

**Guidance on  
the use of  
ultrasound  
locating devices  
for placing  
central venous  
catheters**

---

## Further Information

The NICE website ([www.nice.org.uk](http://www.nice.org.uk)) has further information on NICE and the full guidance on the use of ultrasound locating devices for placing intravenous catheters that has been issued to the NHS. The guidance can also be requested from the NHS Response Line by phoning 0870 1555 455 and quoting reference N0146.

This leaflet is also available in Welsh, (Ref no. N0149).

**Mae'r daflen hon hefyd ar gael yn Gymraeg (rhif cyfeirnod N0149).**

## National Institute for Clinical Excellence

11 Strand  
London  
WC2N 5HR

Web: [www.nice.org.uk](http://www.nice.org.uk)

ISBN: 1-84257-225-3

Published by the National  
Institute for Clinical Excellence  
September 2002

N0148 5k 1P Sep 02 (ABA)

---

## What is NICE Guidance?

The National Institute for Clinical Excellence (NICE) is part of the NHS. It produces guidance for both the NHS and patients on the use of medicines, medical equipment, diagnostic tests and clinical and surgical procedures and under what circumstances they should be used.

To produce this guidance, NICE looks at how well the medicine, equipment or procedure works and also how well it works in relation to how much it costs. This process is called an appraisal. The appraisal process involves the manufacturer of the medicine or equipment for which guidance is being produced and the organisations that represent the healthcare professionals, patients and carers who will be affected by the guidance. Each appraisal takes about 12 months to complete.

NICE was asked to look at the available evidence on ultrasound locating devices for placing central venous catheters and provide guidance that would help the NHS in England and Wales decide when they should be used.

---

## What are central venous catheters and when are they used?

A central venous catheter is a tube that is inserted into a vein (a blood vessel that carries blood to the heart). There are many reasons why a patient might need a central venous catheter – for example, it might be necessary to slowly deliver blood products, certain liquid drugs or other fluids into the body (this is called an intravenous infusion or a 'drip') or to carry out certain surgical procedures such as fitting a heart pacemaker. And there lots of hospital situations in which central venous catheters are used – for example, for patients undergoing cancer treatment, dialysis, or major surgery, and for those admitted to accident and emergency departments or intensive therapy units.

The most common sites for insertion of a central venous catheter are the internal jugular vein (in the neck, carrying blood from the head to the heart), the subclavian vein (under the collar bone, carrying blood from the arm to the heart), the femoral vein (the main vein in the leg), and veins in the arm.

Central venous catheters are usually inserted by doctors, but sometimes a specialist nurse carries out the procedure. It has

---

## How are ultrasound locating devices used?

been estimated that about 200,000 CVCs are inserted annually in the NHS.

A vein has to be punctured to insert a central venous catheter. This is done by inserting a needle into the body and along the vein. Traditionally, doctors have found the right place to insert the needle by using their knowledge of body structure to look for certain features and to feel for the pulse in the artery that lies close to the vein. (An artery is a blood vessel that carries blood away from the heart. The catheter must be inserted into a vein, not into an artery.) This is known as the 'landmark method'.

Ultrasound devices are now available to help the doctor to guide the needle into the vein. There are two types of ultrasound device available to do this: two-dimensional (2-D) imaging ultrasound devices and audio-guided Doppler ultrasound devices. All ultrasound devices send very high frequency sound waves (which can't be heard by the human ear) into the body and detect the echoes that are reflected back. In 2-D imaging ultrasound, these echoes are analysed by the machine and

---

## Why might ultrasound locating devices be used?

translated into an image of the vein and the tissues surrounding it, which is displayed on a screen. Audio-guided Doppler ultrasound devices don't show a picture of the vein; instead they emit a sound when they detect blood flowing in a vein.

There are a number of complications that can be associated with inserting a central venous catheter. These include puncturing an artery instead of a vein, puncturing the wall of the pleural cavity that surrounds the lungs, causing injury to a nerve or having to make several attempts at inserting the catheter, which can delay treatment. The risks and the consequences of complications differ substantially across different patient groups depending on the patient's body structure, the circumstances in which the procedure is carried out and what illnesses or injuries the patient has.

Studies have investigated whether ultrasound locating devices have advantages over the landmark method for placing central venous in terms of factors such as failure to place a catheter, the number of

attempts made before a catheter is placed successfully and the occurrence of complications. NICE has looked at the evidence available and has made recommendations to the NHS in England and Wales about when ultrasound locating devices should be used.

---

## What has NICE recommended ?

NICE has made the following recommendations.

- 2-D imaging ultrasound guidance should be the preferred method when inserting of central venous catheter into the internal jugular vein in adults and children in 'elective situations'. ('Elective situation' means that the operation, or other treatment, has been planned – that is, it is not an emergency.)
- 2-D imaging ultrasound guidance should be considered in most clinical situations where CVC insertion is necessary, whether the situation is elective or an emergency.
- Everyone who uses 2-D imaging ultrasound guidance to insert central venous catheters should

have appropriate training to ensure they are competent to use the technique.

- Audio-guided Doppler ultrasound guidance is not recommended for use when inserting central venous catheters.

---

What should I do?

If you or someone you care for is going to have a clinical procedure which might involve inserting a central venous catheter (for example, major surgery), you should discuss this guidance with your doctor or nurse.

---

Will NICE review its Guidance?

Yes. The guidance will be reviewed in August 2005.