

Radon Infiltration in Rented Accommodation

Measurement of radon in homes and variables describing building characteristics

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Introduction



Radon is formed in many different isotopes and develops as a result of the decay chains of thorium-232, uranium-235 and uranium-238. In the home and workplace is one of the main risks of ionizing radiation causing deaths from lung cancer. (Rn-222 og Rn-220)



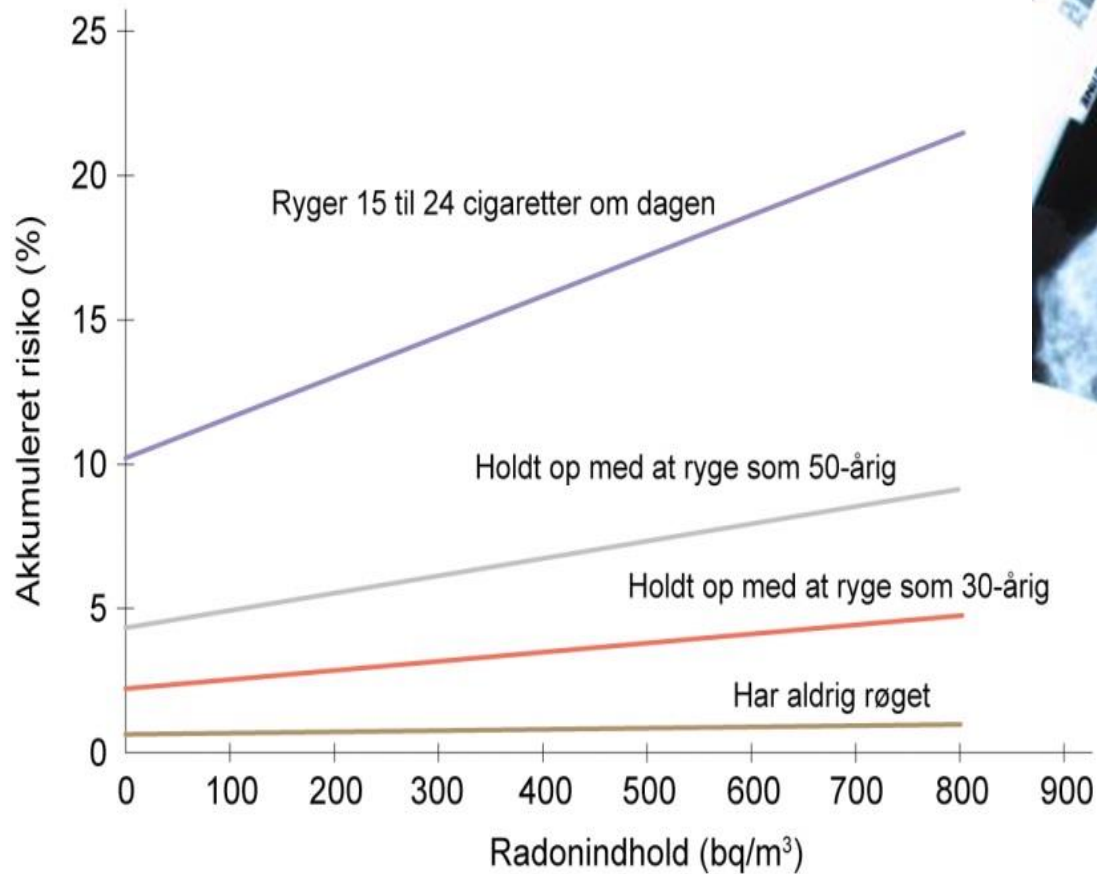
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Accumulated health risk



Building regulations:

- In Denmark the natural sources of radiation is radon
- Radon originates in the ground, from building materials and water (ground is the primary source in Denmark)
- Radon is a radioactive noble gas
- When radon decays into different radon daughters, it generates radiation. It is the radiation from the radon daughters that is harmful to human beings.
- Requirements for new buildings, 100 Bq/m³
- Advised level for existing buildings, 100 Bq/m³



MEASUREMENTS

- 221 homes for rented accommodation and in 9 basements.
- 196 homes were located in 28 multi-occupant houses and 25 homes were located in single-family terraced houses.
- 2013/2014 and 2014/2015 between November and May.
- Buildings are located in most exposed areas in Denmark
- Built between 1850 and today



RESULTS

- Minimum was 1 Bq/m³, maximum was 250 Bq/m³.
- Mean value was 30.7 Bq/m³.
- Homes exceeding 100 Bq/m³ was 5.9%.
- Homes exceeding 200 Bq/m³ was 1.4%.
- All single-family terraced houses.

Floor	0-50	51-100	101-150	151-200	>200	No. homes
Ground floor	58	18	7	3	3	88
1st	50	0	0	0	0	51
2nd	38	0	0	0	0	38
3rd	30	0	0	0	0	30
4th	6	0	0	0	0	6
5th	8	0	0	0	0	8
No. homes	190	18	7	3	3	221
Ratio in %	86.0	8.1	3.1	1.4	1.4	100



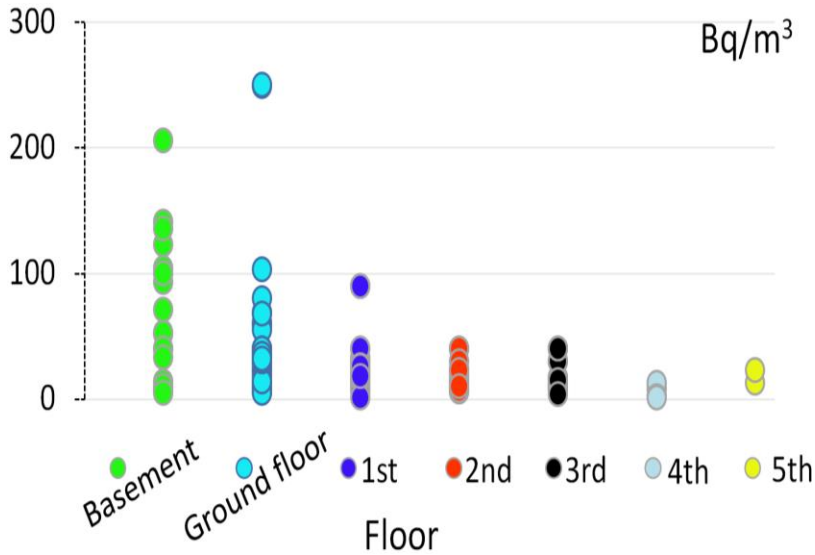
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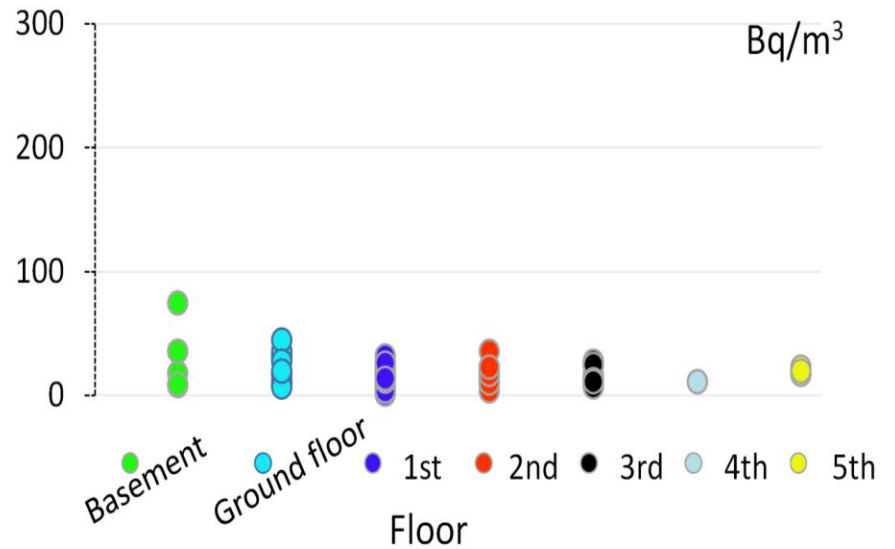
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Variables



Radon for homes in a building with a basement that has not been fire protected.



Radon for homes in a building with a basement that has been fire protected.

CONCLUSION

- Mean year value of the indoor radon level was 30.7 Bq/m³ ranging between 1 and 250 Bq/m³.
- In total, 5.9% (13 of the 221) homes had indoor radon levels exceeding 100 Bq/m³, all located in single-family terraced houses. Approx. 75% of homes exceeding 100 Bq/m³ indoor radon level had levels between 100 and 200 Bq/m³.
- Significant differences in indoor radon levels were found in homes located in multi-occupant houses.
- None of the other investigated variables explained the variation in indoor radon levels in homes. Variables were not significant characterising homes with a low radon concentration in rented accommodation, but seen to be variables that need to be further studied.



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Thank you



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