

East Lancashire Teaching Hospital

Clinical Radiology Referral Guidelines

Breast Referrals



X-Ray



CT Scan



MRI



Ultrasound



PET Scan

EAST LANCASHIRE HOSPITALS NHS TRUST

CLINICAL RADIOLOGY REFERRAL GUIDELINES

These guidelines are intended to be used by all “referrers” requesting imaging at East Lancashire Hospitals NHS Trust. They are appropriate for both primary and secondary care clinicians and Non-Medical Referrers (NMR) to promote the best use of imaging and resources for the benefit of our patients.

The Ionising Radiation (Medical Exposure) Regulations (IR(ME)R) provide for the health protection of individuals undergoing medical exposures involving ionising radiation. All diagnostic tests should therefore be carefully considered prior to referral and should only be requested appropriately. Diagnostic tests which do not utilise Ionising Radiation (such as ultrasound and magnetic resonance imaging) carry their own potential risks and as such are as strictly governed in terms of justification. This not only serves to protect patients, but also to manage demand appropriately and keep waiting times to a minimum.

The aim for all examinations should be to obtain the maximum information with the minimum of radiation. This means that on occasions the imaging undertaken may not be what the referring clinician/NMR expects. Radiology has set examination protocols utilised for the legal authorisation and justification of requests.

Optimising radiation dose

The use of radiological investigations is an accepted part of medical practice justified in terms of clear clinical benefits to the patient, which should far outweigh the small radiation risks. However, even small radiation doses are not entirely without risk. A small fraction of the generic mutations and malignant diseases that occur in the population can be attributed to natural background radiation. Diagnostic medical exposures account for one-sixth of the total population dose.

The Ionising Radiation (Medical Exposure) Regulations (IR(ME)2017 require that the unnecessary exposure of patients to radiation is kept to a minimum and ELHT must comply with these regulations. This is achieved by avoiding undertaking investigations unnecessarily (especially repeat examinations) and the use of dose optimisation utilising locally set diagnostic reference levels (DRLs).

The effective dose for a radiological investigation is the weighted sum of the doses to a number of body tissues, where the weighting factor for each tissue depends on its relative sensitivity to radiation-induced cancer or severe hereditary effects. This provides a single dose estimate related to the total radiation risk, no matter how the radiation dose is distributed around the body (Table 1).

Typical effective doses for some common diagnostic radiology procedures range over a factor of about 1,000 from the equivalent 1-2 days of natural background radiation.













Table 1

Typical effective doses from diagnostic medical exposure			
Diagnostic Procedure	Typical effective dose (mSv)	Equivalent number of chest x-rays	Approximate equivalent period of natural background radiation
Radiographic examinations			
Limbs & joints (except hip)	<0.01	<0.5	<1.5 days
Chest (single PA film)	0.02	1	3 days
Skull	0.06	3	9 days
Thoracic spine	0.7	35	4 months
Lumbar spine	1.0	50	5 months
Hip	0.4	20	2 months
Pelvis	0.7	35	4 months
Abdomen	0.7	35	4 months
Barium swallow	1.5	75	8 months
Barium meal	2.6	130	15 months
Barium follow-through	3	150	16 months
Barium enema	7.2	360	3.2 years
CT Head	2	100	10 months
CT Chest	8	400	3.6 years
CT abdomen or pelvis	10	500	4.5 years
Radionuclide Studies			
Lung ventilation (Xe-133)	0.3	15	7 weeks
Lung perfusion (Tc-99m)	1	50	6 months
Kidney (Tc-99m)	1	5	6 months
Thyroid (Tc-99m)	1	50	6 months
Bone (Tc-99m)	4	200	1.8 years
Dynamic cardiac (Tc-99m)	6	300	2.7 years
PET head (F-18 FDG)	5	250	2.3 years
*UK average background radiation = 2.2 mSv per year: regional averages 1.5-7.5 mSv per year			

Please note that the doses from some CT examinations are particularly high and the demand for CT imaging continues to rise. **It is therefore particularly important that referrals for CT are thoroughly justified and that techniques that minimise dose while retaining essential diagnostic information are adopted.**

In these referral guidelines, the doses are grouped to support the referrer in understanding the order of magnitude of radiation doses of the various investigations (Table 2).

Table 2
Typical effective doses of ionising radiation from common imaging procedures

Symbol	Typical effective dose (mSv)	Examples
None	0	Ultrasound (US), Magnetic Resonance Imaging (MRI)
	<1	Chest, limbs & pelvis X-ray, mammography
 	1-5	Lumbar spine X-ray, Nuclear Medicine (NM) (e.g., bone), Computed tomography (CT) head and neck
  	5-10	CT chest or abdomen, NM (e.g., cardiac)
   	>10	Extensive CT studies, some NM studies (e.g., some Position Emission Tomography co-registered with CT (PET-CT))
The average annual background dose in most parts of Europe falls within the 1-5 mSv range  		

Pregnancy and Protection of the foetus


Irradiation of a foetus should be avoided whenever possible. This includes situations in which the woman herself does not suspect pregnancy. The prime responsibility for identifying such patients lies with the referring clinician. Radiology also checks the pregnancy status of patients when they attend for examination.

Persons of childbearing potential presenting for an examination in which the primary beam irradiates the pelvic area (essentially, any ionising irradiation between the diaphragm and the knees), directly or by scatter, or for a procedure involving radioactive isotopes, will be asked whether they are or may be pregnant.






If the patient can exclude the possibility of pregnancy, the examination can proceed. If the patient is definitely pregnant, or if pregnancy cannot be excluded, the justification for the proposed examination should be reviewed by the radiologist and the referring clinician/NMR, with a decision taken on whether to defer the investigation until after delivery. However, a procedure of clinical benefit to the parent may also be of indirect benefit to the unborn child and a delay in an essential procedure may increase the risk to the foetus as well as the parent. This consideration is especially relevant in an emergency situation and all decisions must be documented.





Guidelines Key
















The pages of each section are composed five columns:

Clinical/diagnostic problem	Situation for requesting an examination
Investigation	Possible imaging techniques
Dose	Level of exposure to radiation 
Recommendation	Recommendation on appropriateness of the investigation
Comment	Explanatory notes

Breast Disease

Clinical/diagnostic problem	Investigation	Dose	Recommendation	Comment
Asymptomatic patients				
Screening women <40 years old	Mammography		Not indicated	No evidence to support screening of women <40 years old who are not at increased risk from breast cancer
Screening women 40-49 years old (See Family History of breast cancer)	Mammography		Indicated only in specific circumstances	Women seeking screening at this age should be made aware of the risks and benefits
	U/S	None	Indicated only in specific circumstances	There is no evidence that US screening reduces mortality from breast cancer. It may be a useful adjunct to mammography in women with dense breasts and in those with implants
Screening women 50-70 years old	Mammography		Indicated	Women aged 50-70 are invited for screening at 3-yearly intervals under the UK NHS Breast Screening Programme
	U/S	None	Indicated only in specific circumstances	There is no evidence that US screening reduces mortality from breast cancer. It may be a useful adjunct to mammography in women with dense breasts and in those with implants
Screening women >70 years old	Mammography		Indicated	Women over 70 years may self-refer through the NHS Breast Screening Programme
	U/S	None	Indicated only in specific circumstances	There is no evidence that US screening reduces mortality from breast cancer. It may be a useful adjunct to mammography in women with dense breasts and in those with implants
Family History of breast cancer	Mammography		Specialised Investigation	Women with a moderate to high risk of breast cancer based on family history should be referred to a specialist breast clinic for guidance regarding their risk. Screening should only be undertaken after genetic risk assessments and counselling on the risks and benefits have taken place, in accordance with NICE guidance on familial breast cancer
	U/S	None	Indicated only in specific circumstances	There is no evidence that US screening reduces mortality from breast cancer. It may be a useful adjunct to mammography in women with dense breasts and in those with implants

	MRI	None	Specialised Investigation	Recent studies have shown that MRI is more sensitive than mammography in detecting breast cancer in patients with a family history of breast cancer. Its effect, if any, on mortality reduction and cost-effectiveness is not proven. MR screening should only be considered in women with a high-risk family history referred from specialist tertiary care centres
Women <50 years old having HRT or being considered for HRT	Mammography		Indicated only in specific circumstance	HRT has been shown to increase density and incidence of benign changes within the breast. There is a subsequent reduction in screening sensitivity and specificity and an increase in screening recall rate. There is no evidence for routine mammography before start of HRT
	U/S	None	Indicated only in specific circumstances	There is no evidence that US screening reduces mortality from breast cancer. It may be a useful adjunct to mammography in women with dense breasts and in those with implants
Breast screening in women ≥50 years old who have had augmentation mammoplasty	Mammography		Indicated	Sensitivity for cancer detection is lower than in the non-augmented breast
	U/S	None	Indicated only in specific circumstances	There is no evidence that US screening reduces mortality from breast cancer. It may be a useful adjunct to mammography in women with dense breasts and in those with implants
Symptomatic patients				
Clinical suspicion of carcinoma (e.g., breast lump, new nipple retraction, skin tethering or suspected Paget's disease of the nipple) (See also B09)	Mammography		Indicated	Referral to a one stop breast clinic precedes any radiological investigation. Mammography and US should be used in the context of triple assessment (i.e., clinical, imaging and pathology). Mammography is appropriate for women >35 years old
	U/S	None	Indicated	For women >35 years old, US in the imaging investigation of first choice when performed in the context of triple assessment at a specialist clinic
	MRI	None	Specialised Investigation	MRI may provide useful additional staging information where disease extent is unclear on standard triple assessment
Clinical suspicion of carcinoma in patients with	Mammography		Indicated	Mammography is indicated when there is clinical suspicion of carcinoma in women with implants.

augmentation mammoplasty				
Breast cancer staging	Mammography/ CXR US NM CT	  None      	Indicated	Local staging is with mammography and US. MRI is reserved for problem solving. Staging for distant metastases is with bone scintigraphy, CXR and liver US, or CT of the chest/abdomen. The staging strategy is usually decided by the local multidisciplinary team (MDT)
	MRI	None	Indicated only in specific circumstances	
Breast Cancer follow-up (surveillance)	Mammography US MRI NM	 None None   	Indicated	Mammography, US, and MRI may all be used for follow-up of the conserved breast. In suspected locoregional recurrence the principles of triple assessment apply. Occasionally, Scintimammography may have a role
Generalised lumpiness, pain or tenderness, or longstanding nipple retraction	Mammography		Not indicated initially	Mammography may be worthwhile in women >40 years old with persisting non-suspicious breast symptoms
	US	None	Indicated only in specific circumstances	In the absence of other signs suggestive of malignancy, breast US is unlikely to affect management
Cyclical mastalgia	Mammography		Not indicated	Neither mammography nor US should be performed in women with breast pain in the absence of clinical signs
	US	None	Not indicated	
Breast Inflammation	US	None	Indicated	US is useful for follow-up and for guidance in abscess drainage
	Mammography		Specialised investigation	Useful in the diagnosis or exclusion of malignancy when there is clinical doubt
Assessment of integrity of silicone breast implants	US +MRI	None	Specialised investigation	US is quick and simple, and a normal US study is highly predictive of an intact implant. Symptomatic women with implants >10 years old and with positive US findings have a high probability of rupture. MRI is occasionally used.