

ERPAN Meeting

23rd May 2011, CEPN Paris



ICRP consultation 2010 – radon dose coefficients

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Overview

Radon in the workplace

ICRP Statement (November 2009)

ICRP Consultation (July 2010)

Practical implications for regulators

Discussion



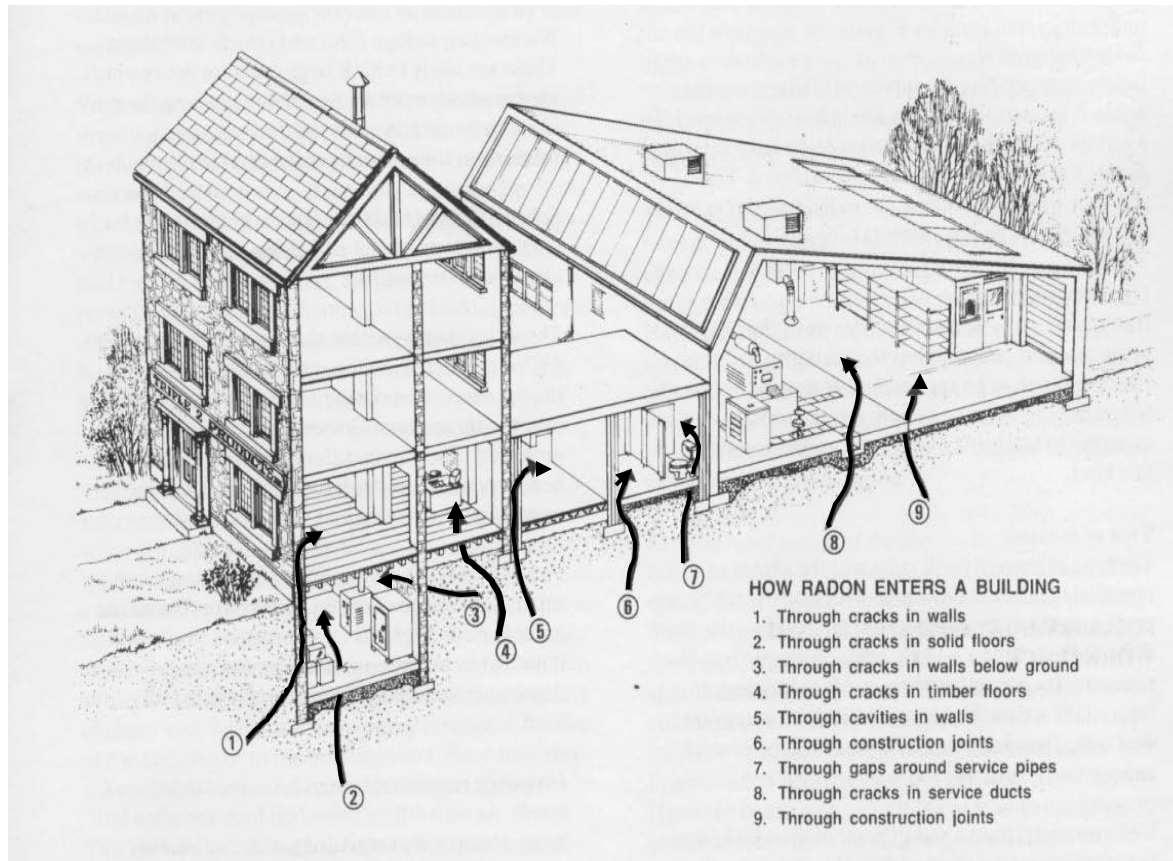
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Radon risks

Natural radioactive gas that emanates from the ground.



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ICRP Statement (Nov 2009)

- Plan to replace ICRP 65 (&66) dose conversion convention (which used epidemiological evidence) with reference biokinetic and dosimetric models.
- Plan to publish different dose coefficients for domestic and occupational exposure:
 - with different reference conditions with specified equilibrium factors and aerosol characteristics
- Changes likely to mean increase in effective dose per unit exposure by a factor of 2 !

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ICRP Statement (Nov 2009)

- Current epidemiological approaches (ICRP 66) yields a dose conversion factor of 4 mSv/WLM whilst dosimetric approaches give approximately 13 mSv/WLM.
- Recommendations:
 - **Domestic:** based on 10 mSv/yr, reference level reduces from 600 Bq/m³ to 300 Bq/m³.
 - **Occupational:** based on 1/3 exposure duration, entry point for applying occupational protection requirements for existing exposure situations (which are then managed as planned exposure situations) is 1000 Bq/m³.

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ICRP Consultation (July 2010) – comments received

- Rationale for replacement of epidemiological with dosimetric models not sufficiently defined.
- Doubt of scientific evidence for increasing risk factors.
- “Double value seems premature.” “Premature and unnecessary.” “Insufficient consideration to practical implications.” “Considerable uncertainty.”
- Cause to maintain stability using current risk factors whilst consensus is strengthened.

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Practical implications for regulators

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UK workplace risks

5-7% of lung cancer deaths, approximately 2,000 people per year total (cf. asbestos disease fatalities 3,000/ yr)

160,000 workplaces in affected areas

16,000 workplaces > action level

90 to 280 lung cancers per year from occupational exposure in UK

< 5% lung cancer 'curable'

Feb 05 - S Darby research re risks



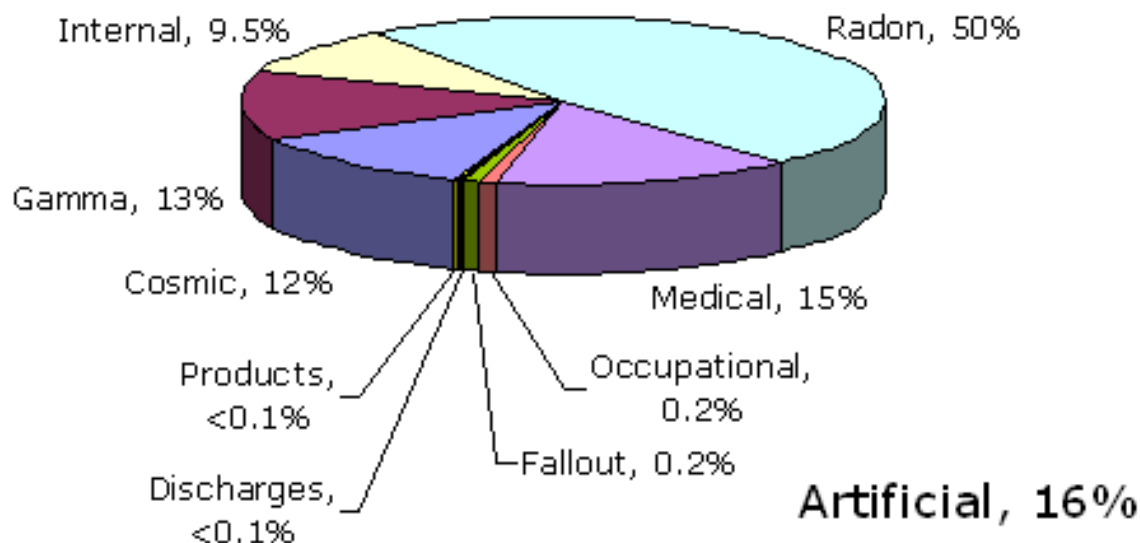
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UK workplace risks

Natural, 84%



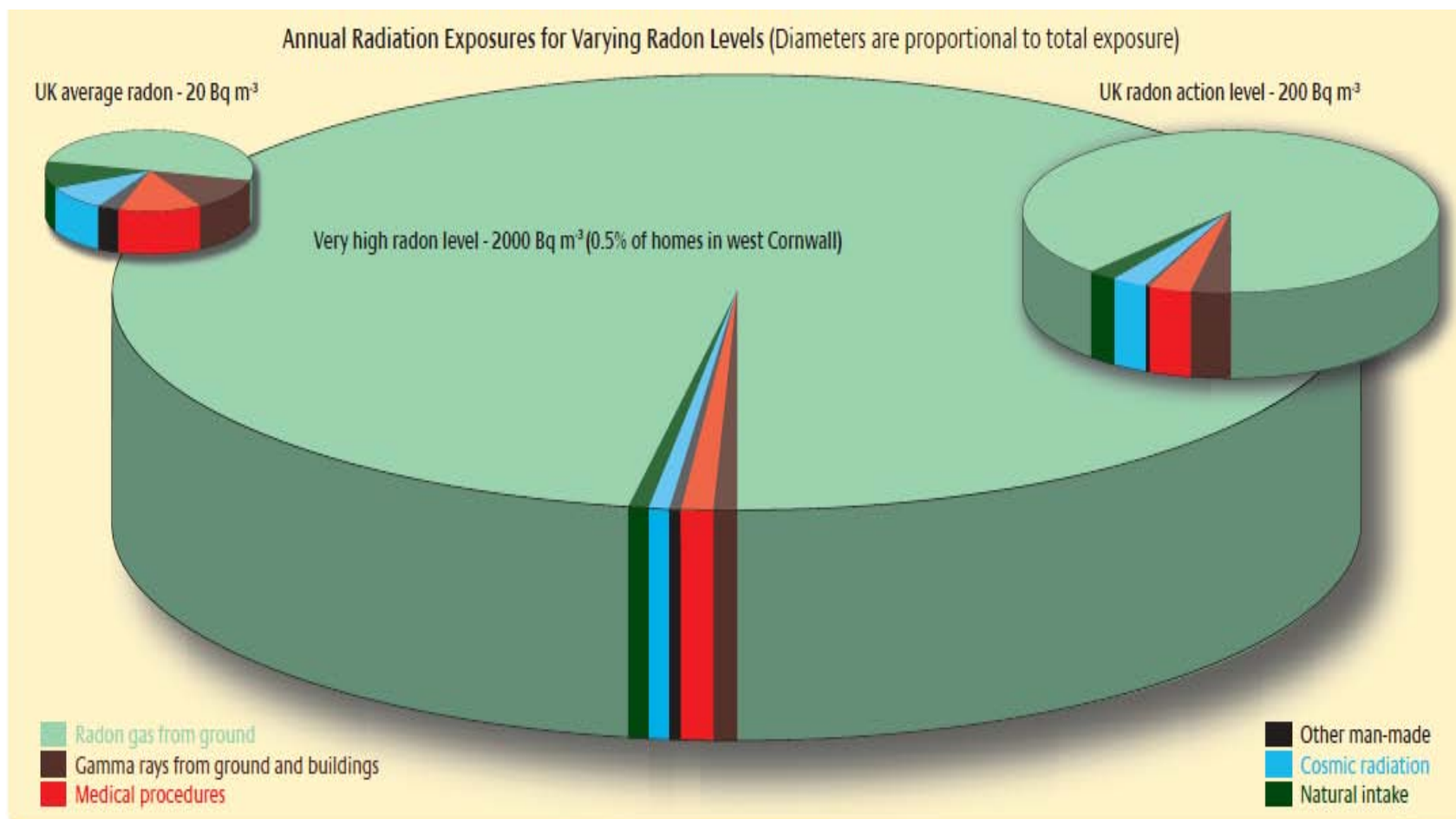
Radon contributes 50% of the annual radiation dose to the average individual in the UK

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UK workplace risks

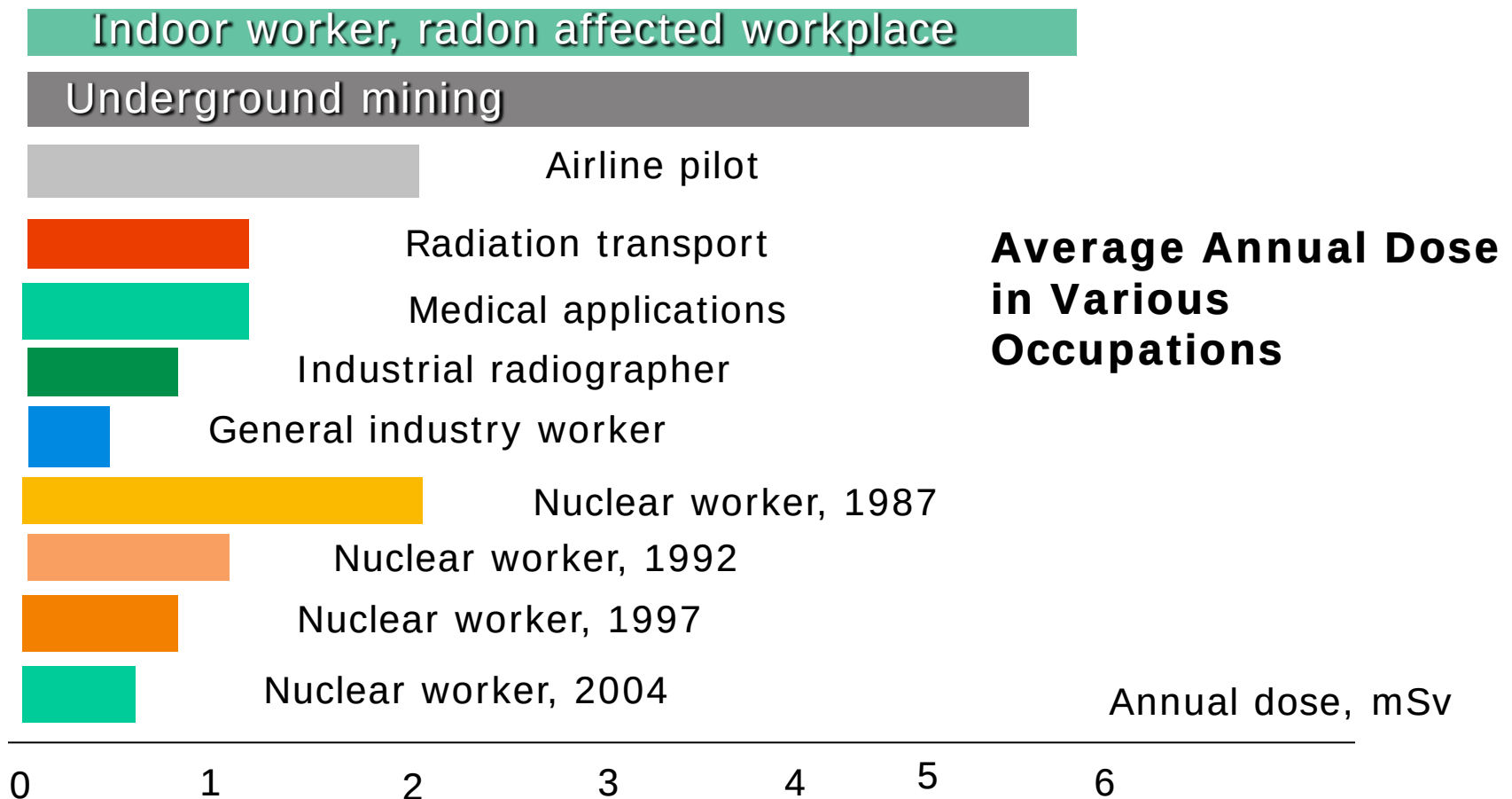


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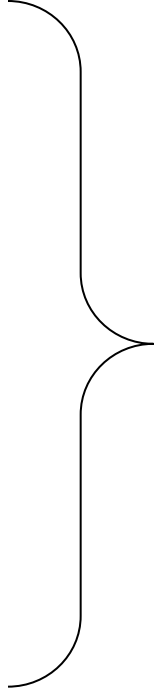
UK workplace risks



UK workplace risks

10 major carcinogens in UK workplaces:

- Crystalline silica
- Radon
- Passive tobacco smoke
- Solar radiation
- Diesel exhaust
- Wood dust
- Benzene
- Ethylene dibromide
- Inorganic lead compounds
- Chemicals used in hairdressing

A large, thin black curly brace on the right side of the slide, grouping the list of 10 major carcinogens.

83% of total
number of
employees
exposed

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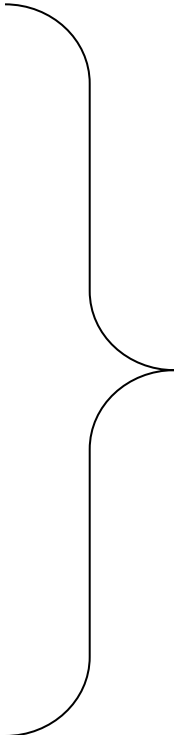
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UK workplace risks

10 -20 major (respiratory) carcinogens:

- decorating paints
- chromium IV compounds
- tetrachloroethylene
- coal tar products
- iron & steel foundries
- asbestos
- formaldehyde
- nickel compounds
- acid mists
- cadmium containing compounds



14% of total
number of
employees
exposed

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Legal requirements for workplaces in UK

In all workplaces in Affected Areas.....



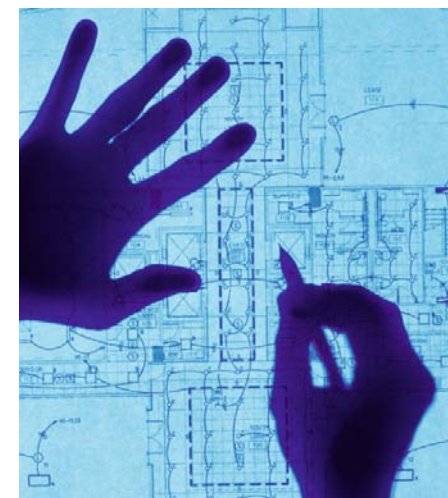
All employers must assess risks of radon
Usually requires measurement



High radon levels ($> 400 \text{ Bq/m}^3$)

Install radon reduction systems

If still $> 400 \text{ Bq/m}^3$, implement occupational
radiation protection controls



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Practical implications for regulators

- Most European countries national reference levels = 400 Bq/m³. Conflict with ICRP entry level of 1000 Bq/m³?
- Worker concerns in relation to non-radiation risks?
- Most workers (in workplaces > 400 Bq/m³) currently < 3/10^{ths} dose limit (6 mSv)
 - Doubling will mean many > 6 mSv (= Cat A)
 - What if < 18yrs?
 - Dosimetry implications?
- Implications for classification of areas?
- Consideration re historical and life-time doses.
- Others?

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Practical implications for regulators

