What is osteoporosis?
Osteoporosis occurs when the struts which make up the mesh-like structure within bones become thin causing them to become fragile and break easily, often following a minor bump or fall. These broken bones are often referred to as ‘fragility fractures’. The terms ‘fracture’ and ‘broken bone’ mean the same thing. Although fractures can occur in different parts of the body, the wrists, hips and spine are most commonly affected. It is these broken bones or fractures which can lead to the pain associated with osteoporosis. Spinal fractures can also cause loss of height and curvature of the spine.

What is the link between osteoporosis and the menopause?
Bone is alive and is continually renewing itself. A process where cells inside the bone get rid of old bone and replace it with new bone is happening in all of us, all the time. Bone density is the quantity of bone that helps to indicate bone strength. When the levels of oestrogen decrease at the menopause more bone is destroyed than formed so a woman’s bone density decreases. An early menopause (before the age of 45) without hormone replacement therapy is known to be a risk factor for developing osteoporosis later in life, which puts a woman at a higher risk of breaking bones.

Hormone therapy or hormone replacement therapy (HRT) in women

What is the menopause?
A woman is described as having completed her menopause (or being ‘post menopausal’) when she has not had a period for at least one year. The average age for this to happen is 51 years. The whole process of going through the menopause is described as the ‘peri menopause’ and this phase can last for two to five years.

At this time, the level of a sex hormone called oestrogen fluctuates and then eventually decreases. This is one of the hormones needed for ovulating (egg producing) and pregnancy. Oestrogen also thickens the womb lining, so once levels drop considerably, menstrual periods no longer occur. Sometimes, blood tests to monitor hormone levels are used, to confirm that this is happening.

During this time, many women will experience some physical and emotional symptoms due to the decreasing levels of oestrogen. These will vary widely but can commonly include tiredness, hot flushes, changes to skin and hair, joint pains, night sweats and mood swings. However, about a third of women experience no symptoms at all, except that their periods stop.

What is hormone replacement therapy (HRT)?
HRT is a medical drug treatment that contains oestrogen. It may also contain another hormone called progestogen. Progestogen is a synthetic version of a hormone called progesterone which is also produced at lower levels after the menopause. Progestogen is prescribed to protect women from the increased risk of womb cancer associated with ‘oestrogen only’ HRT. ‘Oestrogen only’ HRT should only be given to women who have had their womb removed (hysterectomy).

What are the benefits associated with taking HRT?
By taking HRT, a woman’s oestrogen levels increase and for many women this helps to overcome the symptoms that are often associated with the menopause.

It is also evident that by increasing a woman’s oestrogen levels, HRT can help to prevent the continued decrease in bone density and reduce the risk of the fractures associated with osteoporosis. There is also evidence that combined HRT (oestrogen plus progesterone) reduces the risk of colon cancer.

Who can take it?
The way HRT is used has changed a great deal in the last decade. It has always been widely prescribed to women to help with their menopausal symptoms but some women used to stay on it for many years. Women were often also prescribed HRT to prevent
and treat osteoporosis and again would stay on it for many years. The management of osteoporosis has also changed over the last decade. Current thinking is that the drug treatments for osteoporosis should be targeted at those with a high risk of fracture. The publication of two large clinical studies in 2002 and 2003 resulted in major changes in the way HRT is used. These studies were the Women’s Health Initiative (WHI) in the USA and the Million Women study (MWS) in the UK. Although there is still discussion among specialists about the conclusions of these studies, both provided evidence for the benefits and risks associated with HRT. They concluded that the risks associated with HRT may outweigh the potential benefits and that long term use of HRT was not appropriate to prevent chronic diseases. This research then prompted the UK’s Medicines and Healthcare products Regulatory Agency (MHRA) to offer some guidance to health professionals and the general public on how HRT is most safely and effectively used.

The MHRA advises that HRT may be used:

- At the lowest suitable dose for the shortest period of time for the relief of menopausal symptoms. When used in this way, the benefits outweigh the risks
- The decision to prescribe HRT should be based on a thorough evaluation of the potential benefits and potential risks of treatment
- Evidence for the risks of HRT in women who had premature menopause is limited. However, the baseline risk of adverse events in these younger women is low, and the balance of benefits and risks may be more favourable than in older women

Because of the risks associated with long term HRT, it is not generally used as a treatment for osteoporosis. However in post menopausal women under the age of 60, at high risk of breaking a bone, this treatment may be considered provided that the benefit, in terms of reducing fracture risk, outweighs any adverse risks for that individual. HRT would not be considered suitable for women who had risk factors for breast cancer, heart disease, stroke or blood clots.

How is it taken?
HRT can be taken in different ways. There are tablets, patches that you stick on your skin and gels you rub on your skin. There are also rings, creams and pessaries that can be inserted into the vagina which are only used for the relief of specific symptoms such as vaginal dryness. It is thought that vaginal preparations may present less of a general health risk as only a small amount is absorbed throughout the body.

HRT comes in three forms:

- **Sequential combined therapy:** The two hormones, oestrogen and progestogen, are taken separately during the month with oestrogen taken continuously and progestogen for around 12 days per month causing the woman to have a bleed similar to a menstrual period.

- **Continuous combined therapy:** The two hormones are taken together continuously during the month and so no bleed occurs. This treatment is only prescribed to women who are at least a year past the menopause to reduce the risk of irregular bleeding.

- **Oestrogen only HRT:** This contains no progestogen and is given to women who have had their womb removed. These products come in a wide variety of doses and preparations.

### Minimum doses of oestrogen licensed for bone protection

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dosage</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estradiol</td>
<td>1-2mg</td>
<td>Daily</td>
</tr>
<tr>
<td>Conjugated Equine Oestrogen</td>
<td>0.625mg</td>
<td>Daily</td>
</tr>
<tr>
<td>Transdermal Estrodial Patch</td>
<td>50 μg</td>
<td>Twice weekly</td>
</tr>
<tr>
<td>Estradiol gel</td>
<td>2.5mg</td>
<td>Daily</td>
</tr>
</tbody>
</table>

What are the risks associated with HRT?
HRT is associated with an increase in a woman’s risk of some health problems:

- **Stroke:** A woman’s risk of a stroke naturally gets higher the older she is and studies show this risk is increased further by being on HRT over five years. For women in their 50s who have not used HRT, about 4 in every 1,000 women will have a stroke. This increases to five in 1,000 for women who use HRT for five years. For women in their 60s nine out of 1,000 not on HRT will naturally have a stroke in a five year period but taking HRT for five years increases this to twelve in 1,000.

- **Blood clots (venous thromboembolism - VTE):** Again, the natural risk of VTE increases with age but studies also indicate that HRT increases this risk, particularly in the first year of use. Five out of every
1,000 women in their 50s will naturally develop a blood clot in a five year period. Taking continuous combined HRT for five years increases this to twelve women in 1,000, or seven in 1,000 in women using oestrogen only HRT. Eight out of 1,000 women in their 60s will naturally develop a blood clot in a five year period but this will increase to eighteen in 1,000 when continuous combined HRT is used, or 10 in 1,000 women using oestrogen only HRT. Research has suggested that the risk of VTE may not be increased in women using transdermal HRT (HRT patches, or creams and gels that are rubbed into the skin).

**Breast cancer:** Studies on the different types of HRT show an increase in the risk of breast cancer. Again, the risk naturally increases with age. Ten out of every 1000 women in their 50s will develop breast cancer in any 5 year period. This increases to 16 in 1,000 women in their 50s using combined HRT for five years and 12 out of 1,000 women in their 50s using oestrogen only HRT. 15 in 1000 women in their 60s will naturally develop breast cancer over a 5 year period rising to 24 per 1000 women who are using continuous combined HRT and 18 in 1,000 women using oestrogen only HRT. Studies have also shown that the risk of breast cancer declines after HRT is stopped and after five years, a woman’s risk is similar to that of a woman who has never used HRT.

**Endometrial cancer (cancer of the womb lining):** If oestrogen only HRT is used in women who have not had a hysterectomy the risk of endometrial cancer is increased. This risk is eliminated by adding a progestogen either cyclically (causing a monthly bleed) or every day (as in continuous combined HRT).

**Ovarian cancer:** Both oestrogen only and combined HRT may slightly increase this risk when used long term. This risk appears to return to normal when HRT is discontinued.

The information and figures about these risks comes from the MHRA Safety of HRT document dated September 2007.

**Unknown risks**

- **Heart disease:** Some studies have found an increased risk of coronary heart disease (CHD) in women taking HRT, whereas others have shown no effect. Some studies have also suggested that the number of years between the menopause and the time of starting HRT may affect heart disease risk, but others have again demonstrated no effect at all. Therefore the effect of HRT on coronary heart disease risk is unknown.

- **Dementia:** Some studies have demonstrated a detrimental effect of HRT on dementia, whereas others have suggested the opposite. Currently there is no clear data one way or the other and further research is required.

**Tibolone (Livial)**

Tibolone is a synthetic steroid medicine that mimics the activity of the female sex hormones oestrogen and progesterone and the androgen testosterone in the body. Tibolone’s oestrogenic effect on bone density also allows it to be used to prevent osteoporosis in women who are not producing their own oestrogen and who are at risk of fractures. In younger women tibolone is generally associated with similar risks and benefits as conventional HRT, although again the two main studies (WHI and MWS) differed in their findings on the associated risks of breast cancer. A recent study of women using tibolone (Livial) showed a significant increase in the risk of stroke. It is not generally recommended after the age of 60 therefore, when the risks associated with the treatment start to outweigh the benefits.

**What are the side effects of taking HRT?**

As with any other medical treatment, side effects may be experienced by some women. Even if they are experienced, they may still be mild and may be temporary. These can include:

- Breast enlargement and tenderness
- Weight gain
- Breakthrough bleeding
- Headache
- Dizziness
- Raised blood pressure
- Gastric upset, nausea and vomiting

*Please note this is not an exhaustive list of side effects. Always read the information sheet that comes with any medication you use for a full list.*
Hormone therapy or hormone replacement therapy in men

Does osteoporosis affect men?
Yes, one in five men will suffer a fracture after the age of 50. About half of all cases of osteoporosis in men occur as the result of another medical condition. These conditions include low levels of the hormone testosterone (hypogonadism), long term use of glucocorticoid tablets, prolonged immobility, excessive alcohol intake and malabsorption of essential minerals and vitamins due to other medical conditions such as Crohns disease, major surgery on the stomach and coeliac disease.

If an underlying medical problem can be treated or controlled, this may help prevent further bone loss. Some men have osteoporosis for an unknown reason (idiopathic osteoporosis). If osteoporosis is suspected, a bone density scan and tests to rule out any underlying medical problems are usually required.

What is male hypogonadism?
Hypogonadism is a lack of the male sex hormone testosterone, which is made in the testes (testicles). Hypogonadism in men can be due to a problem with the testes themselves or the pituitary gland, which controls the hormone systems. Disease or damage to the testes may stop them from responding to the stimulation from the pituitary gland. This includes genetic disorders affecting the function of the testes (such as Klinefelters syndrome), inflammation of the testes (orchitis), radiation or chemotherapy and alcohol abuse. Removal of both testicles, injury to both testicles and undescended testicles are all causes of hypogonadism.

What are the signs and symptoms of hypogonadism?
Initially, there may be no obvious signs or symptoms of hypogonadism but some men experience a decreased interest in or desire for sex, less sexual activity, reduced quality of erections and orgasm and poor ejaculation. They may also experience a loss of spontaneous erections during sleep and on waking and sometimes, impotence. Some of the physical features at this time include the need to shave less often, feeling excessively tired, loss of body hair and muscle strength and a change in body shape with extra fat being deposited around the stomach. This is sometimes referred to as the male menopause or andropause (androgens are steroid hormones with specific effects on muscle, fat, skin and hair).

How is hypogonadism diagnosed?
Hypogonadism is diagnosed by a simple blood test. As men get older, testosterone levels fall naturally. Testosterone levels change over a 24 hour period, with higher levels found in the morning, decreasing by 35% over the course of the day. Due to this decrease, it is therefore important that the blood test is taken early in the day to ensure an accurate result.

How is hypogonadal osteoporosis treated?
Testosterone replacement therapy can be given in the form of injections, implants, daily patches and daily tablets.

In some cases, testosterone therapy may not be advised and instead the cause of the low testosterone levels will be treated to correct the deficiency e.g. inflammation of the testes.

What are the side effects and risks of testosterone treatment?
Testosterone can cause skin reactions (if given by a patch), persistent painful erection (priapism), weight gain, decreased fertility, a general sense of well being and sometimes, increased aggression. This treatment may also increase the risk of prostate problems or heart disease.

Can testosterone be used to treat men with osteoporosis and a normal testosterone level?
In men with normal testosterone levels who have osteoporosis, some research has shown an improvement in bone density with testosterone treatment. However, testosterone is not a licensed treatment for this use.

There is also some evidence that testosterone therapy may increase a man’s risk of heart disease and prostate cancer so further research in this area is needed.

What about hypogonadism caused by drug treatments for prostate cancer?
Hypogonadism can also be caused by some of the medications that are used to treat prostate cancer. As increased testosterone levels are associated with prostate cancer this type of hypogonadism would not be treated by using testosterone therapy. If a man with prostate cancer has a need for osteoporosis treatment, non-hormonal medications should be considered. For further information on these please see the charity's publications All About Osteoporosis and Drug treatments for Osteoporosis.
Useful contacts

NHS 111
For urgent medical help or advice for something that is not life threatening.
Tel: 111

NHS Choices: www.nhs.uk

NHS Direct Wales (Galw Iechyd Cymru)
Tel: 0845 4647
www.nhsdirect.wales.nhs.uk

Scotland NHS 24
Tel: 08454 242424
www.nhs24.com

Women’s Health Concern
www.womens-health-concern.org

Breast Cancer Care
5-13 Great Suffolk Street
London SE1 0NS
Tel: 0808 800 6000
www.breastcancercare.org.uk

Macmillan Cancer Support
89 Albert Embankment
London SE1 7UQ
Tel: 0808 808 00 00
www.macmillan.org.uk

British Heart Foundation
Greater London House
180 Hampstead Road
London
NW1 7AW
Tel: 0300 330 3311
www.bhf.org.uk

The National Osteoporosis Society is the only UK-wide charity dedicated to improving the prevention, diagnosis and treatment of osteoporosis and fragility fractures. The Charity receives no Government funding and relies on the generosity of individuals to carry out its vital work.

For osteoporosis information and support contact our Helpline:

0808 800 0035
@ nurses@nos.org.uk

To become a member or make a donation:

01761 473 287
@ join online at www.nos.org.uk

To order an information pack or other publications:

01761 471 771
@ info@nos.org.uk

or download from our website at www.nos.org.uk

This fact sheet is one of a range of publications produced by The National Osteoporosis Society. If you would like more general information about osteoporosis see our booklet All about Osteoporosis.

This information reflects current evidence and best practice but is not intended to replace the medical advice provided by your own doctor or other health professional.