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## **Implantable cardioverter defibrillators (ICDs) for arrhythmias**

Understanding NICE guidance –  
information for people with arrhythmias,  
their families and carers, and the public

## Ordering information

You can download the following documents from [www.nice.org.uk/TA095](http://www.nice.org.uk/TA095)

- This booklet.
- The full guidance on this appraisal.
- A short version for healthcare professionals – the quick reference guide.
- The assessment report – details of all the studies that were looked at.

For printed copies of the quick reference guide or information for the public, phone the NHS Response Line on 0870 1555 455 and quote:

- N0973 (quick reference guide)
- N0974 (information for the public).

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## Contents

<b>What is NICE guidance?</b>	<b>4</b>
<b>What is an arrhythmia?</b>	<b>5</b>
<b>What is an ICD?</b>	<b>6</b>
<b>What has NICE recommended on ICDs?</b>	<b>6</b>
<b>What should I do next?</b>	<b>8</b>
<b>Will NICE review its guidance?</b>	<b>8</b>
<b>Further information</b>	<b>9</b>
<b>Glossary</b>	<b>10</b>

## What is NICE guidance?

The National Institute for Health and Clinical Excellence (NICE) is the independent organisation responsible for providing national guidance on the promotion of good health and the prevention and treatment of ill health. One of NICE's roles is to produce guidance (recommendations) on the use of medicines, medical equipment, diagnostic tests and clinical and surgical procedures within the NHS.

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.

NICE was asked to look at the available evidence on the use of implantable cardioverter defibrillators (called ICDs for short). NICE was asked to provide guidance that will help the NHS in England and Wales decide when ICDs should be used. This guidance does not cover the use of ICDs for a heart condition called non-ischaemic dilated cardiomyopathy.

**The medical terms and abbreviations used are explained in the glossary on page 10 of this booklet.**

## What is an arrhythmia?

The heart is a muscle that normally contracts regularly and rhythmically, resulting in the heartbeat. An arrhythmia is a variation in the heartbeat – it can become faster or slower than usual, or become irregular.

Sometimes, an arrhythmia can stop the heart from pumping enough blood around the body, including the blood needed by the brain and the heart muscle itself. This can be fatal, and in some cases this can happen very suddenly and unexpectedly. About 8 out of 10 sudden deaths from heart problems (known as sudden cardiac deaths or SCDs) are caused by 'fast' arrhythmias in the ventricles (conditions called ventricular tachycardia or ventricular fibrillation, or VT and VF for short).

Many patients with a fast arrhythmia are treated with drugs, even if they do not have troublesome symptoms. Long-term drug therapy aims to reduce the chance of an arrhythmia developing, but does not stop it once it has started.

## What is an ICD?

An implantable cardioverter defibrillator (ICD) is a small device that is put into the upper chest below the left shoulder. Leads from the device go into the heart to:

- control the rate of (pace) the heartbeat
- continually sense for an irregular heartbeat
- deliver a small electric shock to return the heartbeat to its normal rhythm (defibrillate) if necessary.

## What has NICE recommended on ICDs?

During the appraisal, NICE's Appraisal Committee read and heard evidence from:

- good-quality studies of ICDs
- doctors with specialist knowledge of arrhythmias and their treatment
- individuals with specialist knowledge of the issues affecting people with arrhythmias
- organisations representing the views of people who will be affected by the guidance (because they have, or care for someone with, the condition or because they work in the NHS and are involved in providing care for people with the condition)
- the manufacturer of ICDs.

The evidence is summarised in the full guidance and additional information about the studies can be found in the assessment report for this appraisal (see 'Further information' section for details).

NICE has recommended the use of ICDs to prevent SCD caused by arrhythmias in the following people within the NHS in England and Wales.

### **People who already have or have had certain fast arrhythmias**

ICDs are recommended for people who:

- have survived a cardiac arrest due to either VT or VF, or
- have VT that is sudden, unexpected and prolonged and causes fainting or significantly restricts the amount of blood being circulated, or
- have VT that is prolonged, but does not cause fainting or cardiac arrest, and an LVEF reduced to less than 35%, and heart failure no worse than class 3 of the New York Heart Association classification system.

### **People who have had a myocardial infarction (MI)**

ICDs are recommended for people who have had a myocardial infarction (MI) more than 4 weeks previously and have all of:

- an LVEF that is reduced to less than 35%, and heart failure no worse than class 3 of the New York Heart Association classification system, and
- VT that is not prolonged when monitored for 24 hours using an ECG machine (this is called Holter monitoring), and
- VT that can be brought on by electrophysiological testing.

ICDs are also recommended for people who have had an MI more than 4 weeks previously and have both:

- an LVEF that is reduced to 30% and heart failure no worse than class 3 of the New York Heart Association classification system, and
- a QRS duration of 120 milliseconds or longer.

### **People with other heart problems**

ICDs are recommended for people who have a heart problem with a high risk of sudden death that runs in the family. These include long QT syndrome, hypertrophic cardiomyopathy, Brugada syndrome and arrhythmogenic right ventricular dysplasia (ARVD), or for patients born with heart disease who have had surgery to correct it.

### **What should I do next?**

If you or someone you care for has an arrhythmia, you should discuss this guidance with your healthcare professional.

### **Will NICE review its guidance?**

Yes. The guidance will be reviewed in July 2007.

## Further information

The NICE website ([www.nice.org.uk](http://www.nice.org.uk)) has further information about NICE and the full guidance on ICDs for arrhythmias that has been issued to the NHS. The assessment report, which contains details of the studies that were looked at, is also available from the NICE website. A short version of the guidance (a 'quick reference guide') is available on the website and from the NHS Response Line (phone 0870 1555 455 and quote reference number N0973).

If you have access to the Internet, you can find more information about heart problems on the NHS Direct website ([www.nhsdirect.nhs.uk](http://www.nhsdirect.nhs.uk)). You can also phone NHS Direct on 0845 46 47.

## Glossary

**Cardiac arrest:** when the heart abruptly stops beating properly and breathing can't be maintained.

**ECG:** electrocardiogram – a test to record the rhythm and activity of the heart.

**Electrophysiological testing:** where the heart is stimulated and electrical impulses are recorded.

**Heart attack:** see myocardial infarction.

**Left ventricular ejection fraction (LVEF):** the amount of oxygen-rich blood that is pumped out of the left ventricle per heartbeat – used to measure how well the heart is working. A normal LVEF is 50–70%.

**LVEF:** see left ventricular ejection fraction.

**Myocardial infarction (MI):** when the blood supply to the heart muscle is reduced, causing parts of it to die. Commonly known as a 'heart attack'.

**New York Heart Association classification system:** used by doctors to describe a patient's heart condition, class 1 being the least serious and class 4 the most serious. Class 3 is described as marked limitation of physical activity. The person is comfortable when resting but has symptoms when doing less-than-normal activity.

**QRS duration:** the length of time it takes for electrical signals to make the ventricles contract. A QRS duration of 120 milliseconds or longer indicates that the electrical system of the heart is not working normally.

**Ventricle (left and right):** the two lower chambers of the heart. The right ventricle pumps blood to the lungs to pick up oxygen and the left ventricle pumps oxygen-rich blood to the body.



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