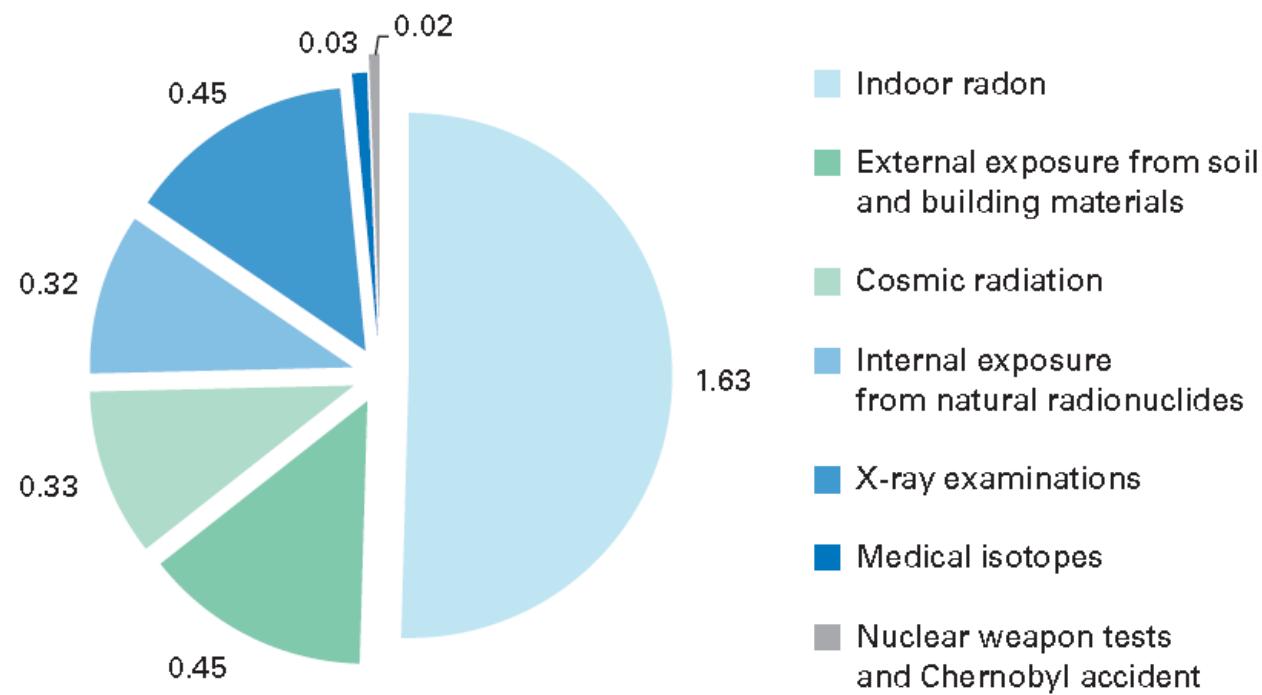


Radon exposure in Finland

Päivi Kurttio
STUK -Radiation and Nuclear Safety
Authority, FINLAND

DOSE FROM RADON

The mean annual effective dose for Finnish people
3,2 millisievert



Individual dose from radon can be as high as 300 mSv!
31 % are unable to estimate how serious risk radon is

Lung cancer cases attributable to radon in Finland

Estimation:

- 300 lung cancers of 2000 total number of cases annually
- 14% (5-25%) of all lung cancer cases are associated with radon exposure (85% of those are smokers)
- 40 lung cancer cases annually : radon only , no smoking

National database

- STUK has radon measurement services and a comprehensive national database on indoor radon
 - radon concentration
 - address
 - type of building
 - type of measured space
 - type of basement
 - radon mitigation and remediation measures
 - etc.
- maps and reports on radon concentrations presented / by postal code, map grids, municipality, county/ house types/ construction year, etc.
- Finland has good quality of registries and radon database can be linked with other national registries

Average: 121 Bq m⁻³ Low-rise residential buildings

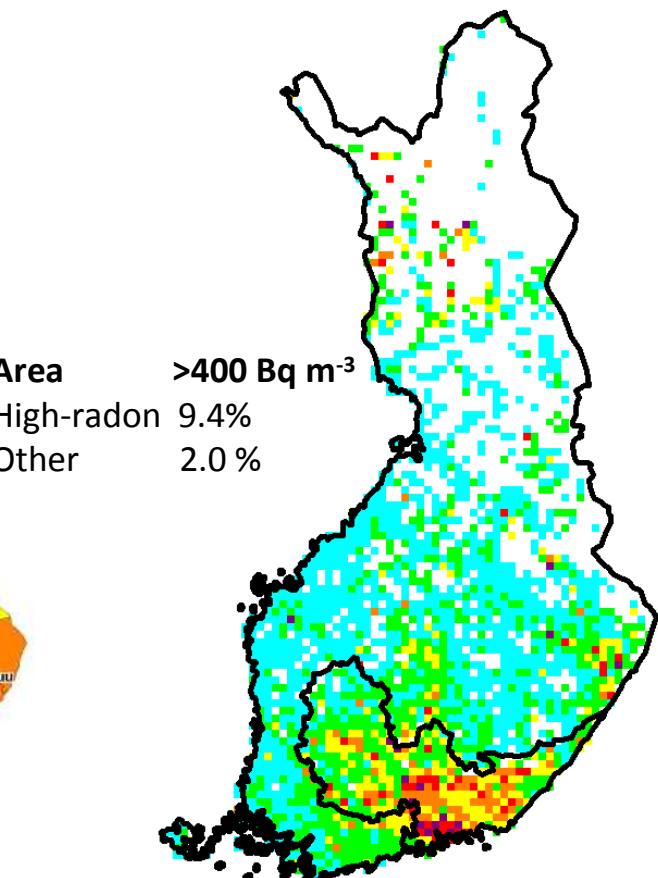
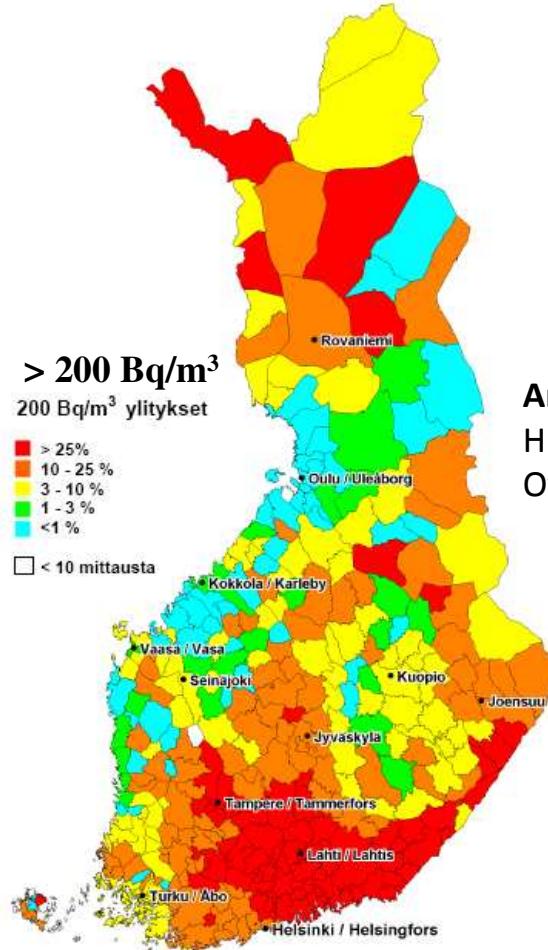
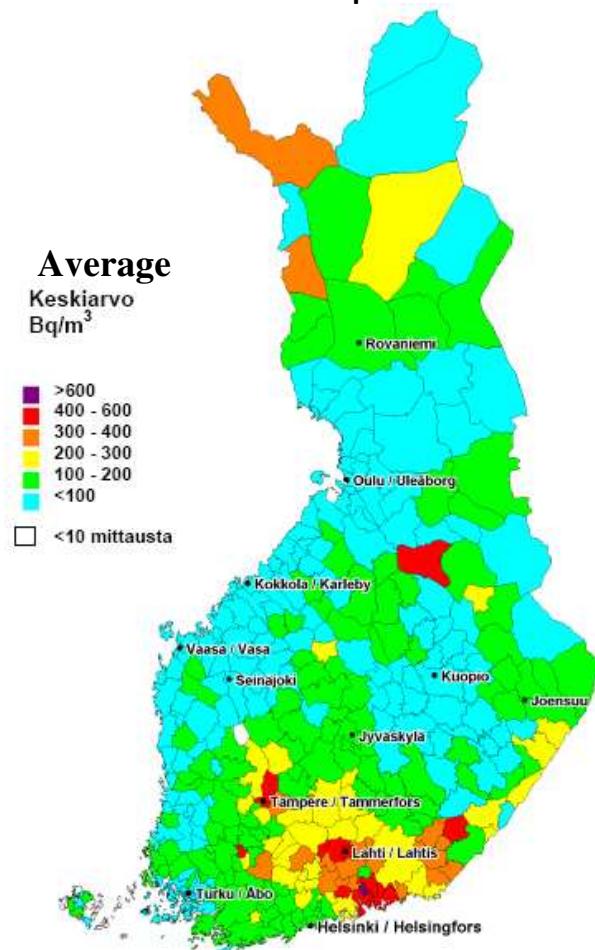
49 Bq m⁻³ Flats

96 Bq m⁻³ All

Of the total radon exposure:

95% at home

5% at work + in public buildings



Current Status of Radon in Finland

Levels above which remedial measures are recommended /MoH:

<200 Bq/m³ new buildings

<400 " existing buildings

New reference level(s)?

Radon measured in 117 000 dwellings in low-rise residential buildings

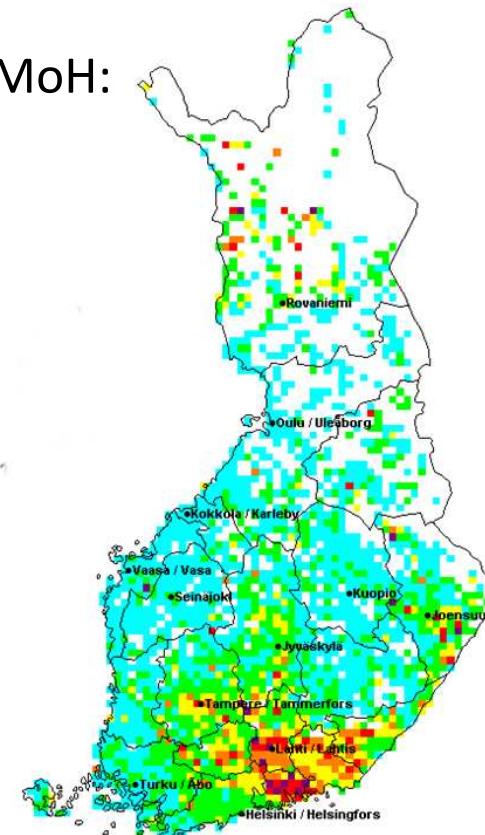
Estimated number of dwellings

>200 Bq/m³ 220 000 (9 % of all 2,5 million)

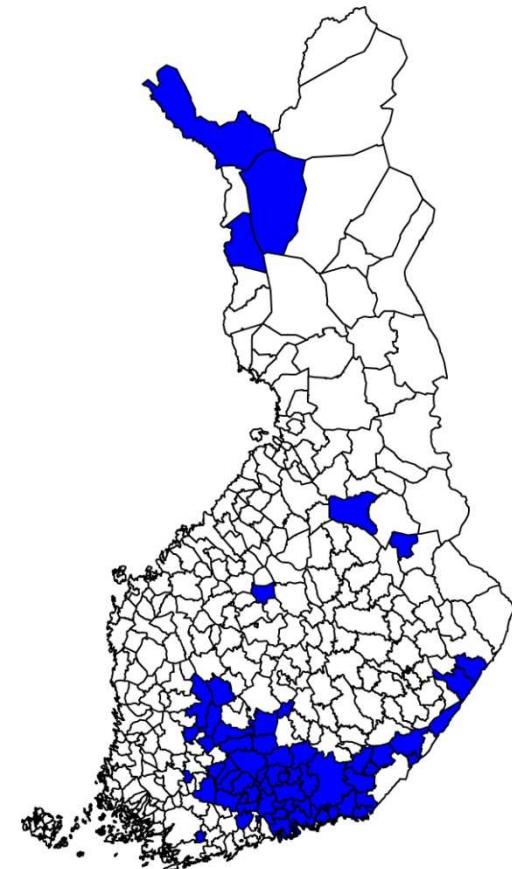
>300 " 100 000 (4 % ")

>400 " 60 000 (2 % ")

- 80 % in the “high-radon area”, but only 20% of the buildings are located there
- 4 500 (8 %) remediated

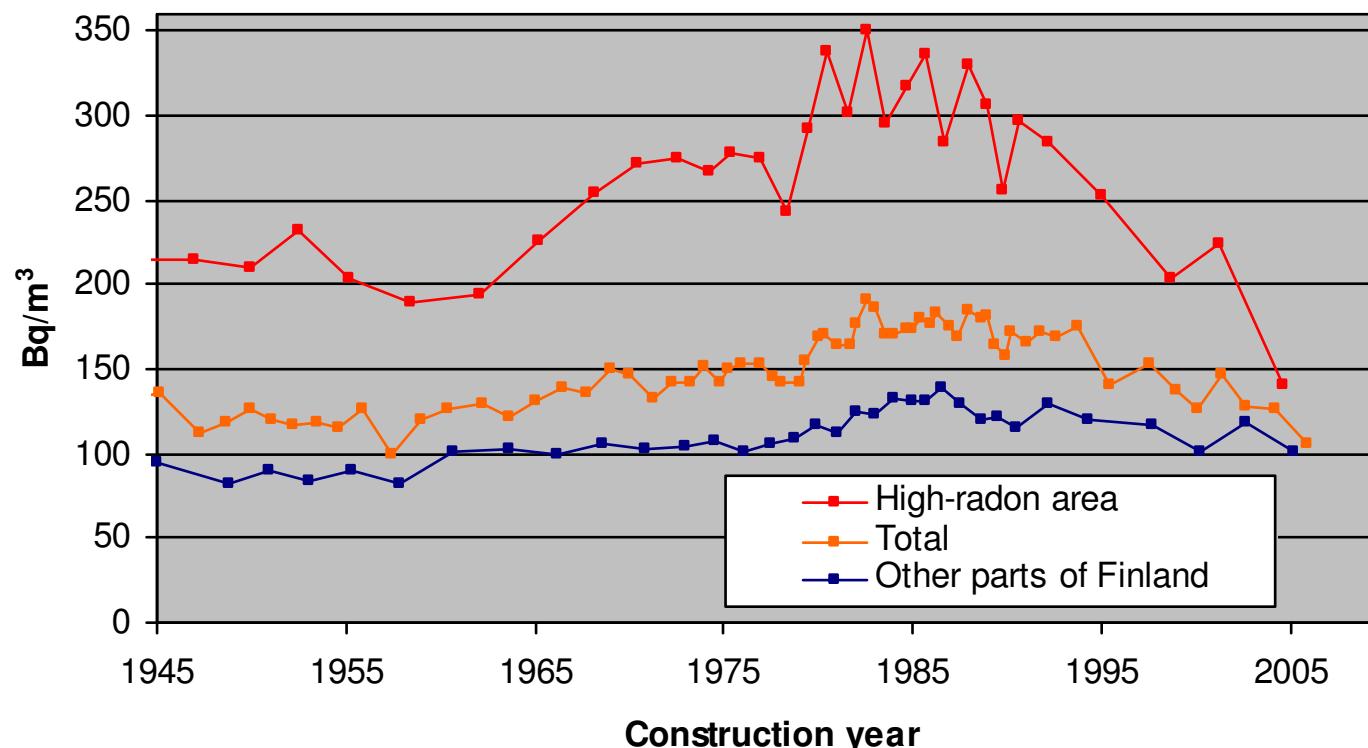


Radon should be measured in certain workplaces



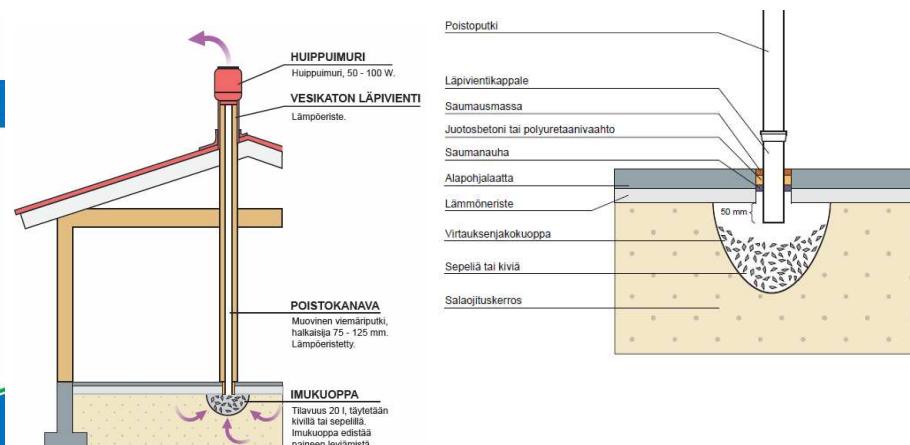
Good development in the high-radon area -new buildings, less radon

- Building code and authorities responsible for buildings construction in a key role
- Prevention measures (e.g. piping installed under the floor slab) required in high-radon area
- New dwellings measured within 5 y: High-radon area 11%, other 4,5%



A practical guide to radon remediation techniques

- It is possible to have some financial support for work expenses



More actors needed for radon field

- STUK provides extensive online information and specialist advice on radon
- STUK has good overall view on radon issues in Finland
- However, more active actors, e.g. from building construction and research, needed in this field

Radon

Onko kodissasi radonia?
Maaperän radonpitoinen ilma tunkeutuu asunton talon alapohjassa olevien rakojen kautta. Ilmavirtauksen aiheuttaa ulko- ja sisäilmän välinen lämpötilaero.
[Lue lisää sisäilman radonista](#)

Radon Suomessa
Korkeita radonpitoisuuksia on asunnoista kaikkialla Suomessa, mutta suurin todennäköisyys niiden löytymiselle on Etelä-Suomessa ja Pirkanmaan alueella. [Lue lisää radonista Suomessa](#)

Tilaat radonmittaus
Huoneilman radonpitoisuus mitataan radonmittauspalkilla lämmityskauden aikana. Radonmittauksen voi tilata STUKin verkkokaupasta tai puhelimisesti (09) 759 88 497 klo 10-14 välisenä aikana. Mittauksen tilaus verkkokaupasta on puhelinlaitesta edullisempaa. [Lisätietoja Palvelut-giosissa](#)

Radon aiheuttaa keuhkosyöpää
Ilmassa leijuvan radonin hajoamistuotteet kulkeutuvat hengityksen mukana keuhkoihin. Keuhkojen samaa säätyannostetta [lisää riskiä sairastua keuhkosyöpään](#).

Radonkorjaus
Jos huoneilman radonpitoisuus ylittää 400 Bq/m³, STUK suositteli toimenpiteitä pitkäjäiden pienentämiseksi. [Lue lisää radonkorjauskset](#)

Radon on huomioitava uudisrakentamisessa
Radonturvallisella rakentamisella estetään radonin pääsy sisään. Radonin torjunta uudisrakentamisessa on halvempaa ja helpompaa kuin radonkorjausten tekeminen. [Lisätietoja radonin torjunnasta uudisrakentamisessa](#)

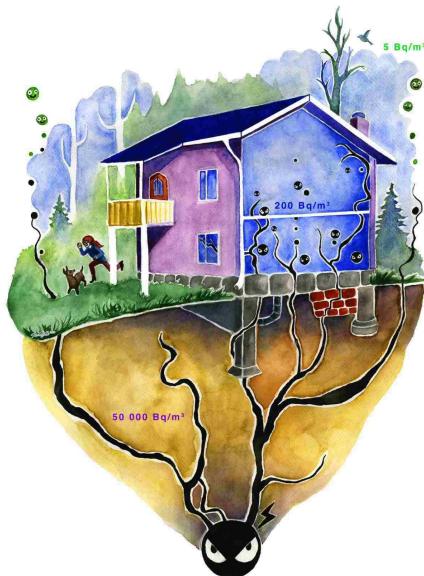
Myös juomavedessä voi olla radonia
Suomessa [talousvesien](#) eniten säätyannosta aiheuttava radionuklid on radon. Vedessä voi olla myös muita radioaktiivisia ainetta, kuten uraania. [Yedem radioaktiivisuusmittaus](#)

Radontalkoot
Talkoideiden pääavtotteena on radonin aiheuttamien keuhkosyöpien määrän vähentäminen.

Usein kysyttyä radonista
STUKin asiantuntijat ovat vastanneet radonia koskeviin kysymyksiin. [Tutustu kysymyksiin ja vastauksiin](#)

Challenges and opportunities

- National action plan / EU-BSS will promote the radon protection and reduce radon exposure
- Low-energy buildings, energy saving and indoor air quality?
- (Financial) support for radon measurements and remediation in high-radon areas in order to find the most exposed people?
- New ideas for risk communication and increase of public awareness on radon (and smoking) ?



Conclusions

Actions to reduce radon exposure in dwellings

- Regulation and guidance for radiation safety and Building Code
 - New Radiation Act and Decree, and Guides under preparation
- Local and national campaigns
 - Increase overall awareness
 - Increase measurement activity
 - Increase remediation activity
- Training, education and information sharing
 - Collaboration between authorities, experts and professionals
 - online material
 - guides
 - SOME
 - expert advice
 - courses
 - Other?

Acknowledgements

- Dr. Tarja K Ikäheimonen
- Radon and Health: Dr. Tuomas Valmari, Dr. Olli Holmgren, et al.

