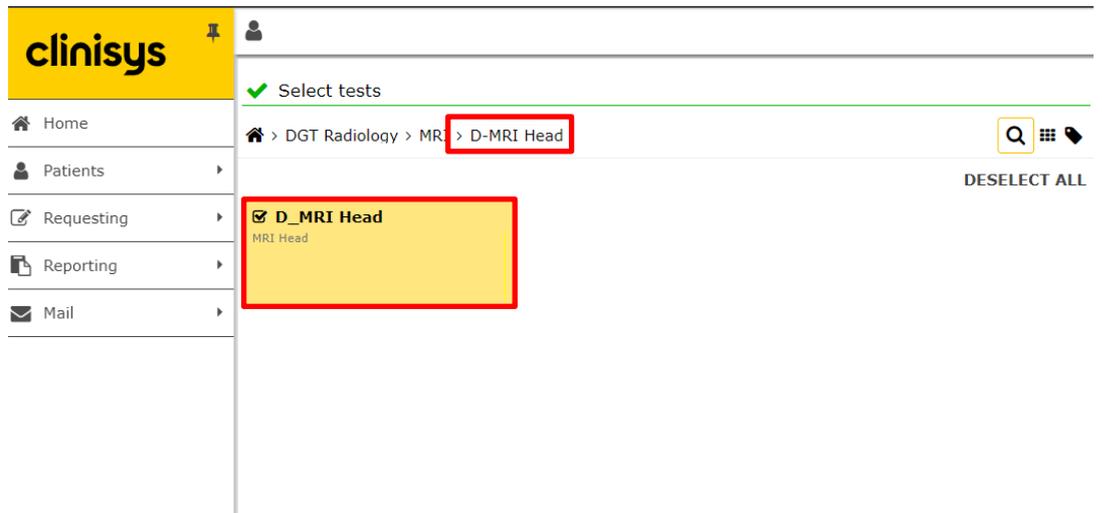


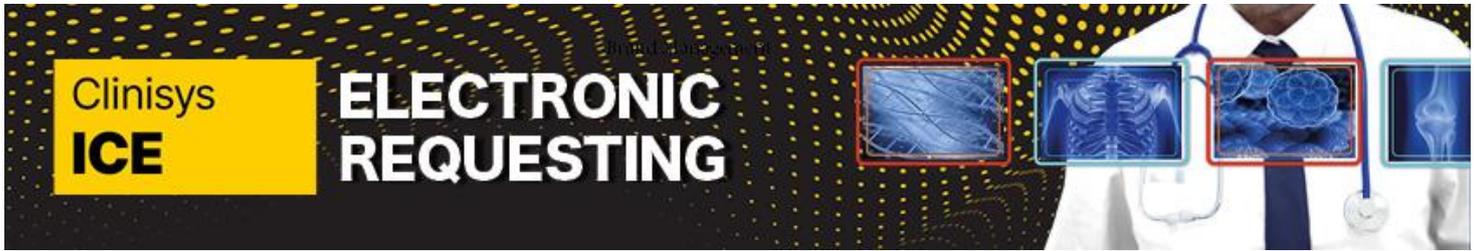
iRefer is a Clinical Decision Support (CDS) tool designed to assist healthcare providers when ordering radiology investigations within ICE. It is tailored to recommend the most appropriate examination based on the provided information and will activate when an investigation is chosen in ICE.

When choosing a test, the CDS tool "iRefer" will automatically launch, displaying a configured list relevant to the selected procedure. This acts as a hint list, presenting the top 10 most suitable reasons for the imaging request. If the desired reason is not shown in the list, there is a search field available to explore the entire library for alternative reasons.

In ICE, select appropriate test (see other QRGs for more guidance on this)

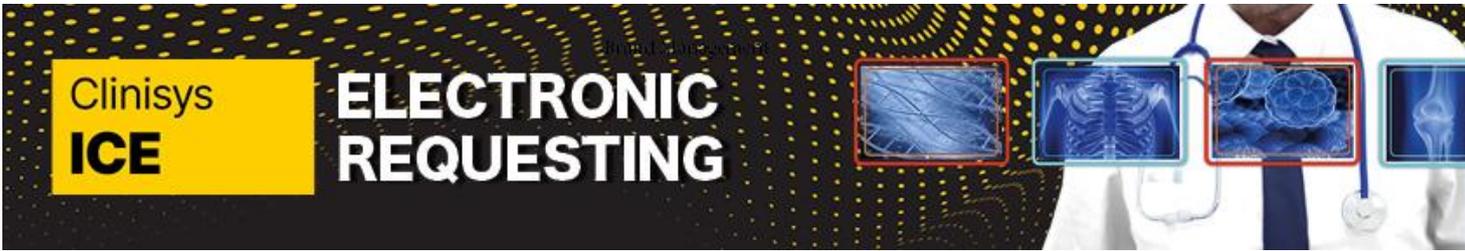


When you select a test, the CDS tool 'iRefer' will automatically launch in the patient context, presenting a list of symptoms that is relevant to your selection. This serves as a hint list, displaying some appropriate reasons for the imaging request. If the reason you need isn't on the list, a search field is available to browse the entire library for an alternative reason.



Click on the 'Primary Reason'

Dependant on the Primary Reason selected, you may need to answer additional questions before the system provides any recommendations



Once you have completed the relevant question(s), the system will provide its recommendations, with the most appropriate investigation highlighted in green. This recommendation is automatically selected, so you can simply click **'SUBMIT ORDER'** to proceed.

If the initial request is not the most suitable, it will still appear at the top of the list. It's marked in amber, indicating that it may be more suited as a specialist investigation.

Appropriateness

Click the ? mark icon to open the legend, which provides additional information about the recommendations



The **Meaning of Scores** will display.

Meaning Of Scores

Meaning of Recommendations

The following rating scale is from the Royal College of Radiologists (RCR) UK.

The recommendations are designated as follows:

<p>APPROPRIATENESS</p> <p>Indicated</p>	Investigations most likely to contribute to clinical diagnosis and management.
<p>APPROPRIATENESS</p> <p>Specialised Investigation</p>	Specialised investigations are frequently complex, time-consuming and/or resource-intensive. They usually only be undertaken after discussion with the radiologist or according to local policy.
<p>APPROPRIATENESS</p> <p>Indicated Only in Specific Circumstances</p>	Non-routine investigations, usually only undertaken if a clinician provides cogent reasons. A radiologist believes the examination represents an appropriate means of furthering the management of the patient. With certain clinical problems which may resolve with time it is correct to defer investigation.
<p>APPROPRIATENESS</p> <p>Not Indicated</p>	Investigations for which the proposed rationale is no longer appropriate.
<p>Unscored Procedure</p> <p>?</p>	No score has been defined for this procedure for the patient's condition.

Levels of Classification of Evidence



Scroll down the screen to find levels of evidence information

the supporting evidence base rather than the importance of these recommendations to the clinical problem addressed

[A]

Any of the following:

- High-quality diagnostic studies in which a new test is independently and blindly compared with a reference standard in an appropriate spectrum of patients
- Systematic review and meta-analyses of such high-quality studies

[B]

Any of the following:

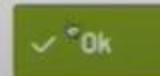
- Studies with a blind and independent comparison of the new test with the reference standard in a set of non-conflicting data confined to a narrow spectrum of patients
- Studies in which the reference standard was not applied to all patients
- Systematic reviews of such studies

[C]

Any of the following:

- Studies in which the reference standard was not objective
- Studies in which the comparison of the new test with the reference standard was not blind or independent
- Studies in which positive and negative test results were verified using different reference standards
- Expert opinion

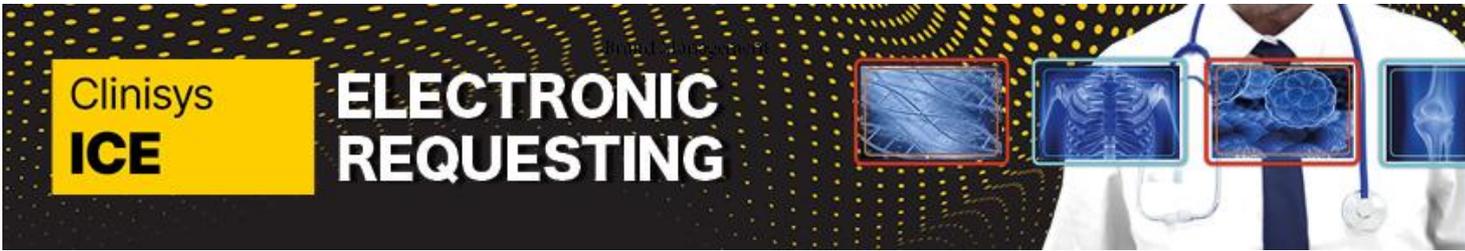
In some clinical situations there are conflicting data within a large body of excellent scientific reports. Thus, no firm recommendations are given and the evidence is graded C. It should be noted that there are very few randomised, controlled trials that evaluate radiological procedures – they are difficult to perform and ethical approval may be denied. Assignment of evidence levels of recommendations differs somewhat from those proposed by the Grading of Recommendations Assessment, Development and Evaluation GRADE Working Group as supporting evidence is generally not from therapeutic studies but from diagnostic studies which a Thornbury hierarchy may be more relevant.



Click the **X** or **Ok** to return to the previous screen



Levels of Radiation



Click the ? icon for information on radiation levels and IRMER guidance

Meaning Of Radiations ✕

What are the Radiation Levels?

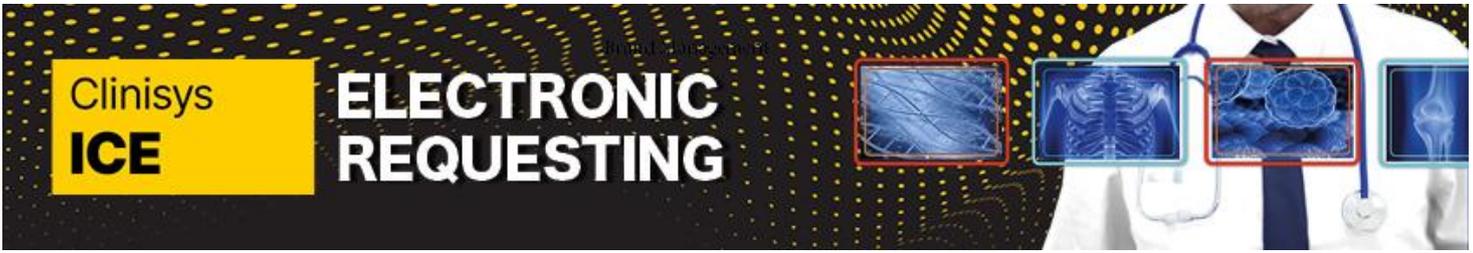
The use of radiological investigations is an accepted part of medical practice justified in terms of clear clinical benefits to the patient, which should far outweigh the small radiation risks. However, even small radiation doses are not entirely without risk. A small fraction of the genetic mutations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

The Ionising Radiation (Medical Exposure) Regulations 2000 and 2006 (IR(ME)R) impose a responsibility on imaging departments to ensure that all exposures to ionising radiation are justified, and that doses are optimised. Organisations and individuals using ionising radiation must comply with these regulations. One important means of reducing the radiation dose is to avoid undertaking procedures unnecessarily (especially repeat examinations). IR(ME)R also introduces the concept of diagnostic reference levels (DRLs). These levels are based on dose data for a range of commonly requested procedures collected from a large number of UK departments, and are regularly updated. IR(ME)R requires all departments to set local DRLs for a range of standard examinations, and monitoring of performance against these levels is an important component of dose optimisation. Guidance on the establishment and use of DRLs has been drawn up by a multi-professional group, including the RCR.

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. It thus provides a single dose estimate related to the total radiation risk, based on the dose distribution within the body.

In these RCR UK referral guidelines, the doses have been grouped into broad bands to help the referrer understand the order of magnitude of radiation dose of the various investigations.

BAND CLASSIFICATION OF TYPICAL DOSES OF IONISING RADIATION FROM COMMON IMAGING PROCEDURES			
Symbol	Typical Effective Dose (mSv)*	Examples	Lifetime Additional Risk of Cancer Induction / Exam
Radiation Level 	0	US; MRI	0



Scroll down the screen to view examples of the radiation levels

Symbol	Typical Effective Dose (mSv)*	Examples	Lifetime Additional Risk of Cancer Induction / Exam
	0	US; MRI	0
	<1	CXR: XR limb, pelvis, lumbar spine; mammography	<1:20,000
	1-5	IVU; NM (eg, bone); CT head and neck	1: 20,000-1:4,000
	5.1-10	CT chest or abdomen; NM (eg, cardiac)	1: 4,000-1: 2,000
	>10	Extensive CT studies, some NM studies (eg, some PET-CT)	>1: 2,000

*The average annual background dose in most parts of Europe falls within the 1-5 mSv range. Cancer risks from radiation vary considerably with age and sex, with higher risks in infants and females. Cancer risk indicated in this table is averaged for adults. As risks for children are higher, the examinations indicated may need to be moved to higher risk band; ie, CT head and neck for a child may move to the Band categorised within the 5.1-10 mSv range. This should be taken in the context of the considerably higher 1 in 2 average lifetime risk for cancer induction and must be balanced against the benefit of the investigation.

✓ Ok

Advice

The advice text provides information on why an investigation may or may not be appropriate. Click 'read more' to view the full text.

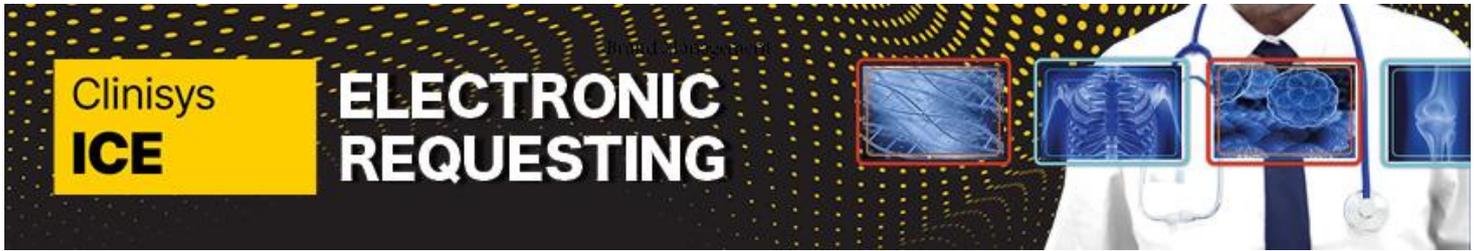
CT Head
 Appropriateness: Specialised Investigation
 Radiation Level: 3 radiation symbols, 2 empty circles
 Recommendation Grade [B]. CT is useful for the acute assessment of seizure disorder when the clinical presentation is of an acute neurological illness, and also when immediate MRI is not feasible; eg, when general anaesthesia is required. CT may complement MRI in the characterisation of lesions - eg, calcification. < READ LESS

MR Head
 Appropriateness: Indicated
 Radiation Level: 5 empty circles
 Recommendation Grade [B]. MRI is the best investigation, but is of little value in idiopathic generalised epilepsy. All adult patients with first seizure/fit... > READ MORE

NM SPECT Head
 Appropriateness: Specialised Investigation
 Radiation Level: 3 radiation symbols, 2 empty circles
 Recommendation Grade [B]. Ictal regional cerebral blood flow SPECT or inter-ictal FDG-PET is useful in the planning of epilepsy surgery when MRI is negative or... > READ MORE

SUBMIT ORDER >

iRefer logo



Clicking on the **iRefer** logo will provide you with source guidelines for that symptom in PDF format, which you can save to your device if needed.

iRefer Making the best use of clinical radiology

Source Information

IREFER8 EVIDENCE TABLE	
Existing NICE, SIGN & ACR Appropriateness Criteria:	<p>NICE GUIDELINE: The epilepsies: the diagnosis and management of the epilepsies in adults and children in primary and secondary care – Published date: January 2012 https://www.nice.org.uk/guidance/og137</p> <p>ACR APPROPRIATENESS CRITERIA: Seizures and Epilepsy – Last review date: 2014 https://acsearch.acr.org/docs/69479/Narrative/</p>
Highest level of evidence:	II/III

The **Source Information** will include supplementary information and comments, and may also contain links to other resources and NICE guidance.

Confirm, change or cancel based on guidance

Note: The system will not prevent you from proceeding with your original request.

To choose the recommended investigation, click **'SUBMIT ORDER'**.

REQUESTED PROCEDURE CT Head

PRIMARY INDICATION Epilepsy, New Onset (iRefer) MORE DETAILS

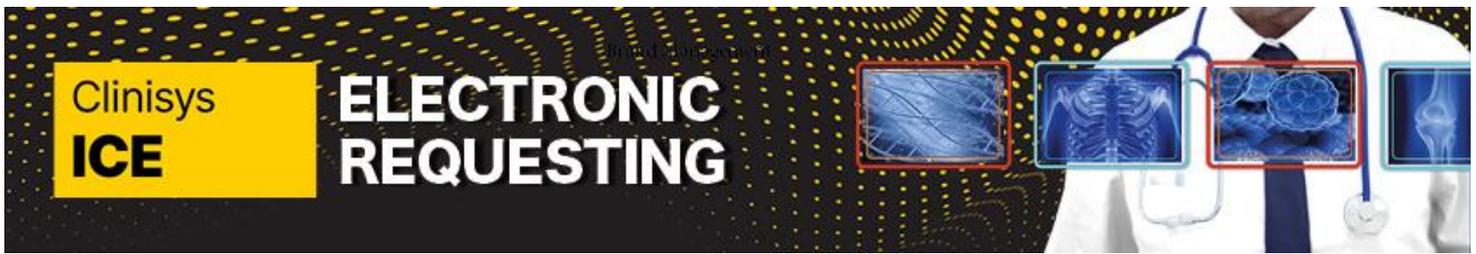
REQUESTED PROCEDURE

CT Head
 Appropriateness: Specialised Investigation
 Radiation Level: [3 icons]

RECOMMENDATIONS

MR Head
 Appropriateness: Indicated
 Radiation Level: [4 icons]

SUBMIT ORDER >

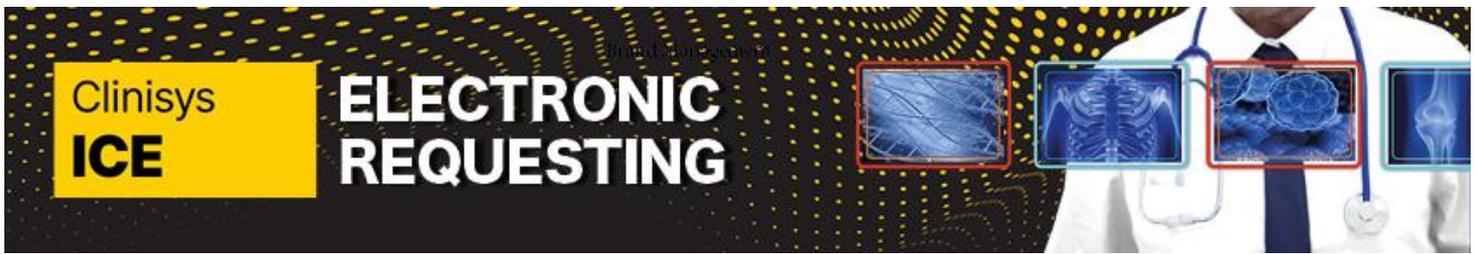


By placing a tick in the original request box, you can continue with the original request. Once selected click **'SUBMIT ORDER'**.

The screenshot shows the 'REQUESTED PROCEDURE' section for 'CT Head'. The primary indication is 'Epilepsy, New Onset (iRefer)'. The appropriateness score is 'Specialised Investigation' (red), and the radiation level is 'Low'. A green 'SUBMIT ORDER' button is highlighted with a red box. Below, the 'RECOMMENDATIONS' section shows 'MR Head' with an 'Indicated' (green) appropriateness score.

Where the Appropriateness score is red 'Not indicated' you are able to **Cancel Request** using the red button. Despite the recommendations shown as: **Appropriateness - Not Indicated** – Red, the system will not prevent you from proceeding with your original request by selecting the request and clicking **'SUBMIT ORDER'**

The screenshot shows the 'PATIENT INFO' and 'PRIMARY INDICATION' sections for 'Headache (Adult) (iRefer)'. The appropriateness score is 'Not Indicated' (red). A red box highlights a warning message: 'Imaging may not improve outcomes in this scenario. Please consider alternative investigation or clinical referral.' A red 'Cancel Request' button is also visible.



For training purposes, you can also modify the symptomatology by cancelling the selection (press 'x' on the top right, as in the screenshot) and choose new symptoms.

After submitting your order, you will be redirected to ICE, where the requested investigation will be updated to "recommended investigation requested." ONLY proceed to complete the order as usual within the ICE system if you wish to request the test from Radiology. If a request is placed in error, please see the QRG for cancelling a request.