

## REFERRAL CRITERIA AND AUTHORISATION PROTOCOLS FOR NON-CARDIAC NUCLEAR MEDICINE PROCEDURES

### SECTION ONE: BACKGROUND

The Ionising Radiation (Medical Exposure) Regulations [IR(ME)R] 2000 require all investigations using ionising radiation to be individually justified. The Nuclear Medicine department has produced a table of referral criteria which, if met, would allow justification of non-cardiac nuclear medicine procedures under most circumstances. Where possible these are taken from professional body guidelines:

- British Nuclear Medicine Society <http://www.bnms.org.uk/>
- European Association of Nuclear Medicine <http://www.eanm.org/>
- Society of Nuclear Medicine <http://www.snm.org/>
- The British Nuclear Cardiology Society <http://www.bnccs.org.uk/>
- The American Society of Nuclear Cardiology <http://www.asnc.org/>
- The National Institute for Health and Clinical Excellence  
<http://www.nice.org.uk/>

The referral procedure for cardiac nuclear medicine procedures is held in a separate document, *Referral Criteria and Authorisation Protocols for Cardiac Nuclear Medicine Procedures*.

The following notes provide advice for referrers on all aspects of the referral, justification and authorisation process, however the department of Nuclear Medicine will be happy to provide further or more specific guidance if requested.

### SECTION TWO: REFERRERS, PRACTITIONERS AND AUTHORISATION OF REQUESTS

#### Nuclear Medicine Referrers

Any medically qualified staff working for Hull and East Yorkshire NHS Trust or North Lincolnshire and Goole NHS Foundation Trust can request a Nuclear Medicine study. These requests may be authorised under protocol by suitably qualified members of Nuclear Medicine Department staff.

Any UK Registered Medical Practitioner employed by a body other than the NHS Trusts mentioned above can request a Nuclear Medicine study but all requests must be authorised by an ARSAC licence holder prior to appointment, with the exception of studies suggested by an ARSAC licence holder either on a previous report or by direct contact with the referrer.

Other staff groups (such as State Registered Nurses, Radiographers etc) may request Nuclear Medicine Investigations under protocol, but these referrals must be authorised by an appropriate ARSAC certificate holder unless stated in the appropriate protocol.

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By law, all referrers MUST sign and date the request and print their name and job title in block capital letters before the request can be approved. If this is not done we cannot perform the requested procedure and the request will be returned to the referrer for completion before approval.

#### **Nuclear Medicine Practitioners**

Under IR(ME)R 2000, all requests for exposure to ionising radiation must be authorised by an IR(ME)R practitioner to ensure that the benefit to the patient outweighs the potential detriment. In Nuclear Medicine all practitioners are ARSAC license holders. The ARSAC certificate holders for imaging, non-imaging diagnostic and therapeutic procedures within Hull and East Yorkshire Hospitals NHS Trust are named at the end of the appropriate lists of referral criteria.

#### **Justification of Requests**

All requests received by the department require justification by an ARSAC licence holder prior to appointment. However, written protocols exist to allow named persons other than the ARSAC licence holders to authorise many of the routine studies performed by the department. These studies are indicated by an asterisk in the following tables.

In-patient requests should be authorised within 1 working day.

#### **Justification of Paediatric Procedures**

Authorisation for paediatric studies (with the exception of routine DMSA and MAG3 studies) will always be performed by one of the ARSAC license holders.

#### **Justification of Procedures during Patient Pregnancy**

For pregnant patients the referrer should discuss the request directly with one of the ARSAC license holders

#### **Justification of Requests as Part of Research and Clinical Trials**

Investigations as part of research or clinical trials require a research ARSAC license specific to the study/trial. Therefore, such trials must be discussed with the department prior to requesting Nuclear Medicine procedures.

#### **Persons who can Authorise Diagnostic Studies in accordance with the Written Protocols**

Any member of staff employed by the Nuclear Medicine Department at Hull and East Yorkshire Hospitals NHS Trust who is approved by an ARSAC certificate holder to authorise Nuclear Medicine Investigations in their absence.

Any medically trained person employed by Hull and East Yorkshire Hospitals NHS Trust who is approved by an ARSAC certificate holder to authorise Nuclear Medicine Investigations in their absence.

A list of the names of the persons approved to authorise procedures and the names of the procedures they may authorise is held within the department and is available on request

#### **Referral Method**

By request card, electronic (order-comms) request or phone/fax - providing the original request is received before the examination is carried out.

### **SECTION THREE: INFORMATION REQUIRED ON NUCLEAR MEDICINE REQUESTS**

#### Clinical Information

It is a legal requirement under IR(ME)R that request cards for nuclear medicine procedures contain sufficient clinical detail to allow the justification and authorisation of the procedure. The regulations state that it is the responsibility of the referrer to provide sufficient clinical detail to enable the Practitioner to decide whether there is sufficient benefit to the patient. In Nuclear Medicine the Practitioner will always be one of the ARSAC holders.

#### Patient Information on Request Card

The following information about the patient is required as a minimum:

- patient's full name
- address
- date of birth
- sex
- HEY number (hospital number if HEY number not available).
- hospital and ward / clinic, or GP practice
- consultant or GP name
- clinical question to be answered
- investigation suggested
- whether the patient is pregnant or breastfeeding, including date of last menstrual period
- clinical history
- any relevant medication
- any previous tests which may interfere with this test (e.g. any radio-opaque substance, or any previous nuclear medicine procedure)
- medical or other potential risk to staff
- language or communications difficulties
- research projects or clinical trials must be clearly identified  
**(N.B. Specific ARSAC approval is required for these investigations)**

#### Referrer Identification

Signature of referrer, referrer name (printed legibly) and referrer status are required by law.

**The law requires that cards without the above clinical, patient and referrer information are returned to the referrer. We CANNOT perform the test without this information.**

#### Supplementary Drugs

Some investigations require the administration of other, non-radioactive pharmaceuticals as an essential part of the test. These are specified in the tables below after the relevant referral criteria. Your request for an investigation will be taken as implying agreement to the administration of the specified supplementary drug. If you are unhappy about your patient being given these drugs or you feel they are contraindicated this must be clearly stated on the request card.

All procedures which require intravenous administration of a radiopharmaceutical will involve administration of Sodium Chloride for parenteral use (0.9% w/v) in order to test the patency of any IV devices and to flush the radiopharmaceutical through the device.

## **SECTION FOUR: PATIENT EFFECTIVE DOSE**

### **Patient Effective Dose**

All of the investigations are listed together with an approximate effective dose in mSv. This is for the recommended ARSAC Diagnostic Reference Level of administered activity and the effective dose is taken from the latest version of the ARSAC Notes for Guidance. The administered activity may be altered according to allow for body habitus, pregnancy, scan-type, etc and so the actual effective dose received by the patient may differ from that stated.

We have the capability to perform hybrid imaging and attenuation correction with SPECT/CT in some investigations. This may be added to the investigation if the ARSAC license holder considers it necessary and will be justified as with any other exposure to ionising radiation. The use of CT causes an additional radiation dose which is not included in the total dose for the investigation unless otherwise stated. The effective dose for scanning a whole field of view is typically in the order of 1.2mSv for examinations of the pelvis and 0.8mSv for chest and abdominal views.

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### SECTION FIVE: REFERRAL CRITERIA FOR DIAGNOSTIC IMAGING STUDIES

#### Bone Scan <sup>99m</sup>Tc HDP

	Indication <sup>(with references where appropriate)</sup>	Supplementary Drugs	Effective Dose (mSv)
*	Known or suspected primary or secondary bone malignancy <sup>1,3</sup>	None	3-5
*	Recent trauma – assessment for occult fracture <sup>1</sup>	None	3-5
*	Suspected osteomyelitis/septic arthritis <sup>1,3</sup>	None	3-5
	Avascular necrosis and Perthes disease <sup>1,3</sup>	None	3-5
	Evaluation of Arthropathies and Arthritides <sup>1,3</sup>	None	3-5
	Reflex sympathetic dystrophy <sup>1,3</sup>	None	3-5
	Bone infarcts <sup>1</sup>	None	3-5
	Bone graft viability <sup>1</sup>	None	3-5
	Distribution of osteoblastic activity prior to <sup>89</sup> Sr therapy <sup>1</sup>	None	3-5
	Unexplained bone pain <sup>1</sup>	None	3-5
	Monitoring disease progression and response to chemo or radiotherapy of bone metastases(>6 months after treatment)	None	3-5
	Benign bone tumours	None	3-5
	Stress fractures <sup>1,3</sup>	None	3-5
	Non Accidental Injury <sup>3</sup>	None	3-5
	Complications of fractures and therapy <sup>3</sup>	None	3-5
	Bone scintigraphy guided surgery (e.g. Osteoid osteoma)	None	3-5
	Bone dysplasia <sup>3</sup>	None	3-5
	Investigation of children with a limp/backache/ or refusing to stand/use one limb <sup>3</sup>	None	3-5
	Pyrexia of unknown origin	None	3-5
	Suspected Plasmacytoma/Myeloma - only if negative skeletal survey performed	None	3-5
*	Known or suspected metabolic disorders (such as Paget's disease or Osteoporosis) <sup>3</sup>	None	3-5
*	Possible loose/infection prosthesis - if greater than 1 year since operation <sup>3</sup>	None	3-5
	Assessment of Osteoporosis <sup>3</sup>	None	3-5

#### Bone Marrow Imaging <sup>99m</sup>Tc Sulfur Colloid

	Indication <sup>(with references where appropriate)</sup>	Supplementary	Effective
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	Drugs	Dose (mSv)
Possible loose/infected prosthesis	None	4

#### Ventilation/Perfusion Lung Scan <sup>99m</sup>Tc MAA and <sup>99m</sup>Tc DTPA

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
*	Suspected In-Patient Acute Pulmonary Embolism <sup>1</sup>	None	1.4
	Suspected Out-Patient Pulmonary Embolism <sup>1</sup>	None	1.4
	To monitor the degree of resolution of change in ventilation and perfusion following an episode of pulmonary emboli <sup>1</sup>	None	1.4
*	Pre-operative assessment eg: lung volume reduction, bronchial carcinoma	None	1.4
	Regional Pulmonary function	None	1.4
	Nebuliser Assessment (Ventilation only)	None	~0.1 per nebuliser

**Exceptions:** requiring ARSAC holder direct assessment  
Patients with known cardiac shunts or pulmonary hypertension.

**Other Requirements:** Patients with suspected pulmonary embolism must have either a recent chest radiograph within 24 hours or be sent for a chest radiograph immediately after the examination. The only exception to this requirement is pregnant patients.

#### Renal Imaging <sup>99m</sup>Tc DMSA

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
*	Renal scarring <sup>1,3</sup>	None	0.7
*	Pyelonephritis <sup>1,3</sup>	None	0.7
	Assessment of the Horseshoe, solitary or ectopic kidney <sup>1,3</sup>	None	0.7
	Localisation of the poor or very poorly functioning kidney <sup>1</sup>	None	0.7
	Confirmation of non-functioning multicystic kidney <sup>3</sup>	None	0.7
	Assessment of renal mass lesion <sup>1</sup>	None	0.7
	Assessment in paediatric urinary tract infection as recommended in NICE Guidance CG54, <i>Urinary Tract Infection in Children: Diagnosis, Treatment and Long Term Management. August 2007</i>	None	0.7

#### Renography <sup>99m</sup>Tc MAG3

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
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*	Suspected obstruction <sup>1</sup>	Furosemide by weight <sup>#</sup>	0.7
	Assessment of dilated collecting system as a cause of back pain <sup>1</sup>	Furosemide by weight <sup>#</sup>	0.7
*	Pre-transplant donor assessment <sup>3</sup>	Furosemide by weight <sup>#</sup>	0.7
*	Assessment of reflux <sup>3</sup>	None	0.7
*	Post surgical assessment of a previously obstructed system <sup>1,3</sup>	Furosemide by weight <sup>#</sup>	0.7
	Assessment of renal transplant <sup>3</sup>	None	0.7
	Assessment of Hydronephrosis <sup>1</sup>	Furosemide by weight <sup>#</sup>	0.7
*	Assessment of split renal function <sup>1</sup>	None	0.7

# If the patient has an abnormal creatinine level then the normal dose of Furosemide will be doubled from 0.5mg/Kg (maximum 40mg) to 1.0mg/Kg (maximum 80mg). In patients with very poor renal function then the dose of Furosemide required to achieve diuresis should be estimated by the referrer.

#### Gastric Emptying and Small Bowel transit <sup>99m</sup>Tc Labelled Meal

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
	Nausea, vomiting, upper abdominal discomfort, bloating, chronic aspiration after eating <sup>1</sup>	None	0.3
	Suspected gastroparesis <sup>1</sup>	None	0.3
	Poor diabetic control <sup>1</sup>	None	0.3
	Gastroesophageal reflux <sup>1</sup>	None	0.3
	Assessing response to therapy for previously documented motility disturbances <sup>1</sup>	None	0.3

#### Meckel's Diverticulum Imaging <sup>99m</sup>Tc as pertechnetate

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
*	Suspected Meckel's Diverticulum <sup>1</sup>	Ranitidine	4

#### Gastro-Intestinal Bleeding Imaging <sup>99m</sup>Tc labelled Erythrocytes

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
	Acute GI bleed assessment <sup>1</sup>	Stannous Agent	4

#### Indium Labelled Leucocyte Scan <sup>111</sup>In labelled Leucocytes

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
	To detect sites of infection/inflammation in patients with granulocytosis and fever of unknown origin for more than 2 weeks <sup>1</sup>	None	9

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	To localise an unknown source of sepsis and to detect additional sites of infection in patients with persistent or recurrent fever and a known infection site for more than 2 weeks <sup>1</sup>	None	9
	To survey for site(s) of abscess or infection in a febrile post-op patient without localising signs or symptoms <sup>1</sup>	None	9
	To detect site(s) and extent of inflammatory Bowel Disease <sup>1</sup>	None	9
	Osteomyelitis/infected prosthesis <sup>1§</sup>	None	9
	To detect mycotic aneurysms, vascular graft and shunt infections <sup>1</sup> .	None	9

§This procedure may be performed with additional bone marrow imaging.  
See Bone Marrow Imaging for further details

### Tc Labelled Leucocyte Scan <sup>99m</sup>Tc-HMPAO labelled Leucocytes

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
	To detect suspected sites of acute inflammation/infection in the febrile patient with or without localising signs or symptoms for less than 2 weeks <sup>1</sup>	None	2
	To detect and determine the extent of inflammatory or ischaemic bowel disease <sup>1</sup>	None	2
	To detect and follow-up musculoskeletal infection such as septic arthritis and osteomyelitis <sup>1</sup>	None	2

### Leukoscan <sup>99m</sup>Tc Monoclonal Antibodies

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
	Infected prosthesis	None	6
	Osteomyelitis	None	6

### Thyroid imaging and uptake with Technetium <sup>99m</sup>Tc as pertechnetate

	Indication (with references where appropriate)	Supplementary Drugs	Effective Dose (mSv)
*	Assessment of functionality of thyroid nodules <sup>1</sup>	None	1
*	Assessment of goitre including hyperthyroid goitre <sup>1</sup>	None	1
*	Assessment of uptake function prior to radio-iodine treatment <sup>1</sup>	None	1
*	Assessment of suspected thyroiditis <sup>1</sup>	None	1

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	Assessment of neonatal hypothyroidism <sup>1</sup>	None	1
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#### Thyroid imaging and uptake with Iodine-123 <sup>123</sup>I as iodide

	Indication <sup>(with references where appropriate)</sup>	Supplementary Drugs	Effective Dose (mSv)
	Assessment of retrosternal thyroid <sup>1</sup>	None	4
	Assessment of ectopic thyroid tissue <sup>1</sup>	None	4
	To determine the presence and extent of residual functioning thyroid tissue and the presence and location of functioning thyroid cancer <sup>1</sup>	None	4
	As part of Parathyroid Localisation Study (see separate section)	None	See below

#### Parathyroid Localisation – Subtraction Technique <sup>99m</sup>Tc SestaMIBI and <sup>123</sup>I as iodide

	Indication <sup>(with references where appropriate)</sup>	Supplementary Drugs	Effective Dose (mSv)
	Localisation of parathyroid adenoma prior to surgical removal of the gland(s) <sup>1</sup>	None	13*

\*Total Dose for combined <sup>99m</sup>Tc SestaMIBI, <sup>123</sup>I and SPECT/CT localisation Studies

#### Octreotide Scan <sup>111</sup>In Octreotide

	Indication <sup>(with references where appropriate)</sup>	Supplementary Drugs	Effective Dose (mSv)
	Assessment of Neuroendocrine Tumour (Detection, metastases, recurrence) <sup>1,3</sup>	Picolax / Senna	6 (planar) 12 (SPECT)
	Determination of somatostatin-receptor status prior to proposed therapy <sup>1,3</sup>	Picolax / Senna	6 (planar) 12 (SPECT)
	Selection of patients for PRR Therapy	Picolax / Senna	6 (planar) 12 (SPECT)

#### HIDA Scan <sup>99m</sup>Tc HIDA

	Indication <sup>(with references where appropriate)</sup>	Supplementary Drugs	Effective Dose (mSv)
	Functional assessment of the gall bladder (NEEDS NORMAL ULTRASOUND FIRST) <sup>1</sup>	Syncalide / Calogen	2
	Acute/chronic cholecystitis <sup>1</sup>	None	2
	Evaluation of common bile duct obstruction <sup>1</sup>	None	2
	Detection of bile extravasation / leak <sup>1</sup>	None	2
	Evaluation of congenital abnormalities of	Phenobarbitone	2

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	the biliary tree including biliary atresia <sup>1</sup>	by weight	
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### Gallium <sup>67</sup>Ga

	Indication <sup>(with references where appropriate)</sup>	Supplementary Drugs	Effective Dose (mSv)
	Pyrexia unknown origin <sup>1</sup>	Picolax / Senna	15
	Detection of pulmonary and mediastinal inflammation/infection <sup>1</sup>		15
	Evaluation and follow-up of active lymphocytic or granulomatous inflammatory processes such as sarcoidosis or tuberculosis <sup>1</sup>	Picolax / Senna	15
	Diagnosing osteomyelitis and/or disk space infection. Ga-67 is preferred over labelled leukocytes for disk space infection <sup>1</sup>	Picolax / Senna	15
	Diagnosis and follow-up of medical treatment of retroperitoneal fibrosis <sup>1</sup>	Picolax / Senna	15
	Evaluation and follow-up of drug-induced pulmonary toxicity (e.g. Bleomycin, Amiodarone) <sup>1</sup>	None	15
	Lymphoma (Hodgkin's and Non-Hodgkin's) <sup>1,3</sup>	Picolax / Senna	15
	HIV assessment	Picolax / Senna	15
	Malignant Otitis Externa assessment	None	15

### MIBG for Oncology <sup>123</sup>I MIBG

	Indication <sup>(with references where appropriate)</sup>	Supplementary Drugs	Effective Dose (mSv)
	Neuroendocrine tumour (e.g. pheochromocytoma) detection, staging and localisation <sup>3</sup>	Lugol's Solution / Potassium Iodide	5 (if thyroid blocked)
	Adrenal medulla hyperplasia	Lugol's Solution / Potassium Iodide	5 (if thyroid blocked)
	Assessment of disease pre- and post- <sup>131</sup> I	Lugol's Solution /	5 (if thyroid

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MIBG Therapy	Potassium Iodide	blocked
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#### Thallium Brain Imaging <sup>201</sup>Tl as thallos chloride

Indication <small>(with references where appropriate)</small>	Supplementary Drugs	Effective Dose (mSv)
Assessment of recurrent tumour/radiation fibrosis	None	37

#### Lymphatic Imaging <sup>99m</sup>Tc Colloid

Indication <small>(with references where appropriate)</small>	Supplementary Drugs	Effective Dose (mSv)
Sentinel Node assessment	None	0.1
Lymphoedema assessment	None	0.1

#### DaTSCAN Imaging <sup>123</sup>I Ioflupane

Indication <small>(with references where appropriate)</small>	Supplementary Drugs	Effective Dose (mSv)
Differentiation between Essential Tremor/Drug Induced Parkinson's Disease, and Parkinsonian syndromes <sup>3</sup>	Lugol's Solution / Potassium Iodide	4.4
Assessment of the severity and progression of Parkinsonian syndromes <sup>3</sup>	Lugol's Solution / Potassium Iodide	4.4
Differentiation between Alzheimer's Disease and Dementia With Lewy Bodies/Parkinsonian Dementia	Lugol's Solution / Potassium Iodide	4.4

#### Exametazime Imaging of the Brain <sup>99m</sup>Tc Cerrotec

Indication <small>(with references where appropriate)</small>	Supplementary Drugs	Effective Dose (mSv)
Detection and evaluation of acute and chronic cerebrovascular disease <sup>1,3</sup>	None	5
Evaluation of patients with suspected dementia <sup>1,3</sup>	None	5
Presurgical localization of epileptic foci <sup>1,3</sup>	None	5
Evaluation of suspected brain trauma <sup>1,3</sup>	None	5
Evaluation of suspected inflammation <sup>3</sup>	None	5
Evaluation of suspected brain death <sup>3</sup>	None	5

#### FDG PET/CT Imaging <sup>18</sup>FDG

Indication <small>(with references where appropriate)</small>	Supplementary Drugs	Effective Dose (mSv)
Differentiation of benign from malignant lesions <sup>1,3</sup>	None	8
Staging of malignant disease <sup>1,3</sup>	None	8
Differentiation of recurrent or residual malignant disease from therapy-induced changes <sup>1,3</sup>	None	8
Monitoring the response to therapy <sup>1,3</sup>	None	8

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	Occult recurrence of malignant disease with raised tumour markers but normal cross-sectional imaging.	None	8
	Detection of unknown primary following detection of metastatic disease <sup>3</sup>	None	8
	Assessment of most active area of tumour for radiotherapy treatment planning <sup>3</sup>	None	8
	Investigation of Pyrexia of Unknown Origin	None	8
	Grading of malignant brain lesions <sup>1</sup>	None	5

Note: at the moment PET imaging is only available on a case-by-case basis. Please consult an ARSAC licence holder or the department of nuclear medicine for more information.

**Any other Investigation required should be discussed with the appropriate ARSAC licence holder**

### ARSAC LICENCE HOLDERS FOR DIAGNOSTIC IMAGING STUDIES

Dr G R Avery (Consultant Radiologist)

Dr A J Paddon (Consultant Radiologist)

Dr. A. C. Tweddel (Consultant Cardiologist)

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### SECTION SIX: NON-IMAGING DIAGNOSTIC STUDIES

<b>Measurement of Glomerular Filtration Rate (GFR) <sup>99m</sup>Tc DTPA</b>			
	<b>Indication</b> <sup>(with reference if appropriate)</sup>	<b>Supplementary Drugs</b>	<b>Effective Dose (mSv)</b>
	Measurement of Glomerular Filtration Rate (GFR)	None	0.06

<b>Red Cell Volume <sup>51</sup>Cr Erythrocytes</b>			
	<b>Indication</b> <sup>(with reference if appropriate)</sup>	<b>Supplementary Drugs</b>	<b>Effective Dose (mSv)</b>
	Measurement of Red Cell Volume <sup>4</sup>	None	0.3

<b>Bile Salt Malabsorbtion <sup>75</sup>Se SeHCAT</b>			
	<b>Indication</b> <sup>(with reference if appropriate)</sup>	<b>Supplementary Drugs</b>	<b>Effective Dose (mSv)</b>
	Investigation of Bile Salt Absorption <sup>4</sup>	None	0.3

### ARSAC LICENCE HOLDERS FOR NON-IMAGING DIAGNOSTIC IMAGING STUDIES

Dr G R Avery

**SECTION SEVEN: RADIONUCLIDE THERAPY**

**<sup>131</sup>Iodine Therapy**

<b>Indication</b> <sup>(with reference if appropriate)</sup>
Hyperthyroidism (Graves' disease, toxic multinodular goitre, solitary toxic thyroid nodule) <sup>1,3</sup>
Non toxic multinodular/diffuse goitre <sup>1,3</sup>
Post-operative ablation of benign thyroid remnant after thyroidectomy <sup>1,3</sup>
Therapy of residual thyroid cancer, local and distant metastases <sup>1,3</sup>

**<sup>32</sup>Phosphorus Therapy**

<b>Indication</b> <sup>(with reference if appropriate)</sup>
Polycythaemia rubra vera <sup>3</sup>
Essential Thrombocythaemia <sup>3</sup>

**Radiation Synovectomy <sup>90</sup>Y**

<b>Indication</b> <sup>(with reference if appropriate)</sup>
Rheumatoid arthritis <sup>3</sup>
Spondylarthropathy <sup>3</sup>
Other inflammatory joint diseases <sup>3</sup>
Persistent synovial effusion <sup>3</sup>
Haemophilic arthritis <sup>3</sup>
Calcium pyrophosphate dihydrate arthritis <sup>3</sup>
Pigmented villonodular synovitis <sup>3</sup>
Persistent effusion after joint prosthesis <sup>3</sup>
Undifferentiated arthritis (where the arthritis is characterised by synovitis, synovial thickening or effusion) <sup>3</sup>

**Palliative Relief of Metastatic Bone Pain <sup>89</sup>Sr**

<b>Indication</b> <sup>(with reference if appropriate)</sup>
Treatment of bone pain due to skeletal metastases involving more than one site associated with an osteoblastic response on bone scintigraphy <sup>1,3</sup>

**ARSAC LICENCE HOLDERS FOR THERAPY STUDIES:**

Please ask for the most up to date list of certificate holders for the procedure you are interested in.

**References**

1. Society of Nuclear Medicine Guidelines ([www.snm.org/policy/guidelines\\_download.html](http://www.snm.org/policy/guidelines_download.html))
2. British Nuclear Medicine Society ([www.bnms.org.uk/](http://www.bnms.org.uk/))
3. European Association of Nuclear Medicine ([www.eanm.org/](http://www.eanm.org/))
4. ARSAC Notes for Guidance on the Clinical Administration of Radiopharmaceuticals and Use of Sealed Radioactive Sources. March 2006 ([http://www.arsac.org.uk/notes\\_for\\_guidance/docs/arsac\\_nfg.pdf](http://www.arsac.org.uk/notes_for_guidance/docs/arsac_nfg.pdf))