistency in data recording and information sharing and hence improve data quality.

This subset is maintained by the SNOMED CT clinical imaging management group (CIMG) – see doc ref NPfIT-NCR-DES-0878.01 Management arrangements for SNOMED CT Clinical Imaging procedures subset.

2.3 National Programme for IT and the NHS PACS Programme

NHS CfH and their respective Local Service Provider (LSP) PACS providers have completed the implementation phase of the PACS Programme. The RIS and PACS systems have previously maintained and utilised many code sets including sets for imaging procedures undertaken. Whilst, traditionally, these procedure code sets have been developed and implemented at a local level it would be beneficial to define and maintain a national standard set of codes in order to maintain interoperability and usability across the Regions.

2.4 Interim coding scheme for existing PACS and RIS systems
2.4.1 Background

A great number of ‘off the shelf’ PACS and RIS systems have been introduced throughout the NHS in England at a very rapid pace. All of these systems need procedure codes and descriptions to enable the business of imaging departments to be conducted effectively.

A collaborative effort from many parties produced the SNOMED CT Clinical Imaging procedures subset to support the HL7 messages to PSIS and between compliant systems. However, the first tranche of new, ‘off-the-shelf’ systems being rolled out in support of PACS cannot (technically) use either SNOMED CT codes or descriptions.

In order for the Local Service Providers (LSPs) to deliver common functionality to their applications some regional catalogues of procedure descriptions were developed. These were arrived at by means of an analysis of terms utilised in current systems and then a rationalisation of these through best practice group review or similar processes. A great deal of business domain knowledge was applied in the generation of these lists and have resulted in a great number of descriptive terms describing practice within and from the perspective of that community.

It is also recognised, both for clinical communication and various secondary uses, that it is important that any list should be consistent over as large a geographic area as possible – the ideal would be a National list.

As a result of discussions with regional representatives, suppliers, clinical representatives and other stakeholders associated with the National Programme for IT, it became apparent that there was a need for these regional lists to converge into a National list of standard, unambiguous descriptions of radiology procedures.

2.4.2 Proposal

The original proposal was that the local codes used in each of these local or regional systems could be mapped to the National SNOMED CT subset. This task would have to be undertaken by every local health community as there are so many lists to map from/to.

In addition, the local codes, even if adopted region-wide, would still require the same robust on-going management arrangements as utilised for SNOMED to keep pace both with the changes in the SNOMED subset and changes in the local list (and the maps between the two codesets).

In recognition of the difficulty of establishing multiple management arrangements for each local/regional list, the SNOMED CT Clinical Imaging Procedures Subset Management Group (CIMG) requested that this task be undertaken by the ‘central’ terminology service. It was agreed that a single list should be adopted for interim use in the newly installed ‘legacy’ systems. It was further recommended that the starting point for this list would be the one developed in conjunction with the Royal College of Radiologists, already being adopted in new installations in some of the regions and which had already had significant consultation in mapping to the SNOMED subset.

For clarity, all references to a previous procedure list in the body of this document is to the following, sometimes referred to as the ‘London catalogue’:

CRS Radiology Catalogue v2.0 (Examination Code Set), NPFIT-LON-LBP-0228.06

This editorial principles document describes all aspects of the representation and ongoing maintenance of this ‘interim’ solution which will supersede that detailed above and should be read alongside the implementation guidance (ref NPFIT-NCR-DES-1087.01). The implementation guidance will assist end-users and system administrators to understand what approach to take when moving from their local lists to this National standard, and what is permissible to continue to do in support of local business imperatives.
3 Principles underlying the composition of the interim descriptions

The composition of the earlier lists were subject to variable levels of editorial control and as a consequence common components were often represented rather differently and representation was in some cases inconsistent. The editorial principles and associated processes described here represent an attempt to take the ‘best’ aspects of each of the forerunner lists to provide consistent guidance for the creation and on-going maintenance of the interim descriptions for as long as they are required.

The group originally set up to manage the SNOMED CT subset was also felt to be best placed to formally manage this interim representation. The composition of this group is described in the document “Management arrangements for SNOMED CT Clinical Imaging procedures subset” document reference NPFIT-NCR-DES-0878.01.

The National standard SNOMED CT subset (as described in NPFIT-NCR-DES-0878.01.) comprises simply modality (or imaging method), the body site and where necessary the laterality (by post-coordination) - these are the only aspects that would be expected to be communicated to PSIS in coded, structured form. In the National SNOMED subset it was agreed that the descriptions should be clear and unambiguous both within and outside the DI business domain and that the descriptions should represent only ‘clinical’ activity and not administrative functions.

It is just as important that, in common with the SNOMED subset, the style of representation must be consistent. This therefore requires that consistent common representations for procedures of each modality for the interim representation be established. There are many facets of the description to consider - for instance word order, the use of prepositions, suffices and plurals.

Each facet of a procedure that could potentially be represented in a procedure description is described in the following sections.

All exceptions to the Editorial principles must be agreed by the CIMG and their submission must be accompanied by an explanation in the associated implementation guidance.

3.1 Modality (method)

Almost every DI procedure uses some form of energy (eg radiation or ultrasound) to produce a form of image – the ‘type’ of imaging performed is commonly referred to as the modality. Depending on the reason for differentiating between the modalities or procedures, there is potentially a difference to the level of detail at which they could or should be described. Traditionally the description has been used to help organise or measure work, describe equipment, the type of radiation employed as well as to differentiate between the actual procedures themselves.

In order to satisfy all of these apparent business needs it is therefore important to be able to categorise a procedure as being a type of one or more modalities.

The modalities (and sub-types) explicitly described in the interim list are as follows:

- Computed tomography (CT) including:
  - CT angiography
  - CT arthrography
- Fluoroscopy
  - Angiography
  - Venography
- Interventional radiological procedures performed using fluoroscopy
- Magnetic resonance imaging (MRI)
  - Magnetic resonance angiography (MRA)
  - Magnetic resonance venography (MRV)
  - MRI focussed US ablation
- Nuclear medicine
  - Non-imaging therapeutic procedures
  - Positron emission tomography (PET)
  - Single photon emission computed tomography (SPECT)
- Ultrasound (US)
  - Obstetric US
  - Doppler US
- Plain film imaging
  - Mammography
  - Dual energy X-ray photon absorptiometry (DEXA)

There are further medical physics, non-imaging procedures that were included in the forerunner catalogues which, although arguably out of scope of the CIMG, have been incorporated in the maintained National version. A list of these procedures can be found in appendix A.

Procedures relating to import and review of outside imaging and image processing are outside the scope of the National list and their historical inclusion (in the London catalogue) has not been perpetuated (as they are not imaging procedures). The accompanying implementation guidance provides a mechanism by which this activity can be achieved if required.

3.1.1 Modality-specific guidance

3.1.1.1 (Plain) X-ray

Plain X-Ray (eg Chest X-ray) - A plain radiograph obtained using conventional X-Rays; used mainly to demonstrate musculo-skeletal, thoracic and some intra-abdominal problems.

These examinations are commonly expressed in a number of styles, examples include:

- XR ankle
- X-ray of ankle
- radiography of ankle
- plain X-ray ankle
- radiological examination of ankle
- ankle X-ray

It has been agreed that the representation in the interim National standard list should be the first listed and, where required, all other forms would be synonyms.

3.1.1.2 Ultrasonography

Ultrasound - A cross-sectional imaging technique relying on the reflection of ultrasonic waves from various structures within the body; widely used for obstetric/gynaecological and abdominal problems but also for ever expanding roles elsewhere in the body (eg musculoskeletal).

Again, there are a number of ways this type of examination could be expressed, for example:

- US kidney Rt
- Ultrasound of right kidney
• Ultrasonography of kidney, right
• Ultrasound scan right kidney

The recommendation for the National interim standard list is to use the first example and, where required, all other forms would be synonyms.

Ultrasound doppler is often referred to as ultrasound duplex. For the purposes of the interim procedure list the preferred representation will be the former and the latter may be used as a synonym if necessary, eg:

• US Doppler lower limb veins Both

A number of requests have been received for the preferred representation of ultrasound duplex. The existing Editorial Principles relating to this procedure have been reviewed by the CIMG. The existing preferred method of representation was ratified for the second time at the most recent meeting of the CIMG. Duplex will be added as a synonym to ultrasound doppler procedures where a request for this is received.

3.1.1.3 Computerised Tomography

Computed Tomography (CT) - A cross-sectional, X-Ray imaging technique using a CT scanner, providing high contrast and high spatial resolution images.

There are a number of ways this type of examination could be expressed, for example:

• CT brain
• computerized axial tomography of brain
• CAT scan of brain
• Computerised tomography of brain

The recommendation for the National interim standard list is to use the first example, all others would be synonyms where required.

3.1.1.4 Magnetic Resonance Imaging

Magnetic Resonance Imaging (MRI) - A complex cross-sectional imaging technique relying on the way in which tissues respond to radio-frequency stimulation when placed in a strong magnetic field.

As with CT and Ultrasound, the abbreviation of MRI is commonly used and accepted in clinical practice. It has therefore been decided to use the abbreviation MRI (or MRA for Magnetic Resonance Angiography and MRV for Magnetic Resonance Venography) as the representation for this type of DI procedure. As with previous modalities the first listed in the example below is the agreed National interim standard representation, and where required, all other forms would be synonyms:

• MRI arthrogram wrist Lt
• Magnetic resonance imaging of heart
• Abdomen MRI

The equivalent expressions for MRV and MRA follow the same pattern:

• MRV cerebral veins
• MRA aorta abdominal
3.1.1.5 Nuclear Medicine

Nuclear medicine (NM) is a branch of medicine and medical imaging that uses unsealed radioactive substances in diagnosis and therapy. These substances consist of radionuclides, or pharmaceuticals that have been labeled with radionuclides (radiopharmaceuticals). In diagnosis, radioactive substances are administered to patients and the radiation emitted is measured. The majority of these diagnostic tests involve the formation of an image using a gamma camera. Imaging may also be referred to as radionuclide imaging or nuclear scintigraphy. Other diagnostic tests use probes to acquire measurements from parts of the body, or counters for the measurement of samples taken from the patient. In therapy, radionuclides are administered to treat disease or provide palliative pain relief.

Nuclear medicine imaging tests differ from most other imaging modalities in that the tests primarily show the physiological function of the system being investigated as opposed to the anatomy. In some centres, the nuclear medicine images can be superimposed on images from modalities such as CT or MRI to highlight which part of the body the radiopharmaceutical is concentrated in. This practice is often referred to as image fusion.

PET/CT is a complex cross-sectional imaging technique combining the data from a sophisticated Nuclear Medicine technique (Positron Emission Tomography) with CT (above).

The optimal representation for Nuclear Medicine procedures is as follows:

- NM bone whole body

SPECT and PET are considered sub-types of Nuclear medicine and will be represented in the list as follows:

- NM bone local ankles/feet SPECT
- NM parathyroid scan SPECT
- NM brain study PET

The words scan and study are perhaps superfluous but often aid readability so are permitted but not mandatory. The CIMG have concluded that the radioisotope used should be excluded from the procedure description unless absolutely necessary.

There are occasions when there needs to be a dual representation both of the locality and nature of the body site for NM procedures – eg thorax and bone for a NM study of the bone structures (but not other contents) of the chest cavity.

- NM bone study thorax

Nuclear medicine is a particularly complex field as often the technique and/or the site is not representable in the same simplistic logical fashion as can be applied to most other modalities. These editorial principles will be extended iteratively as and when decisions on representation are made and will be applied in later releases of the interim list.

In the NM domain there are rather more exceptions than in other modalities, however, consistent expressions have been adopted wherever possible, but occasionally, non-standard essential aspects of the examination will also be expressed in the description, eg:

- NM red cell mass estimation

A number of NM procedures include information related to the timing/phasing of the examination, eg:

- NM Bone local ankles & feet early
- NM Bone local ankles & feet late

This information was felt to be outside the existing editorial principles. The group concluded that the phasing information was indeed necessary although the nature this is expressed was sub-optimal.
The site representation was also felt to be flawed as the level of detail expressed and hence the number of procedure codes incorporated was unnecessarily high. The preferred representation would be:

- NM Bone local peripheral single phase
- NM Bone peripheral dual phase
- NM Bone whole body single phase
- NM Bone whole body dual phase

### 3.1.1.6 Fluoroscopy

Fluoroscopy - An X-Ray screening technique used to show dynamic processes within the body; a barium enema is a good example whereby the large bowel is opacified and observed under direct fluoroscopic screening.

Most fluoroscopy is carried out to support a more invasive procedure such as arthrography or angiography. However, these invasive aspects may also be conducted in conjunction with other imaging guidance such as Ultrasound (nephrostomy) or CT (arthrography). Common practice within the DI domain is to assume that unless stated explicitly, the type of imaging used to support the invasive element is fluoroscopic. Therefore to avoid lengthening the descriptors, this need not be explicitly described, for example the following are all acceptable descriptions:

- Arthrogram ankle left
- Bile duct calculus removal
- Cardioversion
- Proctogram

It can be seen from the second and third items above that it is even possible that no form of imaging is explicitly stated.

Where it is necessary to explicitly indicate the fluoroscopic nature of the imaging, the following section will describe the alternatives.

The order of words in the description is not significant as long as one of the synonyms has fluoroscopy/fluoroscopic (or an agreed abbreviation) as the first word in the string - parentheses should not be used. ‘Fluoroscopy’ is the preferred fully expressed description for simple fluoroscopy, ‘Fluoroscopic’ is the preferred fully expressed description, for the more commonly encountered, fluoroscopy to support an invasive procedure.

The application of these rules can be seen in the following examples:

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<td>Sialogram submandibular fluoroscopic left</td>
<td>Fluoroscopic submandibular Sialogram</td>
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<tr>
<td>Fluoro Guided Aspiration (Upper) Abdomen</td>
<td>Fluoroscopic guided aspiration abdomen (nb no recognised need for 'upper')</td>
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<tr>
<td>Fluoroscopy Hip Lt</td>
<td>Fluoroscopy hip left</td>
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<tr>
<td>Intussusception Reduction( Fluoroscopic)</td>
<td>Intussusception reduction fluoroscopic</td>
<td>Fluoroscopic Intussusception reduction</td>
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The angiographic variants of fluoroscopy procedures would utilise the following style:

- Angio cerebral
- Angioplasty hepatic
- Angio aorto-femoral lower limbs
- Arterial stent subclavian Lt
- IV DSA carotid
It can be seen that where angiography only is undertaken, the truncated form 'angio' is used to minimise the length of the text string length. Where additional techniques/procedures are applied (e.g. angioplasty), then they are explicitly stated and the angiography aspect implied.

Where a device is being screened it is important to capture the nature of the reason for the screening. For example it is acceptable to include all of the following variants:

- Cardiac defibrillator change
- Cardiac defibrillator upgrade
- Cardiac defibrillator implant
- Cardiac defibrillator check

### 3.1.1.7 Dual energy X-ray photon absorptiometry

Dual energy X-ray absorptiometry (DXA or DEXA) is a means of measuring bone mineral density (BMD). Two X-ray beams with differing energy levels are aimed at the patient's bones. When soft tissue absorption is subtracted out, the BMD can be determined from the absorption of each beam by bone. DXA is the most widely used and most thoroughly studied bone density measurement technology.

Commonly known as a bone density scan or bone densitometry, DXA scans are used as a screening and diagnostic test for osteoporosis. The bones that are most commonly fractured in humans with osteoporosis are scanned for screening purposes, although osteoporosis can occur in any bone and is not necessarily uniformly distributed in the skeleton. These include the proximal femur, and the lumbar spine. Under some circumstances, the distal radius and ulna are also scanned, usually in obese patients, or those whose orthopedic impairments make scanning of the spine and hips impossible.

There are a small number of these scans in the National interim standard list. The unambiguous description adopted in the interim list will be in the following format e.g.

- Bone mineral densitometry DXA

### 3.2 Functional domain-specific principles

#### 3.2.1 Breast imaging

Imaging of the breast can involve many modalities and techniques. Described below are the editorial principles to be applied specifically to these procedures.

1. Each modality group will have right, left and bilateral. All modalities will be included even if little used or unused — mammogram, ultrasound, MRI, Nuclear Medicine (scintimammography +/- SPECT, FDG PET), pneumocystogram, mammary ductogram, electrical impedance imaging, thermography, transillumination spectroscopy.
2. Mammographically guided biopsy may be by using a plate (fenestrated or otherwise) or using a Stereotactic device.
3. Stereotactic mammography is stated as prone or upright because of the very different equipment, costs, etc used and not because of patient position.
4. Pathology specimens may undergo mammography or ultrasound. The type of specimen will be defined by local code if needed.
5. There will be times when more than one modality group will need to be recorded against an examination e.g. US + Radionuclide injection = US + NM to allow correct KHI2 statistics, nuclear medicine waste control, etc.
6. Mammographic projections are important and reflect additional workload and will be coded as “Mammography Extra Views” e.g. magnification, extended, lateral, compression.
7. Interventional procedures will be described with modality and intervention. Typical interventions are as follows: MR - FNA, core biopsy, FNA & core, VAC (vacuum assisted biopsy) [trade names will not be used e.g. Mammotome], aspiration, aspiration & cytology, drainage, skin marking, guide wire localisation, marker insertion, and injection.

8. Breast CT is only required for radiotherapy planning.

9. Excisions are not diagnostic procedures and should be coded with other treatments e.g. US Vacuum assisted biopsy. The subsequent excision of fibroadenoma is a separate procedure not in scope of the CIMG.

10. Associated examinations are axillary and supraclavicular fossa ultrasound +/-biopsy for axillary ultrasound. There will be miscellaneous biopsy codes which can be used in an ad hoc way where there is no more appropriate code.

3.2.2 Interventional Radiology

The broad meaning of ‘interventional’ in a Radiological setting is not the fact that the body has been entered but that a treatment has been given by entering the body. Furthermore, ‘interventional’ imaging procedures are primarily conducted for treatment rather than diagnosis. They will often utilise various devices which should be represented in a generic fashion.

3.2.2.1 Devices

Where a device is specified and no action in connection to it, then the default action is ‘insertion’.

The types of actions/procedures that would need to be represented include:
- Embolisation (coils, balloons, glue, particles, polymer)
- Ablation (radiofrequency/ultrasound)
- Removal (of object/device)
- Repositioning/adjustment (object/device)
- Change (object/device)
- Check (object/device)
- Biopsy (Core or FNA or Vacuum assisted)
- Drainage (where device is left in situ)
- Insertion (of device such as stent)
- Injection (as an objective of the procedure, not as part of the preliminary to this objective)
- Lithotripsy
- Aspiration
- Plasty ('repair' as in angioPlasty or dacrocystoPlasty)
- Extraction (as in retrieval of intravascular foreign bodies or biliary stone)

It is acceptable to express terms which differentiate between the possible methods of the intervention eg. Atherectomy, atherectomy cutting balloon, atherectomy laser, atherectomy rotor but should not go down to the level of detail of any proprietary device.

The expression of the relative size of device, for example small, medium, large, giant, was discussed at the most recent CIMG meeting. The CIMG concluded that the expression of size described in the format of those given in the example should be excluded as they do not give a quantitative measure of size. Cost implications associated with size of device should be coded in the procedure description when there is a costing model defined.

Where imaging is undertaken to support an interventional procedure (e.g. when an US scan of breast is performed)....it is not necessary to use a separate code for the interventional aspect and a code for the imaging. These can be combined and the description should include the imaging guidance technique and the intervention (or the intervention alone in the case of fluoroscopy).
In this example, where there is also a full diagnostic examination performed then the description US of breast should also be assigned. There is therefore a need for both flavours of descriptions in the interim solution.

Therefore in the case where a full diagnostic US of the left breast is performed and a fine needle aspiration and core biopsy under US guidance is also performed then the following combination of concepts should be entered:

- US breast left
- US guided FNA breast left
- US guided core biopsy of breast left

Where devices in situ or during placement or removal are being imaged then it is important to capture the nature of the change as this can significantly alter the procedure performed. For example it is acceptable to include all of the following variants:

- Cardiac defibrillator change
- Cardiac defibrillator upgrade
- Cardiac defibrillator implant
- Cardiac defibrillator check

It has been agreed that the generic equivalent of any proprietary device should be used in the interim procedure description. The devices that can be used include the following:

- Stent
- Drug eluting stent
- Metallic stent
- branched bifurcated stent
- branched tube stent
- branched tapered stent
- fenestrated stent
- Stent graft
- Prosthesis
- Tube graft
- Coil
- Balloon (cutting/occlusion)
- Vascular closure device
- Embolic protection
- Filter
- Catheter/line/tube

Similarly, it was further concluded by the CIMG that the generic equivalent of any proprietary line/catheter should be used in the interim procedure description. The following illustrate some proprietary examples with their generic equivalent:

<table>
<thead>
<tr>
<th>Proprietary name</th>
<th>Generic representation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tenkoff Line</td>
<td>Continuous ambulatory peritoneal dialysis line or CAPD line</td>
</tr>
<tr>
<td>Hickman line and Portocath</td>
<td>Peripherally inserted central catheter (or PICC), also known as subcutaneously tunneled catheter</td>
</tr>
<tr>
<td>Cardiac Swan Ganz Line</td>
<td>Pulmonary catheter</td>
</tr>
<tr>
<td>Arrow-Howes multilumen</td>
<td>Central venous catheter</td>
</tr>
<tr>
<td>BROVIAC catheter</td>
<td>Tunneled catheter</td>
</tr>
<tr>
<td>Cardiac Radi wire</td>
<td>Cardiac pressure wire &amp; Cath insertion</td>
</tr>
</tbody>
</table>

3.2.2.2 Ablation agents
Where the procedure being undertaken is an ablation, it is necessary to specify the agent of the ablation, eg coil, ultrasound, alcohol, radiofrequency etc.

**3.2.3 Dental Radiography**

Descriptions for most Dental imaging follow the same pattern as that for ‘plain’ X-rays but include the domain description ‘dental’, ie the following are agreed representations

- XR dental mandibular occlusal
- XR dental intraoral lower occlusal
- XR dental intraoral molar
- XR dental oblique lateral Both
- XR dental oblique lateral Lt
- XR dental oblique lateral Rt
- XR dental periapical 5
- XR dental intraoral parallax
- XR dental periapical 10
- XR dental periapical 10+
- XR dental intraoral periapical
- XR dental periapical full
- XR dental intraoral premolar
- XR dental maxillary occlusal
- XR dental intraoral upper occlusal
- XR dental intraoral vertex occlusal
- XR dental bitewing

Technique adjustments are therefore included for periapical, occlusal films and parallax and vertex directional adaptations.

**3.2.4 Medical photography**

The scope of the interim description work has expanded to include Medical Photography. The principles for describing these procedures should be exactly the same as for plain X-rays but will have the additional description Medical photography (Medphoto is abbreviated form) as the modality.

The short code will start with an O for both general photography and ophthalmic photography. Example representations are as follows:

- Medical photography lower limbs right
- Medical photography torso

**3.3 Body site**

Almost all imaging procedures will have a target ‘site’ for the imaging, whether this be a discrete body part or a complete subsystem.

There will be, however, a number of procedures which will not ordinarily contain a fully specified target site in the description but need to be included in the interim list, for example ‘barium meal’ does not include the site (stomach or upper GI tract) in the description – this is an agreed exception.

There will also be descriptions of the type ‘CT guided biopsy’ where the multitude of potential lesion sites prevent the pre-coordination of every possibility.

There are other examples of interventional type procedures which it would be problematical to pre-coordinate with every single body site on which they may be performed. Examples of allowable exceptions are therefore:

- Intravascular foreign body retrieval
- Linogram
• NM Y90 antibody therapy
• US guided aspiration

Specifically with regard to blood vessels it was agreed, for non-interventional procedures, that there was a level of detail beyond which pre-coordination of vessels was not useful and potentially confusing. It was suggested that this would be below the level of branches of the aorta. In which case, the following would not be allowed:

• Angioplasty infrapopliteal Lt
• Angioplasty anterior tibial Lt

For interventional procedures then a further level of detail is permitted down to the main vessels of the long bones, ie tibial and radial/ulnar arteries and to sub-branches of branches of the aorta, eg sub-branch of renal artery. There are also some neurological interventional procedures that will require further detail and be made exceptions to this principle.

For procedures performed on the main vessel of an organ it is permissible to use the vessel or the organ in the preferred description for the item – the other alternative might usefully be included as a synonym. eg:

• Angio penile (preferred)
• Angio penis (synonym)

### 3.4 Laterality

Laterality provides information on whether the procedure being performed on a body site is on the left, right or on both sides (or none of these for mid-line structures). Laterality will be pre-coordinated for appropriate body sites in the descriptions. The plural form of a body site should not be used to mean both sides. Laterality is always expressed at the end of the description and expressed as Lt (for left), Rt (for right) and Both (for bilateral), even where a suitable plural exists (eg MRI knees would be MRI knee Both). Where an abbreviation for ‘both’ is required, this would take the form of ‘B’.

### 3.5 Associated Procedure/Disorder

Many imaging procedures are undertaken in a particular way to effectively image a particular suspected condition/abnormality. Sometimes this information is vital to support the business of the service department and on other occasions is less so.

Timing/condition specific examinations should not be included in the list except in exceptional circumstances, for example:

• XR hand & wrist (bone age)

The following are unacceptable:

• US Pelvis For IUCD (TA)
• US Pelvis for IUCD (TV)
• US For Nephrostomy Puncture

It has further been agreed that the pathology/morphology should be excluded from the description – the following would therefore be disallowed:

• MRI temporal lobe epilepsy
• MRI cord compression
Only where the pathology is the actual target of imaging of the interventional procedure or where the pathology causes the examination performed to be significantly different would it be permitted, e.g.:

- Drainage of renal cyst
- Embolisation of liver mass
- Cardiac angio congenital anomaly study
- MRI cardiac congenital anomaly study

It has been determined that where the imaging is targeted at or technique is adapted because of a congenital anomaly, then this should be stated as part of the procedure description.

Examples of expressions that describe a characteristic of a patient not directly related to the procedure would not be permitted are the following:

- MRI claustrophobic
- MRI antenatal

### 3.6 Perioperative and percutaneous procedures

Many imaging procedures are performed as an essential part of a surgical operation. Of the three ways of describing procedures performed during surgical operations the convention for this list will be to describe them as Perioperative. The alternative descriptions of ‘operative’ and peroperative can be used in synonymous descriptions.

In the interests of minimising description length, the use of the word percutaneous is not essential unless there is a perioperative equivalent in which case both variants will need to be explicitly represented. Unless stated otherwise, the default approach will be percutaneous for all interventional procedures.

### 3.7 Contrast

Both in terms of resource requirements, technique, interpretation and risk it is necessary to know when a contrast medium is required to be used or has been used for a DI procedure within the service domain. It is important to differentiate between procedures performed using contrast and those performed without. It has been agreed that the convention will be that those procedures involving contrast will be recorded as ‘with contrast’.

For some procedures the use of radiographic contrast media is implicit in the procedure description (e.g., angiography). Where contrast is not specified then it should not be implied that contrast was not used. In procedures such as angiograms and other examinations which are always performed with contrast the use of contrast is implicit.

The exception to this rule is MR Angiography where delineation of the blood vessels can be accomplished by other means. In these cases when contrast is utilised it must also be specified in the description.

The route and method of administration may also form part of the description when significant. The substance of which the contrast is composed is not permitted except in exceptional cases to be justified by a submitter. The generic representation of ‘contrast’ or ‘water soluble contrast’ should always be described rather than the brand name or the substance, except for agreed exceptions such as ‘barium’.

The representation will therefore be:

- Water soluble contrast enema
• MRI axilla with contrast both
• CT adrenal with contrast
• CT IAM with intrathecal contrast
• XR intravenous cholangiogram

And not
• Breasts MRI + Gd
• CT Abdomen With/Without Contrast

It should also be noted that the generic description of “contrast” (when not further qualified), actually means intravascular contrast. It can be seen in the ‘allowable’ list above where the contrast is not intravascular as it is specified.

3.8 Administrative aspects

It has traditionally been the case that administrative aspects have been introduced into procedure descriptions. However, in the interim description list, this is permitted only where a valid use case can be demonstrated and makes a clinically significant difference to the nature of the examination performed.

3.8.1 Location

Many examinations may be performed in more than one business area and this may have implications for resource allocation in particular (e.g. room/equipment usage and staff allocation). This differentiation is not permitted in the procedure description, therefore the following is not allowed:

• Mobile Chest X-ray
• Skull X-ray resus

However there are small number of exceptions where the location is required for differentiation in the Körner banding, in which case the description has been permitted as an exception, these are almost entirely regarding the use of image intensification, eg:

• Mobile Image Intensifier Abdomen

3.8.2 Report

Most procedures require a formal radiological opinion, however some do not. This fact should be considered an administrative property and should not be represented in the procedure description. The following would therefore not be permitted in the list:

• X-ray upper occlusal – no report required

This information should be reflected in other facets of the information system and not in the procedure description.

3.8.3 Procedure status

During the lifecycle of a procedure it can have many statuses including ‘requested’, ‘completed’, ‘scheduled’, ‘reported’ or even ‘cancelled’ or ‘abandoned’. All of these are statuses of the procedure rather than being types of procedure. There is thus no National requirement for descriptions such as ‘Procedure abandoned’. As such, procedure status is another administrative property and should not be represented in the procedure description.
3.8.4 Visit information

Many procedures are performed over a number of visits to an imaging centre. It is often important to know which stage of the procedure is to take place so that correct techniques/protocols are observed for that particular visit as part of a single procedure, for example radionuclide study for colonic transit day 1, day 2, day 3 etc. This information is not required outside the performing image department. As such, it was agreed that visit information is an entirely administrative property and should not be represented in the procedure description but should be reflected in other facets of the electronic record.

In summary, examination descriptors should not contain any administrative or scheduling information.

The following would therefore not be permitted:
- Oral Cholecystogram - Control
- Oral Cholecystogram - Post Oral Contrast
- XR Colonic Transit Study Day 1 to Day 10
- US Breast Recall
- NM Gastrointestinal Bleed (2 Hours)

3.8.5 Performer

The CIMG have agreed that the performer should not be included in the procedure description. The following would therefore be disallowed:
- Percutaneous stone extraction Radiologist
- Percutaneous stone extraction Urologist

3.9 View/Projection/Technique adjustments

It is often important both clinically and from an administrative perspective that variations in technique (from the norm) are captured, not least so that images can be both acquired and interpreted correctly. Those that have been explicitly agreed as permitted in the current list of descriptions are:
- Soft tissue
- Stress
- Periapical (for dental)
- Occlusal (for dental)
- Upright (for mammography)
- Prone (for mammography)

It is important to note that these would not exist as procedures in their own right but would be used as part of a complete procedure description (including modality, site etc). The rationale for inclusion is where the projection will significantly alter the examination being performed.

Those that it has been agreed will be excluded on the basis that they do not normally significantly affect the performance of the procedure (in terms of clinical requirements) include the following:
- Axial
- Skyline
- Lateral
- Decubitus
• Weight-bearing
• Penetrated
• Paediatric
• Flexion/Extension
• Magnification
• Compression
• Challenge
• Selective

It has further been decided not to include specific named projections i.e. judets, frog lateral, stryker’s.

There are occasions when the sequencing of MRI scans is important to capture so the following are permitted:

• MRI diffusion weighted
• MRI functional imaging
• MRI perfusion weighted

These are in addition to the previously mentioned many variations in radionuclide imaging studies

3.10 Approach/route/method of administration
This should always be included where it provides the main differentiation between two otherwise apparently similar procedures, eg:
Oral cholecystogram is significantly different to a T-Tube cholecystogram.
The following are all therefore acceptable:
• Oral cholecystogram
• Transvaginal US
• Intravenous urogram
• Venogram hepatic transjugular

3.11 Proprietary descriptions

Many investigations have been known either partly or totally by the name of the company that first introduced the technology or by a particular pharmaceutical/contrast medium – eg ‘Mammotome’ (breast imaging and biopsy apparatus) or ‘MRI Alkermes’ (drug delivery equipment manufacturer).
Unless the use case for having this representation can be justified to the management group, and considered as legitimate exceptions, then these should be represented more generically – for example in the form of ‘Vacuum assisted biopsy breast’ in the case of the ‘mammotome’.

It has been agreed that commercial/proprietary names for radiopharmaceuticals, drugs and other substances should not be a part of any term description (exceptions will be documented).
The following would therefore be disallowed in favour of generic equivalents:
• NM CEA (Oncoscint) Scan
• NM Indium Capromab (ProstaScint) Scan
• NM Brain Bicasate (Neurolite) SPECT
• NM CardGated Dipyridamole Stress MIBI/TF (Dipyridamole is the stressing agent)
• NM Cardiac Dobutamine Stress MIBI/TF
Any substance delivered (infused, injected, imbibed etc) should be represented by its generic equivalent, eg:

- Shoulder arthrogram depomedrone injection would become,
- Arthogram steroid injection shoulder

### 3.12 Research activities

Research procedures and trials (of equipment or drugs) are undertaken in local environments so the descriptions would be of very limited utility nationally. They should therefore be created and maintained in the local environment and not communicated outside that environment.

### 3.13 Additional style guidance

There are number of aspects which can aid consistency and clarity in the construction of term strings. These are described in the following section.

#### 3.13.1 Term length

Due to the 40 character term length limit, many words are used both in their full form and in an abbreviated form depending on the length of the other words in the description. However, where the maximum term length is not compromised abbreviations should not be used.

#### 3.13.2 Plurality

In general procedures are described as the singular in terms of body site. Body sites are only expressed as plural when describing it and its sub-types, rather than to refer to paired structures (which should be described in the singular). The following are both acceptable representations:

- CT salivary glands (means more than one type of salivary gland)
- CT parotid gland (means one or both)

#### 3.13.3 Prepositions and conjunctions

Although the word ‘of’ was considered of utility in making descriptions readable in the SNOMED subset, in the interim representation, due to the character length constraints it is desirable to eliminate this.

Also, it was agreed in the interests of consistency and character length restriction to use the character “&” in all circumstances instead of ‘and’ or ‘+’.

In addition, where a “/” has been used as a logical “and” then this should also be replaced with the “&” character, eg: MRI Liver/Spleen would become MRI Liver & Spleen.

#### 3.13.4 Exclusions and catch-all categories

There should be no exclusion categories (eg x excluding particular sub-types of x) and no use of the word ‘other’ (eg other fluoroscopy of chest) as these would not describe actual instances of procedures.
3.13.5 Punctuation (parentheses, colons, full-stops, commas etc)

It has been agreed that there is no requirement for the use of parentheses. Neither should hyphens, colons, semi colons, commas and full stops be used in any description. The following characters should not be used in the codes or descriptions:

£, $, %, ^, *, !, |, \, ?, @, #, ~, {}, [ ], <, >, ¬.

3.13.6 Capitalisation

The first letter of the term string will always be capitalised. All acronyms will be entirely capitalised. The first letter of any other abbreviation, will be capitalised. The first letter of the laterality is also capitalised. No other capitalisation is permitted.

3.13.7 Suffices

One of the most common areas of flexibility in the practice of Diagnostic Imaging is the variable use of the suffices ‘….ography’ and ‘….ogram’. It was agreed that, for the interim list, the chosen representation would be ‘ography’ and the ‘ogram’ would be perfectly acceptable as the synonym, for example:

- Cystourethrography (preferred term)
- Cystourethrogram (synonym)

3.13.8 Combined procedures

3.13.8.1 Combined site procedures

It is often difficult to determine whether a single procedure is being performed on more than one site or whether it really comprises multiple procedures. As a general rule, we would expect a procedure on a single site to be the consistent, uniform style adopted however it is recognised that a small number of procedures on proximate sites are fairly universally considered to be a single examination. There are therefore a small number of combined site procedures represented as follows:

- CT neck & thorax & abdomen & pelvis
- MRI liver & spleen

3.13.8.2 Combined modality procedures

It is important to consider which modality is the dominant one, so that term and code composition is logical. There are also imaging techniques which are sometimes considered as modalities. The following are agreed examples of multi-modality/technique procedures:

- US doppler carotid artery
- NM parathyroid scan SPECT

In the case of combined PET/CT and SPECT/CT procedures, the word order is important as the CT is considered to not need to be of diagnostic quality (PET and SPECT are the dominant modality). If, for whatever reason, the CT is of diagnostic quality then it should be coded separately. There is therefore no requirement to have the reverse as a synonym.
In the case of modalities combined with fluoroscopy, the principle to be adopted is that the examination should be described by its dominant modality. This would reduce the requirement to include many “combined” procedures. The interim list should contain versions of each examination by modality, eg in the case of nephrostomy tube insertion we should have all of the following:

- US guided nephrostomy
- CT nephrostomy
- Nephrostomy (which implies fluoroscopic imaging)

Only the dominant modality should be coded, therefore a nephrostomy tube insertion performed using ultrasound and fluoroscopy would take the form of:

- US guided nephrostomy

Similarly, an insertion of a biliary stent, endoscopically, and with fluoroscopic guidance, would take the form:

- ERCP & insertion biliary stent

3.14 Acronyms and abbreviations in the DI interim procedure list

Due to the difficulty in fully articulating complex procedures using no more than 40 characters, many words have to be abbreviated. Depending on character availability the same word might have more than one abbreviation. However, the same abbreviation must not be used for more than one word (each abbreviation must be unique).

Where substances are required in the description and they are required to be abbreviated, the representation should be in the form of the International chemical symbol, eg Se for Selenium. The approved abbreviations for the latest release of the interim descriptions can be found in appendix B – this will be updated with each subsequent release as new abbreviations are required.
4 Proposed technical representation

4.1 SNOMED CT

SNOMED CT is a clinical terminology with interface and reference properties. Interface properties are those features of the terminology that focus on data collection at the user interface as opposed to reference properties which focus on data retrieval, aggregation and analysis.

4.2 Basic Elements of SNOMED CT

- Concepts – are the basic units of SNOMED CT. SNOMED is organised into hierarchies of concepts.
- Descriptions – are terms that are assigned to concepts. Descriptions describe or express the meaning of the SNOMED concept.
- Hierarchies – Concepts are organised into twenty SNOMED CT hierarchies (including UK admin hierarchy). Each hierarchy has sub-hierarchies within it.
- Attributes – are properties or characteristics of concepts. Attributes are used to characterise and define concepts.
- Relationships – are the connections between concepts in SNOMED CT.

All concepts in SNOMED CT have formal definitions which are an explicit representation of the concept’s meaning with respect to the concept model. A concept’s definition consist of its relationships to other concepts through the ‘is a’ relationship and its attribute relationships. These are known as the defining characteristics of SNOMED and they allow the concept to be differentiated from all others.

For example:

Elbow X-ray
  IS-A procedure on elbow
  IS-A skeletal X-ray of upper limb
  Has-Method radiographic imaging
  Has-Procedure site elbow region structure

Formal concept definitions are one of the reference properties that allow concepts to be processed by a computer.

Concept descriptions are the terms, or labels that are assigned to specific SNOMED CT concepts. For example

- Concept ID: 68306006
- Fully specified name: diagnostic radiography of facial bones (procedure)
- Preferred term: diagnostic radiography of facial bones
- Synonym: facial bones X-ray
- Synonym: radiography of facial bones
- Synonym: X-ray of facial bones

Alternative descriptions are an important interface property because they give end users the flexibility to use terms that they are familiar with. The fully specified name is a phrase that describes a concept uniquely and in a manner that is unambiguous. Therefore a DI procedure’s fully specified name should reflect an unambiguous descriptor which includes the modality and body site, for example fluoroscopy of abdomen (procedure).
The preferred term is a term that is deemed to be most clinically appropriate way of expressing a concept in a clinical record currently. The preferred term can be changed to reflect changes within clinical practice over time. Synonymous terms are used to provide acceptable alternatives to the preferred term in order to express a concept in different ways.

4.3 Constraints preventing use of SNOMED CT subset and concepts

The proposed PACS list is abbreviated to fit within 40 character term length constraints imposed by some PACS and RIS systems.

SNOMED CT has a 255 character maximum term length.

The proposed PACS list includes some terms that are interpreted in a particular way because of the scope in which they are used. Thus the scope makes it evident that the term refers to a radiological process even when the term may not specifically state that.

In a few cases a similar term might be interpreted differently outside that scope (i.e. within a more general clinical terminology such as SNOMED CT).

The proposed PACS list includes terms that include laterality as a "pre-coordinated" part of the term

SNOMED CT also includes some procedure concepts with pre-coordinated laterality but the general view is that in future post-coordination should be the preferred way of expressing laterality. Where pre-coordinated concepts exist, logical modelling requires them to defined by relationships to the appropriate lateralised procedure site.

SNOMED CT is not an unstructured container into which any number of terms can be added without regard for the underlying model. A valuable design feature of SNOMED CT is that where concepts are well-modelled the equivalence of alternative ways of saying the same thing can be computed. This is undermined if new terms are added without addressing the logical relationships between associated concepts.

4.4 SNOMED CT for Interim list

4.4.1 Imaging procedure modelling

The SNOMED CT concept model has in the order of fifteen potential attributes available for defining procedure type concepts. This number may change as the model evolves. Not all of these attributes are necessary or suitable to define an imaging procedure. The following are considerations of attributes and their values for interim list procedures:

- **Procedure site:**
  This attribute would take a value from the Anatomical structure hierarchy. The 'structure of xy' variant would be used rather than the 'entire xy' variant unless the imaging truly was of the entire part.

  Example:

  CT of abdomen and pelvis (procedure) is defined as
  
  Procedure site – Direct = abdominal structure
  Procedure site – Direct = pelvic structure
  Method = Computed tomography imaging – action

  The following example states whole spine, therefore the site should be whole spine instead of spine structure.

  MRI of whole spine is defined as
  
  Procedure site – Direct = Entire spine
  Method = Magnetic resonance imaging – action

- **Procedure morphology:**
This attribute will not be needed unless a morphologically abnormal structure is stated as part of procedure.

- **Method:**
  All imaging procedures should be defined with a method which would take its value from the actions qualifier values. This attribute represents the action being performed to accomplish the procedure.

  The following values would be used for clinical imaging procedures for the modality:
  
  - Computed tomography imaging – action
  - Fluoroscopic imaging – action
  - Plain X-ray imaging – action
  - Magnetic resonance imaging – action
  - Ultrasound imaging – action

  For imaging guided procedures, both the imaging and the interventional procedure should be defined and role grouped appropriately. Example:

  Ultrasound guided biopsy of upper abdomen (procedure) is defined as
  
  Method = Ultrasound imaging - action
  Method = Biopsy – action
  Procedure site – Direct = upper abdomen structure

- **Procedure Device:**
  Radiography equipments e.g. CT, MRI unit, are not modelled in current approach. The argument is that information is reflected by defining method.

- **Has intent:**
  Diagnostic intent, therapeutic intent, and screening intent should be considered when defining concept.

  Example:
  
  diagnostic radiography of facial bones
  Has intent = diagnostic intent
  Method = Radiographic imaging – action
  Procedure site – Direct = bone structure of face

- **Using substance:**
  This is a new attribute introduced in the January 2007 release. The attribute describes the substance used to execute the action of a procedure, but it is not the substance on which procedure’s method directly acts.

  Example:
  
  Fluoroscopic arthography of ankle is defined as
  Using substance = contrast media
  Method = fluoroscopic imaging – action
  Procedure site – Direct = ankle joint structure

- **Using energy:**
  This is a new attribute introduced in the January 2007 release. This attribute describes the energy used to execute an action. Further investigation is required to use this attribute and ‘using devices’ attribute for modelling modality in future.

  Example:
  
  Gamma ray therapy (procedure)
  Using energy = Gamma radiation (physical force)

- The following attributes are not used for interim list procedures. But they may be needed for imaging guided procedures if these guided procedures are defined by following attributes.
Access, Approach, Direct substance, has focus, recipient category, Revision status, Route of administration, Priority

Example:

X-ray guided core needle biopsy is defined as
- Method = Plain X-ray imaging – action
- Method = Biopsy – action
- Using device = Core biopsy needle

4.4.2 Mapping and description of concepts

All terms in national interim list are now mapped to a concept in SNOMED CT. A new concept will be added in SNOMED CT if there is no equivalent SNOMED CT concept for a term in the interim list. The mapping table and SNOMED CT subset for PACS are part of interim solution.

Incorporation in SNOMED CT should adhere to the following guidelines:

- The set of nationally agreed "PACS terms" should be divided into two sets.
  - "PACS Specific Terms" – terms that are abbreviated or phrased in ways that are specific use in PACS systems and might be misunderstood outside that scope.
    - Example "Cardiac valvuloplasty" (which in PACS terms refers to the radiographic procedure related to valvuloplasty rather than the general concept of valve repair).
  - "General terms also used in PACS" – terms that are used in PACS systems but which are not abbreviated and which would have the same meaning outside the scope of PACS.
    - Example "X-ray of chest"

- The mapping between interim list and SNOMED CT is based on meaning of concept instead of term, for example,
  - The PACS term "Cardiac valvuloplasty" should not be added as a description of the existing SNOMED CT concept "Cardiac valvuloplasty". The PACS term refers to a fluoroscopic procedure undertaken to support the associated procedure "cardiac valvuloplasty". Whereas the existing SNOMED CT concept "cardiac valvuloplasty" does not imply the use of a radiographic technique and is not defined as if it did.

- Mapping to general SNOMED CT concept
  - There may not always be a specific match for the interim descriptions, in which case the most closely matched general concept should be used.
    - For example, ‘X-ray of acetabulum’ is in the interim procedure list but there is no equivalent in SNOMED CT. This would therefore be mapped to the less specific ‘X-ray of hip’.
  - Along with the development of SNOMED CT, the mappings to general SNOMED CT concepts should be deprecated. The mappings to specific new concepts in UK extension or international core should be active in interim table. The records of old mappings will remain in interim table for audit, report, and data analysis.

- Representation of descriptions for all terms including general and specific PACS terms
  - Representation will follow the SNOMED CT guideline, e.g. abbreviations, acronyms and truncations should not appear in Fully Specified Name (FSN), descriptions should be explicitly expressed, for example:
    - “Cardiac valvuloplasty” should have “fluoroscopy examination of the heart for cardiac valvuloplasty (procedure)” as FSN.
  - "PACS specific terms" should be added to description with status of DescriptionType=0 (unspecified) and language code "en" (not "en-GB"?)
    - The intended effect is that these terms will not be treated as preferred terms or synonyms in a general search or in a general display of synonyms.
National Interim Standard Descriptions for Clinical Imaging Procedures to support PACS/RIS implementations - Editorial Principles

18th September 2008

- "General terms used in PACS" should be used for preferred terms or synonyms where they comply with SNOMED CT guideline, for example
  The PACS term "XR chest" should be added as a description of "X-ray of chest" because the meaning of "XR chest" in the scope of a PACS system is "X-ray of chest".

4.4.3 SNOMED CT subset

A "Context Description Subset" should be created which includes as its members all the "PACS terms" (both specific and general).

- The intention of this is to clearly identify the set of terms agreed for use in PACS systems.
- Implementers of PACS systems and interfacing applications need to be aware of this subset and apply it when determining the terms that are permissible for use in PACS and where appropriate translating these to the more appropriate scope independent preferred terms.

4.4.4 Requirement for additional concepts

The above only addresses the general rules for mapping and treatment of descriptions to convey the PACS terms. It is only appropriate to map PACS terms to existing concepts which, taking account of their scope applied to the term, have the same meaning. Therefore, additional concepts need to be added in SNOMED CT to cover many of the terms in the proposed PACS list.

The following guidance applies to the process of adding such concepts.

- A new "PACS term" should only be added as a description of concept which unambiguously refers to the implied meaning by that term when used in the scope of a PACS system. If not as such, a new SNOMED CT concept is required.
  - For example
    - The PACS term "Cardiac valvuloplasty" should not be added as a description of the concept "Fluoroscopy of the heart" because the PACS term is more specific. Thus a new concept is needed which might have the name "Fluoroscopic examination of the heart for cardiac valvuloplasty"

- A new "PACS term" referring to lateralised (or bilateral) procedures should not be added to an existing SNOMED CT procedure concept
  - For example
    - None of the following PACS terms "XR foot Lt", "XR foot Rt", "XR feet" should be added as a Description of the existing concept "X-ray of foot". Unless the lateralised concepts already exist these need to be added.
4.4.5 Guidelines for addition of concepts

Addition of concepts to support "PACS terms" (either specific or general) should follow exactly the same rules as applied to normal concept addition.

- An unambiguous FullySpecifiedName and PreferredTerm must be created that clearly stated the meaning in ways that are not dependent on the scope (i.e. terms that would be meaningful in a patient record without presuming a heading saying "radiographic procedure").
- As a minimum the following defining relationships must be added
  - At least one "is a" relationship
  - Any defining relationships inherited from that supertype
  - A new concept with only these relationships must be marked as "primitive"
- Ideally the relationships should also include any of the following that are appropriate based on the meaning of the concept as represented in the SNOMED Concept Model
  - Additional "is a" relationships
  - Additional defining relationships
  - Refinements of inherited defining relationships
    - In the case of lateralised procedures this may lead to a further requirement to create additional lateralised body structure concepts where these do not exist.
    - If the refinements are sufficient to distinguish a concept from its supertype then it should be marked as “fully defined” (IsPrimitive=false)

4.4.6 Should the additions be made to "core" or "extension"

Additional Descriptions to cover PACS specific issues should probably be added to a UK Extension in the first instance as this will minimise the risk of misunderstanding in a wider distribution where the PACS scope as specified in the UK may not exist. However, where the need for additional Concepts is identified these will be submitted for incorporation in the International edition. Due to timing constraints it is necessary to add these concepts to the UK Extension as an interim measure.

4.4.7 Practical examples

4.4.7.1 Interim description exact match with current SNOMED concept

Interim term “Barium small bowel enema” has an exact equivalent of ‘Barium small bowel enema’ 241162004

4.4.7.2 Interim description suitable for inclusion in core as new concept

New concept with FSN of “CT of coccyx (procedure)” needs to be added to SNOMED CT as a sub-type of 241577003 “CT of Spine”

4.4.7.3 Interim description is a suitable synonym for an existing SNOMED concept

“CT Angiogram Aorta” could be added as a synonym of 419462002 “CT angiography of aorta”
4.4.7.4 Interim description is equivalent to existing SNOMED concept but would not be acceptable as synonym

Interim description = CT radiotherapy planning scan
This is equivalent to “CT guidance for treatment planning, teletherapy” 24689001 in SNOMED
CT
The interim description would be associated with the existing concept as a descriptiontype=0 (unspecified)

4.4.7.5 Interim description would be equivalent to a suitable new SNOMED concept but would not be acceptable as synonym

Interim description = CT Radiotherapy Planning Scan Bladder
A new concept would need to be created = CT scan for planning of radiotherapy to bladder
The appropriate super-type would be “CT guidance for treatment planning, teletherapy” 24689001

4.4.7.6 Interim description is not suitable for addition to SNOMED and is not equivalent to any existing SNOMED concept (because of ambiguity)

A suitable FSN will have to be determined which effectively represents the concept.
The appropriate super-types should be assigned
The interim description should be associated with this new concept with a descriptiontype=0 (unspecified)
Due to the constraints under which the interim descriptions have been developed, most of them will be represented this way in SNOMED.
For example:

Interim description = Inferior vena cava filter removal
A precise fully specified name = Fluoroscopic guidance and removal of inferior vena cava filter (procedure)
This would need to be created (initially in the UK extension) and assigned appropriate super-types, in this case = Removal of inferior vena caval filter 233439000 and Fluoroscopic angiography 420040002
This new concept would also inherit the defining attributes (it is not necessary at this time to assign additional definitions) but the concept would remain ‘primitive’.
The interim descriptor would be associated with this concept exactly as Inferior vena cava filter removal with descriptiontype=0

Nb There are a number of concepts which could be considered as imaging to support an interventional procedure or as a contemporaneous set of procedures. The above example has been described as if the latter situation were true, if the former were true, the FSN might = Fluoroscopic guidance for removal of inferior vena cava filter and the only appropriate super-type would be fluoroscopic angiography. Advice will be sought from the expert reference group for all of this type of description.
If both variants should be captured then both should have new concepts added to SNOMED (as described above) with the interim description being associated with both new concepts.

4.4.7.7 Interim description is not suitable for addition to SNOMED and is not equivalent to any existing SNOMED concept (because of embedded laterality)

In a similar fashion to that described above, new concepts would need to be created with the laterality pre-expressed (left and right and also both – as specified in interim description list)
For example:
Interim descriptions = XR leg length measurement Both
                     XR leg length measurement Lt
                     XR leg length measurement Rt

New equivalent concepts should be created for each of these
  = XR leg length measurement Both (procedure)
     XR leg length measurement Left (procedure)
     XR leg length measurement Right (procedure)

The appropriate super-type would be = Leg length measurement X-ray 299010000

The interim descriptions would be associated with these new concepts with descriptiontype=0

Nb to define these procedures fully, it would be necessary for the procedure site to be available with laterality precoordinated, ie procedure site = left leg, or right leg or both legs. This is not for consideration at this stage.
4.5 Legacy (meaningful) codes

In the short to medium term, the 5 or 6 character meaningful codes used to uniquely identify the procedure will continue to be maintained. These codes are used in current systems to aid user interface functionality. It is undesirable to change codes unnecessarily as this can effect implementations adversely. Where a description from an earlier version has been changed in a minor fashion to conform to more rigorous editorial principles, then it is not necessary to change the code too. These codes are unique and are constructed to a formula developed by the Royal College of radiologists.

Modality codes are as follows:

- **C**: CT, including CT IR procedures, virtual CT procedures and CTA
- **E**: Endoscopic procedure, where the endoscopy is the PRIME modality even if radiologically assisted
- **F**: Fluoroscopic diagnostic tests, including diagnostic angiograph
- **I**: Interventional Radiological procedures performed using fluoroscopy
- **M**: MRI/MRA/MRV procedures
- **N**: NM or RNI diagnostic imaging procedures
- **U**: Ultrasound, including Obstetric U/U and US IR procedures
- **X**: Plain film imaging procedures including mammography
- **Y**: physics or
- **O**: Clinical/Ocular Photography
- **H**: Cardiology imaging procedure

**Legacy (Short) Code conventions**

<table>
<thead>
<tr>
<th>Modality Codes</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasty</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Vertbroplasty (fluoroscopic)</td>
<td>I</td>
<td>V</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Procedure</td>
<td>Code 1</td>
<td>Code 2</td>
<td>Code 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kyphoplasty (fluoroscopic)</td>
<td>I</td>
<td>K</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cementoplasty (fluoroscopic)</td>
<td>I</td>
<td>C</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting balloon – artery</td>
<td>I</td>
<td>C</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cutting balloon - vein</td>
<td>I</td>
<td>B</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTA – artery</td>
<td>P</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTA - vein</td>
<td>Q</td>
<td>P</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Aortic Graft Stent Types**

- Tube (straight)                  | S      | S      |
- Tapered                           | T      | S      |
- Bifurcated                        | Y      | S      |
- Branched                          | B      | S      |
- Fenestrated                       | F      | S      |

**Artery Stent Types**

- Stentgraft - artery               | G      | S      |
- Stentgraft - vein                 | H      | S      |
- Stent - artery                    | A      | S      |
- Stent - vein                      | V      | S      |
- Drug eluting stent                | D      | S      |

**Cardiovascular abbreviations**

- Internal carotid                  | I      | C      |
- External carotid                  | X      | C      |
- Common carotid                    | C      | C      |
- Subclavian                        | S      | C      |
- Brachiocephalic                   | B      | R      | C      |
- Axillary                          | A      | X      |
- Brachial                          | B      | R      |
- Radial                            | R      | A      |
- Ulnar                             | U      | N      |
- Coeliac                           | C      | O      | E      |
- Hepatic                           | H      | E      | P      |
- Hepatic                           | H      | E      |
- Splenic                           | S      | P      | L      |
- Superior mesenteric               | S      | M      |
- Inferior mesenteric               | I      | M      |
- Renal                             | R      | E      |
- Renal                             | R      | E      | N      |
- Adrenal                           | A      | D      |
- Renal transplant artery           | R      | T      |
- Common iliac                      | C      | I      |
- External iliac                    | E      | I      |
- Internal iliac                    | I      | I      |
- Common femoral                    | C      | F      |
- Profunda femoris                  | P      | F      |
- Superficial femoral               | S      | F      |
- Popliteal                         | P      | O      |
- Tibial                            | T      | I      |
- Graft                             | G      | F      | T      |
- Dialysis fistula                  | D      | F      | I      |
- Abdominal aorta                   | A      | A      | O      |
- Thoracic aorta                    | T      | A      | O      |
- Gastro-duodenal                   | G      | D      | U      |
- Gastric                           | G      | A      |
- Lumbar                            | L      | U      |
- Intercostal                       | I      | C      |
- Gonadal                           | G      | O      |
The optional sixth character field has been populated with some of the following codes:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Ablation</td>
</tr>
<tr>
<td>B</td>
<td>Biopsy</td>
</tr>
<tr>
<td>C</td>
<td>Contrast use (where the use of contrast is not implicit in the nature of the examination. e.g., not used for angiography examinations but is used for CT Head with contrast)</td>
</tr>
<tr>
<td>D</td>
<td>Drainage</td>
</tr>
<tr>
<td>E</td>
<td>Embolisation</td>
</tr>
<tr>
<td>G</td>
<td>Exchange of device, e.g., Cardiac defibrillator change, dialysis catheter exchange</td>
</tr>
<tr>
<td>I</td>
<td>Insertion of device</td>
</tr>
<tr>
<td>J</td>
<td>Injection --as an objective of the procedure, not as part of the preliminary to this objective</td>
</tr>
<tr>
<td>L</td>
<td>Lithotripsy</td>
</tr>
<tr>
<td>M</td>
<td>Mobile for any modality, but particularly for ‘portable’ plain films and use of mobile image intensifiers</td>
</tr>
<tr>
<td>N</td>
<td>aspiration</td>
</tr>
<tr>
<td>O</td>
<td>Tomography in its wider sense.</td>
</tr>
<tr>
<td>P</td>
<td>‘Plasty’ - as in angioPlasty or dacrocystoPlasty - ie balloon dilatation</td>
</tr>
<tr>
<td>Q</td>
<td>obliQue</td>
</tr>
<tr>
<td>R</td>
<td>for Radiotherapy planning</td>
</tr>
<tr>
<td>S</td>
<td>Stent</td>
</tr>
<tr>
<td>T</td>
<td>Use of intraTheal contrast</td>
</tr>
<tr>
<td>X</td>
<td>eXtraction - eg in retrieval of intravascular foreign bodies or removal of temporary IVC filter</td>
</tr>
<tr>
<td>Y</td>
<td>Other</td>
</tr>
</tbody>
</table>

Additional Characters as used in dental representations are as follows:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>X Ray</td>
</tr>
<tr>
<td>D</td>
<td>Dental</td>
</tr>
<tr>
<td>P</td>
<td>Periapical</td>
</tr>
<tr>
<td>A</td>
<td>Up to 5 teeth</td>
</tr>
</tbody>
</table>
Between 6 and 10 teeth
more than 10 teeth
Full mouth
Occlusal
Upper
Lower
Panoramic radiograph
Lateral Cephalogram
PA Cephalogram
Oblique lateral

5 Distribution
In due course, the code set will be distributed in standard SNOMED file format along with the rest of the SNOMED and associated datasets using the terminology update distribution service aligned with the defined National release cycle (currently 1st April and 1st October each year).
In the short term alternative distribution mechanisms will need to be employed, either by download or CD distribution.

6 Requests for change
These should be submitted to the data standards helpdesk (datastandards@cfh.nhs.uk) with a definition and a rationale of why the submission is required.
Where a new submission is found to exist albeit represented slightly differently, it is acceptable to add the new submission as a synonym.
These requests for change will be assessed against the editorial principles and either added to the list, declined or referred to the CIMG for consideration.
All submissions will be dealt with in due course but there is no guarantee that any new item will be added in time for a particular release.

7 Mapping to Körner banding
To support the data collection undertaken in all imaging departments, the mapping from each item in the interim list is mapped to the relevant Körner banding, eg:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F2</td>
<td>Angioplasty Aorto-Femoral</td>
</tr>
<tr>
<td>F2</td>
<td>Arterial Stent iIiac Rt</td>
</tr>
<tr>
<td>D4</td>
<td>Arthrogram Shoulder Rt</td>
</tr>
<tr>
<td>A</td>
<td>Bone Densitometry DEXA</td>
</tr>
<tr>
<td>E</td>
<td>Cavernogram</td>
</tr>
<tr>
<td>D1</td>
<td>CT Chest and Drainage</td>
</tr>
<tr>
<td>B3</td>
<td>US Achilles Tendon</td>
</tr>
</tbody>
</table>

Further information on the Korner bandings can be found at the following link:

7.1 (Korner) Body part multiplication factor
It is necessary in KH12 mandatory returns to indicate the weight examinations on multiple body parts by the assignation of a multiplication factor. This is included in the spreadsheet of interim procedure descriptions. For example:
XR wrist Rt = multiplication factor of 1
XR wrist both = multiplication factor of 2
7.2 Interventional flag

It is also necessary in KH12 mandatory returns to indicate whether a particular examination was interventional in nature. The list includes a flag to indicate whether each examination was indeed considered interventional or not. Where there is a diagnostic element and an interventional element, the procedure is flagged as interventional. The definition adopted is that used by the Royal College of Radiologists and the British Society of Interventional Radiology is that a technique is interventional if it effects treatment.

8 Mapping to OPCS-4

To support current and future data collection in all imaging departments, a mapping to OPCS-4 will need to be maintained.

As new content from the interim representation is added to SNOMED CT, a map to OPCS-4 will routinely be assigned as part of the process.

The map from the interim representation to SNOMED CT should therefore provide a useful method for deriving the OPCS-4 code.
9 Appendix A – Physics and administrative procedures

The non-patient focussed physics and non-imaging procedures maintained are as follows:

<table>
<thead>
<tr>
<th>Physics procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anorectal Manometry</td>
</tr>
<tr>
<td>Balance Assessment</td>
</tr>
<tr>
<td>Electrogastrography</td>
</tr>
<tr>
<td>Foreign Body - Electrical Coil loc</td>
</tr>
<tr>
<td>Thermography of Lower Limb Both</td>
</tr>
<tr>
<td>Breasts Electrical Impedance Imaging</td>
</tr>
<tr>
<td>Breasts Thermography</td>
</tr>
<tr>
<td>Moire Fringe Topography</td>
</tr>
<tr>
<td>Oesophageal AMB Manometry</td>
</tr>
<tr>
<td>Oesophageal Manometry</td>
</tr>
<tr>
<td>Oesophageal Ph</td>
</tr>
<tr>
<td>Breast transillumination spectroscopy B</td>
</tr>
<tr>
<td>Air Plethysmography Bilateral</td>
</tr>
<tr>
<td>Air Plethysmography Lt</td>
</tr>
<tr>
<td>Air Plethysmography Rt</td>
</tr>
<tr>
<td>Photoplethysmography</td>
</tr>
<tr>
<td>Capsule Endoscopy</td>
</tr>
<tr>
<td>3 D study</td>
</tr>
<tr>
<td>4 D study</td>
</tr>
<tr>
<td>Abandoned procedure</td>
</tr>
<tr>
<td>Digitised Film</td>
</tr>
</tbody>
</table>
### 10 Appendix B – Abbreviations and acronyms in the DI interim procedure list

<table>
<thead>
<tr>
<th>EXPANDED NOTATION</th>
<th>ABBREVIATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abdomen/Abdominal</td>
<td>Abdo</td>
</tr>
<tr>
<td>Abdomen X-ray</td>
<td>AXR</td>
</tr>
<tr>
<td>Ablation</td>
<td>Abl</td>
</tr>
<tr>
<td>Absorption</td>
<td>Abs</td>
</tr>
<tr>
<td>Ambulatory</td>
<td>Amb</td>
</tr>
<tr>
<td>Aneurysm</td>
<td>Aneur</td>
</tr>
<tr>
<td>Angiotensin converting enzyme</td>
<td>ACE</td>
</tr>
<tr>
<td>Angiogram</td>
<td>Angio</td>
</tr>
<tr>
<td>Aorto-uni-iliac</td>
<td>AUI</td>
</tr>
<tr>
<td>Arterio-venous fistula</td>
<td>AVF</td>
</tr>
<tr>
<td>Arterio-venous malformation</td>
<td>AVM</td>
</tr>
<tr>
<td>Artery</td>
<td>A</td>
</tr>
<tr>
<td>Arthrogram</td>
<td>Arthro</td>
</tr>
<tr>
<td>Aspiration</td>
<td>Asp</td>
</tr>
<tr>
<td>Assisted</td>
<td>Ass</td>
</tr>
<tr>
<td>Attenuation correction</td>
<td>Atten Correct</td>
</tr>
<tr>
<td>Balloon</td>
<td>Balln</td>
</tr>
<tr>
<td>Barium</td>
<td>Ba</td>
</tr>
<tr>
<td>Biopsy</td>
<td>Bx</td>
</tr>
<tr>
<td>Bone mineral densitometry</td>
<td>BMD</td>
</tr>
<tr>
<td>Both</td>
<td>B</td>
</tr>
<tr>
<td>Carcino-Embryonic Antigen</td>
<td>CEA</td>
</tr>
<tr>
<td>Carcinoma</td>
<td>Ca</td>
</tr>
<tr>
<td>Cardiac</td>
<td>Card</td>
</tr>
<tr>
<td>Catheter</td>
<td>Cath</td>
</tr>
<tr>
<td>Cerebro-spinal fluid</td>
<td>CSF</td>
</tr>
<tr>
<td>Cervical</td>
<td>C</td>
</tr>
<tr>
<td>Chest X-ray</td>
<td>CXR</td>
</tr>
<tr>
<td>Cholangiogram</td>
<td>Cholangio</td>
</tr>
<tr>
<td>Computed tomography</td>
<td>CT</td>
</tr>
<tr>
<td>Collateral</td>
<td>Coll</td>
</tr>
<tr>
<td>Contrast</td>
<td>Cont</td>
</tr>
<tr>
<td>Common carotid artery</td>
<td>CCA</td>
</tr>
<tr>
<td>Common femoral artery</td>
<td>CFA</td>
</tr>
<tr>
<td>Common iliac artery</td>
<td>CIA</td>
</tr>
<tr>
<td>Conversion</td>
<td>Conv</td>
</tr>
<tr>
<td>Coronary</td>
<td>Cor</td>
</tr>
<tr>
<td>Defibrillation</td>
<td>Defib</td>
</tr>
<tr>
<td>Diagnostic</td>
<td>Dx</td>
</tr>
<tr>
<td>Digital subtraction angiography</td>
<td>DSA</td>
</tr>
<tr>
<td>Dual energy X-ray photon absorptiometry</td>
<td>DXA</td>
</tr>
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