



**Huntington's
Disease
Association**

Huntington's disease

**Predictive testing for
Huntington's disease**

Introduction

Huntington's disease is a hereditary disorder of the central nervous system. It is caused by a faulty gene. If one of your parents or another relative has Huntington's disease then you will probably be wondering about the likelihood of developing the disease yourself.

This fact sheet explains:

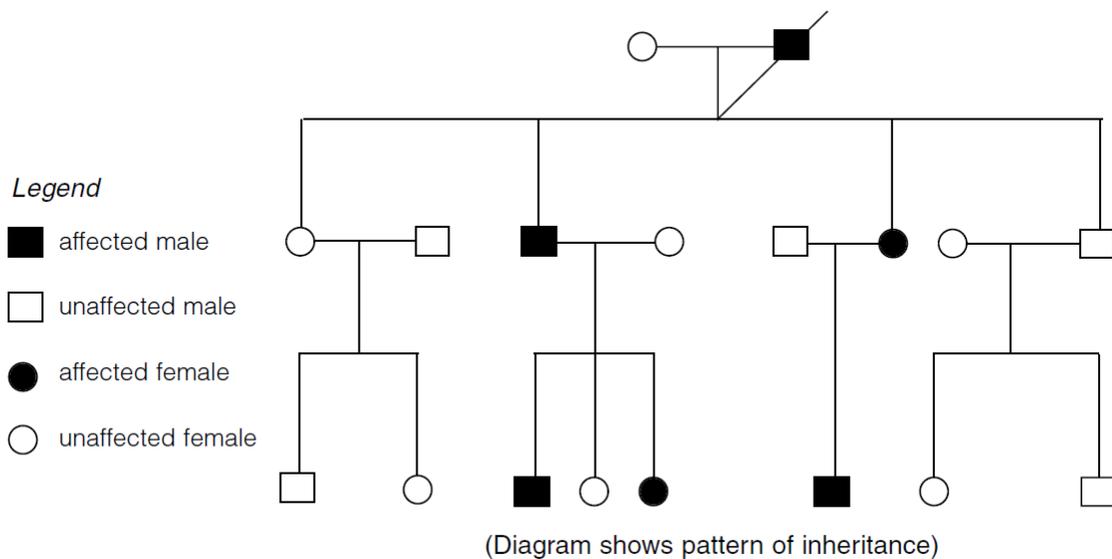
- How Huntington's disease is passed on
- The likelihood of developing the disease
- Genetic testing
- The Huntington gene
- Having children - including foetal exclusion testing

How Huntington's disease is passed on

In each cell of your body you have 22 pairs of chromosomes (autosomes) and two sex chromosomes.

One of each pair of autosomes comes from your father and one from your mother. Chromosomes contain genes which are the basic units of inheritance.

The gene for Huntington's disease is on chromosome four.



The gene for Huntington's is larger than normal. Your affected parent has one normal sized copy of the gene and one larger sized copy. You got half your genetic material from each parent so it's a 50:50 (or 50%) chance that you got the half with the normal sized gene and a 50:50 (50%) chance that you got the half with the large size. There is a 50:50 chance each time, so each child is at 50% risk. Sometimes this is called a 'one in two' chance of developing the disease.

If you have the faulty gene you will, at some stage, develop the disease. If you inherit the 'good' gene, you won't develop the disease and cannot pass it on to your children.

The symptoms of Huntington's disease usually develop when people are between 30 and 50 years old (though they can start much earlier or much later). The faulty gene is present from conception.

As the age of onset is so variable, an individual who carries the faulty gene may die before the disease has had time to develop and the relatives, then, may not know the true extent of their risk.

The likelihood of developing the disease

If one of your parents has Huntington's disease your 'risk factor' does not remain at 50% all your life. As you get older, the likelihood of developing the disease decreases.

If you reach 70 years of age without any symptoms your risk will be very low. However, these are standardised figures and your Genetic Clinic will advise you individually of your risk.

The following table illustrates how the risk decreases over time for someone who is not symptomatic and who has a parent affected by Huntington's.

Age	Percentage Risk	Age	Percentage risk
20	49.6%	50	31.5%
25	49	55	24.8
30	47.6	60	18.7
35	45.5	65	12.8
40	42.5	70	6.2
45	37.8	75	4.6

For technical reasons, the figures used by some genetic clinics or in other countries may vary slightly from those shown in this leaflet.

It does not make any difference to your risk factor if:

- You look like your affected parent
- Your brothers or sisters develop the disease
- You are male or female

Genetic Testing

Living with the knowledge that you are at risk can be very worrying. You may feel that you would prefer to know for certain whether or not you have the faulty copy of the gene. A DNA test can now be carried out which will usually give you this information. In a few cases the test is still uninformative. Although the test is available, it does not mean that you should have it.

You need to consider very carefully whether the test is right for you. If you do decide that it is, you need to think about things like its effect on life insurance, job opportunities etc. It is probable that a positive test result would make it more difficult to get life insurance.

If you have only just discovered that you are at risk, then be careful not to rush into making a decision. Once you have been given your test results, you can't change your mind about whether or not you wanted to know.

Only you can make the decision about whether you want to be tested and you usually need to be over eighteen years of age before it will be performed.

Parents, partners and other family members may pressure you one way or the other, but it remains your decision. Please let the Huntington's Disease Association know about any pressure which you feel is being put on you by health care professionals, employers or insurance companies.

If one of your grandparents has/had Huntington's disease but your own parent is so far not showing any symptoms and does not wish to be tested, you will need to talk things over particularly carefully. If you take the test and find that you have the faulty gene, then it will automatically mean that your parent has as well. Trying to keep this result secret is likely to be difficult or even impossible. So, you will need to discuss how any adverse effects can be minimised. Though this is a very difficult issue the general opinion at the moment is that your right to have the test is greater than the right of your parent not to know.

Testing is only available at Regional Genetics Clinics, which are located throughout the country. A list of these centres is given at the end of this leaflet. You can ask your GP to arrange an appointment for you.

However not all GPs are aware that testing is available, so you may have to explain the situation. It might be

useful to give your GP a copy of this fact sheet and other information from the HDA.

Going to the Genetics Clinic does not mean that you are obliged to take the test but it does give you the chance to talk over all the implications and any other concerns you may have. Each Clinic follows an agreed counselling procedure or 'protocol' which is usually spread over at least three sessions, to help you decide. You can withdraw from the procedure at any time.

According to national and international guidelines, follow-up counselling – after you have been given the test result – should be available.

If you decide to have the test done you may have two separate blood samples taken (to double check the results). Your affected parent's blood may also be tested to check the original diagnosis of Huntington's disease. The DNA which is extracted from the blood is then analysed in a specialised laboratory.

Some people find waiting for the results very stressful. If you feel there is a particularly long delay, do ask the Genetics Clinic for the reason.

Technically, the test can be quite complicated both to perform and interpret. The Clinic will want to allow time to ensure that a result is ready for you and this may be from four-six weeks after the third counselling session.

The Huntington's gene

Genes are made up of DNA (deoxyribonucleic acid). DNA itself is made up of four chemicals which are known by letters of the alphabet:

A Adenine G Guanine
C Cytosine T Thymine

One section of the Huntington's gene contains three of these chemicals - CAG - repeated a number of times. In the faulty gene these three chemicals are repeated many times, like a 'molecular stutter'.

Four types of results are recognised:

- Under 27 repeats is unequivocally normal.
- Between 27-35 repeats is normal, but there is a small chance that the repeat may increase in future generations.
- Between 36-39 repeats the result is abnormal but there is a chance the person may be affected very late in life or even not at all.
- Over 40 repeats is unequivocally abnormal.

Though the test can tell whether you carry the Huntington's disease mutation, it cannot tell you when the disease itself will start to develop.

Having children – including prenatal testing

Knowing that you are at risk may affect your decisions about having a family of your own.

Some people decide never to have children at all, whilst others go ahead on the grounds that the children are likely to have many years of normal life before developing the disease (if they get it at all).

Couples at risk to Huntington's disease may find it more difficult to adopt, although they may be able to undertake fostering. IVF (in vitro fertilisation) and AID (artificial insemination by donor) may also be considered.

Your decision to have children may depend upon the results of genetic testing. If testing shows that you don't have the faulty gene, then you can't pass it on to your children.

If you do have the faulty gene then your unborn children can be tested to see if they have inherited it.

If you do not know if you have the faulty gene, and do not want to take the test yourself, there is a different type of prenatal test which can be performed; using linkage analysis. It was used before the gene was found and direct testing was available; so it is not as accurate, but it does not alter your risk.

If you are considering this option do discuss it at the Genetics Clinic well before embarking on the pregnancy.

Pre-implantation Genetic Diagnosis (PGD) offers another alternative to testing for Huntington's in a pregnancy (prenatal testing). PGD gives a couple the chance of conceiving a pregnancy that should be unaffected by Huntington's.

PGD involves the couple undergoing IVF treatment (fertility treatment) even if they are a normally fertile couple. These embryos are then tested for Huntington's before they are implanted in the woman's womb. Only embryos without the Huntington's mutation are chosen for replacement.

The hope is then that the couple will be successfully pregnant with a baby that is not at risk of inheriting the Huntington's gene. Couples have to be referred to the specialist clinic by their own genetics clinic, and funding of this procedure can be problematic.

REGIONAL GENETICS SERVICES

East Anglia

Dept of Clinical Genetics, P.O. Box 134
Addenbrookes Hospital NHS Trust
Cambridge
CB2 2QQ
Phone: 01223 216 446

London - North East Thames

Clinical Genetics Dept
Great Ormond Street Hospital
London
WC1N 3JH
Phone: 0207 762 6845

Dept of Clinical Neurology
The National Hospital for
Neurology and Neurosurgery
Queen Square
London
WC1N 3BG
Phone: 0203 448 3613

London - North West Thames

Kennedy Galton Centre for Clinical Genetics
Level 8V, Northwick Park and St Mark's NHS Trust
Watford Road, Harrow
Middlesex, HA1 3UJ
Phone: 0208 869 2795

London - South East Thames

Dept of Clinical Genetics
7th Floor, Guys Hospital
Great Maze Pond, London
SE1 9RT
Phone: 020 7188 1364

London - South West Thames

Regional Genetics Service
St Georges Hospital Medical School
Cranmer Terrace, London
SW17 0RE
Phone: 0208 725 (0571 or 5335)

Merseyside & Chester

Merseyside & Cheshire Clinical Genetics Service
Liverpool Women's Hospital
Crown Street, Liverpool
L8 7SS
Phone: 0151 802 5001/2

Northern

Institute of Human Genetics
International Centre for Life
Central Parkway, Newcastle-upon-Tyne
NE1 3BZ
Phone: 0191 241 8721

North West

Genetic Medicine
6th Floor St Mary's Hospital
Oxford Road, Manchester
M13 0JH
Phone: 0161 276 6510

Oxford

Dept of Clinical Genetics
The Churchill Hospital, Old Road
Headington, Oxford
OX3 7LJ
Phone: 01865 226 024

South West

Clinical Genetics Dept
St Michael's Hospital
Southwell Street
Bristol
BS2 8EG
Phone: 0117 342 5115

Devon and Cornwall Clinical Genetics Service
Heavitree Hospital
(Royal Devon and Exeter Hospital)
Gladstone Road, Exeter
EX1 2ED
Phone: 01392 405 728

Trent

Leicestershire Genetics Service
Leicester Royal Infirmary
Leicester
LE1 5WW
Phone: 0116 258 5736

Dept of Clinical Genetics
Nottingham University Hospitals
NHS Trust, City Hospital Campus
The Gables Gate 3
Hucknall Road
Nottingham
NG5 1PB
Phone: 0115 962 7728

Sheffield Clinical Genetic Service
Sheffield Children's Hospital
Western Bank
Sheffield S10 2TH
Phone: 0114 271 7025

WESSEX

Wessex Clinical Genetics Service
Princess Anne Hospital
Coxford Road
Southampton
SO16 5YA
Phone: 02381 206 170

WEST MIDLANDS

West Midlands Regional Clinical Genetics Unit
Birmingham Women's Hospital
Mendlesham Way, Edgbaston
Birmingham
B15 2TG
Phone: 0121 627 2630

YORKSHIRE

Dept of Clinical Genetics
Ward 10, Chapel Allerton Hospital
Chapeltown Road, Leeds
LS7 4SA
Phone: 0113 392 4463

NORTHERN IRELAND

Dept of Medical Genetics
Belfast City Hospital
Lisburn Road, Belfast
BT9 7AB
Phone: 028 9063 2716

SCOTLAND

Dept of Medical Genetics
Medical School, Ashgrove House
Foresterhill, Aberdeen
AB25 2ZA
Phone: 01224 552 120

Dept of Clinical Genetics
Western General Hospital
David Brock Building
Edinburgh
EH4 2XU
Phone: 0131 537 1116

West Scotland Regional Genetics Service
Level 2, Laboratory Medicine
Southern General Hospital
Govan Road
Glasgow
G51 4TF
Phone: 0141 354 9200 or 9300

Inverness Cytogenetics Laboratory
Raigmore Hospital
Old Perth Road
Inverness
Scotland
IV2 3UJ
Phone: 01463 704 000

Ninewells Hospital & Medical School
Genetics Unit, Level 6
Dundee
Scotland
DD1 9SY
Phone: 01382 632 151

WALES

Institute of Medical Genetics
University Hospital of Wales
Heath Park
Cardiff
CF4 4XW
Phone: 02920 744 023

EIRE

National Centre for Medical
Genetics
Our Lady's Children's Hospital
Crumlin
Dublin 12
Ireland
Phone: 00 353 1409 6902

.

Fact Sheets available from the Huntington's Disease Association:

- General information about Huntington's disease and the Huntington's Disease Association
- Predictive testing for Huntington's disease
- Talking to children about Huntington's disease
- Information for teenagers
- A young adult's guide
- Eating and swallowing difficulties
- Huntington's disease and diet
- The importance of dental care
- Communication skills
- Behavioural problems
- Sexual problems
- Huntington's disease and the law
- Huntington's disease and driving
- Advice on life assurance, pensions, mortgages etc.
- Seating equipment and adaptations
- Checklist for choosing a care home
- Advance Decision to Refuse Treatment (ADRT)
- A carer's guide
- Challenging behaviour in Juvenile Huntington's disease
- A brief guide to Juvenile Huntington's disease for children's hospices and palliative care services
- A teacher's guide
- A young person with Juvenile Huntington's disease at school

All fact sheets can be downloaded free of charge from our website www.hda.org.uk or ordered by phone 0151 331 5444 or email info@hda.org.uk

For a publication price list/order form, membership form, details of our Specialist Huntington's Disease Advisers and local Branches and Support Groups, please phone 0151 331 5444 or email info@hda.org.uk