

# Environmental **Radon** Newsletter

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## Natural environmental radiation and childhood cancer

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**C**hildhood cancer, in particular childhood leukaemia, is a matter of great public concern. In recent decades there have been tremendous advances in the treatment of these diseases. If a child born in the 1950s was diagnosed with leukaemia, this was almost a death sentence. Nowadays, there is a very good chance that a complete cure can be achieved (around 80% for some common types of leukaemia).

Nevertheless, childhood cancers remain serious and distressing diseases and the great advances in therapy have not been matched by an increase in understanding of their causes. While we now know a good deal about the changes to DNA which are associated with cancer, we understand relatively little about the factors which induce these changes. Ionising radiation is one of the few agents thought to induce childhood cancer. In particular the work of Alice Stewart showed that irradiation of the unborn child due to x-ray examination of the mother can lead to childhood leukaemia and possibly other childhood cancers.

Most radiation exposure of an average member of the population is due to natural causes. The largest component of the natural radiation exposure is from radon, which delivers a radiation dose to the lung. High radon exposures have been shown to lead to increased levels of lung cancer.

Calculations suggest that although radon delivers the highest doses to the lung, other organs are also irradiated by radon and other natural sources. This implies that there could also be some radiation-induced cancers in other body organs, but at a much lower level than lung cancer induced by radon. There have therefore been a number of epidemiological studies, some in the UK, to investigate a possible link between natural environmental radiation and childhood cancer. These include the United Kingdom Childhood Cancer Study, a large case-control study which reported in 2002, and which failed to find a link.

Nevertheless, other studies using different approaches, with different strengths and weaknesses, may also give useful information on this important question. One possible approach is to use a correlation study, where the average level of a variable

(such as environmental radiation) is compared with the average level of disease between different areas of the country.

The best data on indoor natural radiation exposures of the UK population comes from a national survey carried out by the then National Radiological Protection Board (NRPB) in the 1980s. Simultaneous measurements were made of radon concentrations and of dose rates from penetrating radiation (cosmic rays and gamma rays from the ground) in over 2000 UK homes. The results were analysed to give mean radiation levels in County Districts in England, and equivalent areas in the rest of the UK. Mean radon concentrations in these 459 County Districts are generally fairly low, but a few reach high levels. The range of mean radon concentrations is from about 3 to over 1,100 Bq m<sup>-3</sup>. The distribution of mean gamma ray dose rates follows a bell-shaped curve, with a range from about 38 to about 170 nGy h<sup>-1</sup>.

Information about childhood cancer has been collected since the 1960s by the National Registry of Childhood Tumours (NRCT), which is operated by the Childhood Cancer Research Group (CCRG) of the University of Oxford. The NRCT is considered to be largely complete in its coverage of cases of childhood cancer.

A decade ago, the data from the national survey on natural radiation exposures were combined with data on childhood leukaemia in a correlation study carried out jointly between the National Radiological Protection Board and CCRG. This study included about 6,700 cases of childhood leukaemia from the NRCT for the period 1969-1983. The results did not provide strong evidence of a link between natural radiation exposure and childhood cancer, but a larger study could have provided more conclusive answers.

As part of a new collaborative study between the Health Protection Agency and the University of Oxford, this analysis will be updated using approximately 76,000 cases of cancer (of which about 30% are leukaemias) in children at ages 0-14 years in Great Britain up to the end of 2002. The study should have much greater power than the previous one. Results are expected over the next year or so.

This newsletter and previous editions can be seen at [www.hpa.org.uk/radiation/radon](http://www.hpa.org.uk/radiation/radon)

## POINTS OF CONTACT

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## How to place radon monitors - do's and don'ts

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**P**assive radon gas monitors have been designed to be easy to use. However, the large numbers we send out to houses and workplaces means that we do see some problems caused by incorrect use. These problems can cause false high or low results. False high results can result in unnecessary concern and expense, and false low results can result in people not receiving the protection they need.

The checklist below was designed for workplaces but almost all the points are suitable for householders as well.

### Do's ✓

- ✓ Do read the location labels on the flat side of the monitors.
- ✓ Do put them in their correct positions as soon as you receive them.
- ✓ Do place them at around breathing height (1-2 metres off the ground).
- ✓ Do put them on a shelf or notice board.
- ✓ Do hang them from their loop if that is convenient, e.g. to tie them to racking.
- ✓ Do put them up out of harm's way if necessary.
- ✓ Do record which monitor went in which location (with extra details as required) on the record sheet, along with the dates.
- ✓ Do put them any way up (they are not sensitive to this).
- ✓ Do make a note in your diary of when to return the detectors.



Passive radon detector being placed

### Don'ts ✗

- ✗ Don't leave them in their wrapper (unless you have ordered special detectors in waterproof bags for wet environments).
- ✗ Don't attempt to open the monitors.
- ✗ Don't pull the barcode labels off the back of the monitors.
- ✗ Don't use a sticky pad or BluTack to hold the monitors in place.
- ✗ Don't put them on top of televisions or VDUs.
- ✗ Don't put them in cupboards or drawers.
- ✗ Don't put them on the floor.
- ✗ Don't put them in ceiling voids, pipes or ducts.
- ✗ Don't tie them to hot pipes.
- ✗ Don't put them on radiators.
- ✗ Don't put them on windowsills.
- ✗ Don't put them direct sunlight.
- ✗ Don't put them in a wet environment, though the occasional splash will do no harm. (This does not apply if you have ordered special detectors for wet environments.)
- ✗ Don't move them to another location during the measurement period.

## UK radon forum 2007

The forum will be held on Monday 26th November at the Health Protection Agency training centre at Chilton, Didcot, Oxfordshire. If you would like to be sent further details when available, please e-mail [radon@hpa.org.uk](mailto:radon@hpa.org.uk) or telephone 01235 822622.

# Northamptonshire Fit 3 radon campaign

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The Health and Safety Executive (HSE) Strategic Programme Fit 3 (Fit for Life, Fit for Work and Fit for Tomorrow) has been developed to contribute to national health and safety target areas which have to be achieved by 2010. The aims are:

- 3% reduction in the incidence rate of work-related major and fatal injuries
- 6% reduction in the incidence rate of cases of work-related ill health
- 9% reduction in the incidence rate of days lost due to work-related injuries and ill health

Northamptonshire local authorities, in partnership with the HSE, have included radon in their health and safety Fit 3 programme for 2006/2007. The campaign started in November 2006, and will be rolled over into the 2007/2008 Fit 3 work programme.

Local authority health and safety and environmental health practitioners have traditionally carried out risk-rated health and safety inspections of commercial premises in accordance with HELA Circular 67/1. Recently there has been a shift away from risk-rated traditional health and safety inspections, to ensure that limited resources are directed towards areas where accidents and ill health most occur.

The new approach focuses on targeted interventions and the use of other means to protect the health and safety of employees. Through the Northamptonshire Health and Safety Liaison group, local authorities selected six target areas for 2006/2007. As well as selecting national priority areas such as workplace transport and manual handling, Northamptonshire also included a local target by launching an initiative to identify those workplaces in the County where employees' health may be at risk from radon gas.

The aim of the Northamptonshire Fit 3 radon programme is to:

- Raise awareness of radon in commercial premises in the county
- Engage businesses by ensuring that a sample of premises in key identified areas are tested for radon and that remedial measures are taken where appropriate

Northamptonshire local authorities contacted about 350 businesses, requiring them to carry out risk assessments and to undertake remedial measures where levels were above the radon Action Level. The campaign was launched to coincide with a Radon Awareness Seminar held by Daventry District Council.

Enforcement officers and other partners received information and advice from the Health Protection Agency and the local authorities worked with the HSE Field Operations Radiation Team.

At the start of the Fit 3 programme, all businesses throughout the County received a newsletter advising them of target areas for 2006/2007. The launch was publicised by several press releases, and there was considerable press coverage in some local areas. The HSE carried out a

programme of inspections in Northamptonshire at the same time. These activities generated considerable interest in the business community.

Businesses in areas where there was a potential for elevated radon levels were targeted using a variety of contact methods, depending on the resources available to each local authority. Some of the local authorities raised awareness during other visits to premises, such as for workplace transport inspections or during food safety inspections. Others such as South Northamptonshire chose to direct letters to a number of target premises requiring risk assessment and testing by a specified date. Those who failed to respond, or to carry out remedial measure where appropriate, were subject to follow-up visits and potential enforcement action.

Follow-up reminder letters were issued in February 2007 and local authorities are at various stages of enforcement follow up where businesses have not responded.

Outcomes will be measured by the following criteria:

- The number of commercial properties identified where radon levels are in excess of the Action Level of 400 Bq m<sup>-3</sup>
- The number of commercial properties in the survey where radon exposure has been reduced below the Action Level

Even with the use of standard letters and project coordination, responses and compliance has sometimes been slow and information-gathering impeded by the length of time required for testing. Although many businesses responded immediately, several have required repeated contact to initiate testing and it is likely that final outcomes will not be available until late 2007.

Early indications are that at least 215 commercial premises have been contacted and 125 letters sent to businesses. Results are starting to come in. Out of 14 results currently available, one of the premises measured has exceeded the Action Level, with a reading of 440 Bq m<sup>-3</sup>, and remedial action is being taken to reduce the radon concentration.

The experience of Northamptonshire authorities is that a focused campaign of this nature is relatively simple to coordinate and implement after the initial preparatory stage, and the campaign satisfies national health and safety enforcement approaches through the Fit 3 programme. Targeted interventions also allow the local authorities to establish a picture of current levels in their areas.

In addition there is anecdotal evidence that smaller businesses appreciate a focused intervention, where they can concentrate on one issue relating to safety at a time. This fits in with government 'better regulation' mandates to reduce burdens on businesses.

The 2007/2008 campaign will build on the previous year's work and contribute to increased protection of employees in Northamptonshire.

# Cornish radon update

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**The Health Protection Agency (HPA) radon programmes in Cornwall cover three districts: Kerrier, the most southerly English local authority; Penwith, the most westerly; and North Cornwall, the most northerly Cornish authority. This article provides an update on progress for all three districts.**

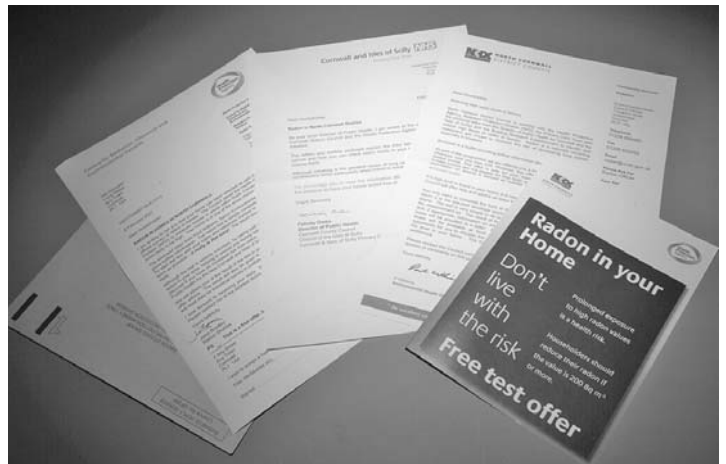
The programmes continued during the transfer of Governmental responsibility for radon from the Department for Environment, Food and Rural Affairs to the Department of Health, and during the significant commitment of HPA resources to deal with the polonium-210 incident in London. (Note that polonium-210 is also a radon decay product, though not one of the short-lived decay products that deliver radon doses.)

The format in each district is similar (see Environmental Radon Newsletter 42) but a policy of continual development and improvement is part of the philosophy of the HPA radon team. The merger of the National Radiological Protection Board with the HPA provided an opportunity to work more closely with locally-based public health colleagues. This approach was piloted in Berwick-upon-Tweed, incidentally the most northerly English local authority (see Environmental Radon Newsletter 49).

In Cornwall, we have the help of HPA colleagues in the local Health Protection Unit and have established a good relationship with the local Primary Care Trust. The Director of Public Health for Cornwall, Dr Felicity Owen, offered support. The free test offer to householders in North Cornwall and Penwith included a letter from her. This development may explain the larger percentage of positive replies in these two districts relative to Kerrier.

The table summarises the progress so far of the programmes in each of the three districts. Note the values are rounded and the results are those available by early June 2007.

The initial indications are that radon sumps were generally effective in achieving low indoor radon concentrations, and positive ventilation could also be



Leaflets and letters sent out as part of radon campaigns

	Kerrier	Penwith	North Cornwall
Programme start	Winter 2004/05	Winter 2006/07	Spring 2007
Householders offered tests	30,900	23,200	17,400
Number agreeing to test	11,400 (37%)	9,700 (42%)	6,900 (40%)
Number of results so far	9,800	5,400	19
Number at or above Action Level	4,800 (49%)	1,300 (24%)	2
Number at or above 1,000 Bq m <sup>-3</sup>	740	94	1
Highest so far (Bq m <sup>-3</sup> )	17,000	10,000	1,100
Known remediations	600	20	No data

effective in suitable circumstances. Other methods frequently failed.

A series of Radon Solution Days will be held during the summer and early autumn of 2007. These allow householders to meet representatives from the Building Research Establishment, the local council and commercial remediation firms as well as from the HPA. The advice provided at these events is underpinned by ongoing research into the effectiveness of remedial measures and analysis of results held on the national radon database.

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