

The European Commission's science and knowledge service

Joint Research Centre



European
Commission

Risultati dell'analisi dei questionari MetroRADON sulle indagini di misura del radon in ambienti chiusi

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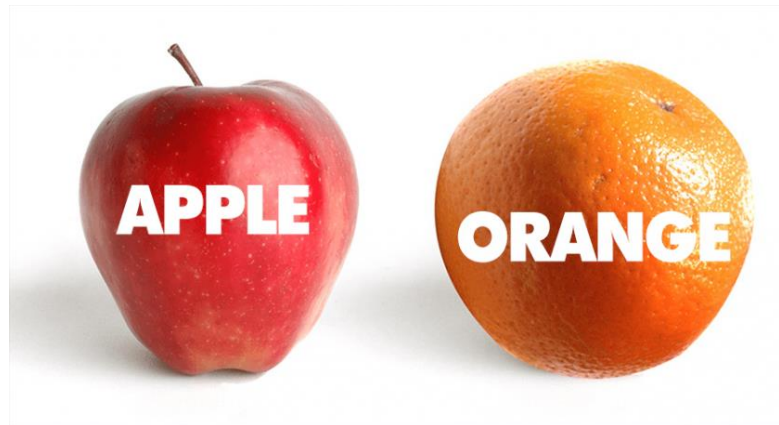
VII Convegno Nazionale Agenti Fisici

5-7 giugno 2019, Stresa, Italia

Key question



Are existing indoor radon measurement procedures* in different surveys comparable in Europe?



***include rationale, design, measurement methods, data analysis etc.**

General Overview

For trying to answer this question, a **questionnaire** was developed in the framework of **MetroRADON** project

General Overview on MetroRADON

- June 2017 – May 2020 (3 years)
- 17 European partner institutions
- 350 PM, 2.26 Mio EUR
- European Metrology Programme for Innovation and Research (EMPIR) project – (Call scope - Metrology for Environment 2016)
- Organised by EURAMET (Regional Metrology Organisation of Europe)
- Co-funded by the European Union's Horizon 2020 programme and the EMPIR Participating States



In the present work:

External funded partners: AGES, BfS, and JRC

Collaborators: ISS and INAIL

General Overview on MetroRADON

✓ Motivation/Scope: New EU-BSS

- Requires developing Radon Action Plans to reduce radon exposure
- Includes, among others, reference values and delineation of Rn priority areas



✓ Main goal: QA from measurements to radon maps

- Coordinated **metrological infrastructure** for radon monitoring and radon mapping
- **Traceable monitoring** of radon at low radon activity concentrations ($< 300 \text{ Bq/m}^3$)
- Investigation of the **influence of thoron** on radon measurements and calibrations
- **Harmonisation** of indoor and soil radon measurements
- Development of **new methodologies** for the identification and characterisation of **radon priority areas** in Europe

General Overview

Are existing indoor radon measurement procedures in different surveys comparable in Europe?

For trying to answer the key question, a **questionnaire** was developed in the framework of **MetroRADON** project



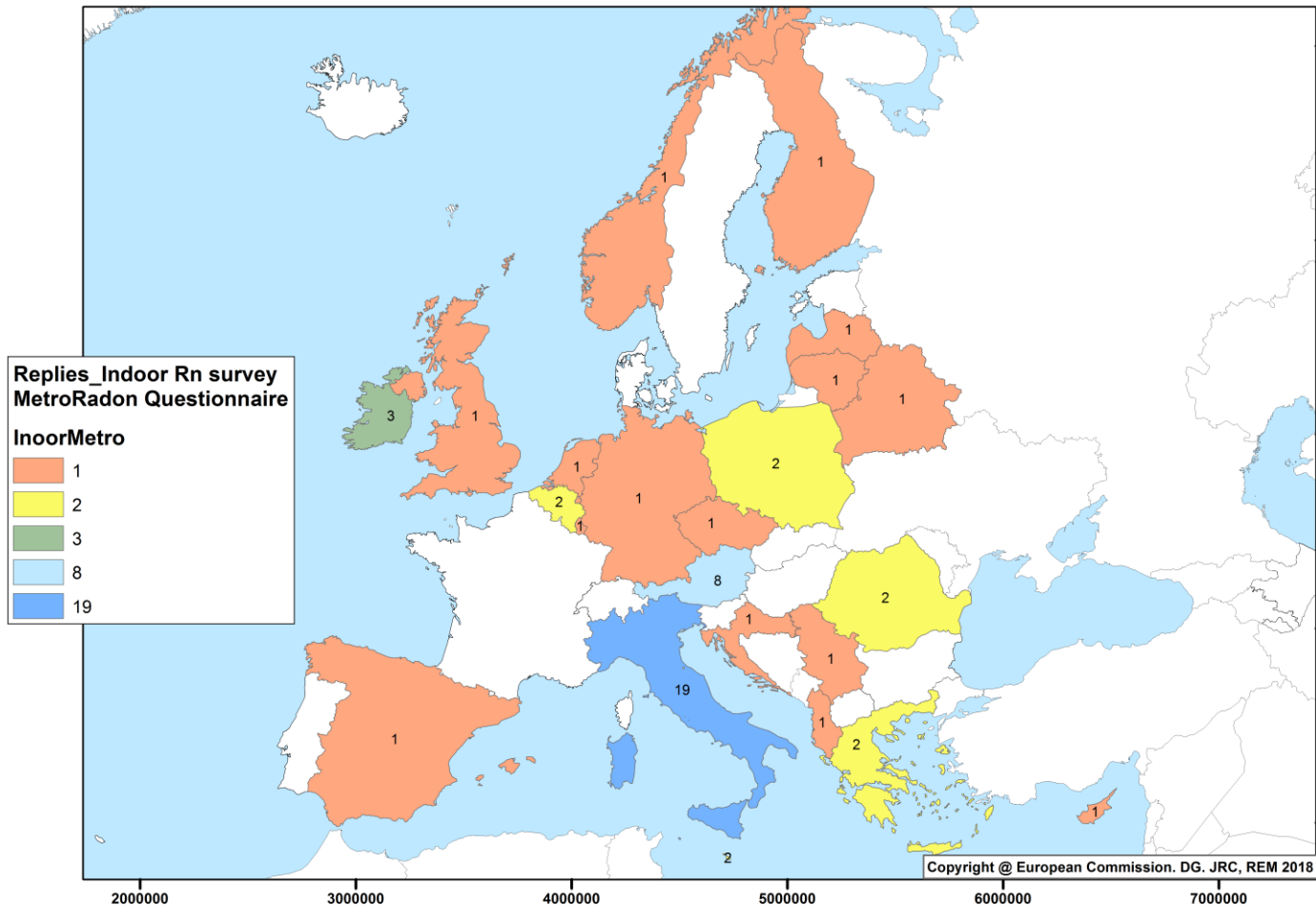
Main objective: to get information from indoor radon surveys

so it has been addressed to all European institutions working in this field:

- national authorities;
- regional administrations;
- universities;
- research centres;

To have a questionnaire filled for each survey

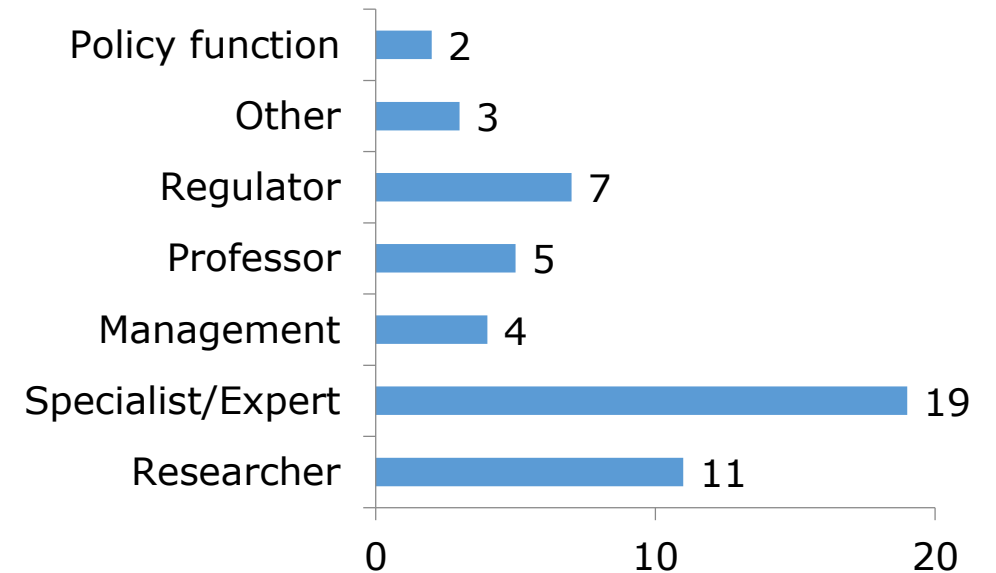
General Overview



Source:
European Commission, Joint Research Centre (JRC),
Directorate G - Nuclear Safety & Security, REM project

- December 2017 and July 2018
- 56 replies from 24 countries

Role of the respondent



For answering...

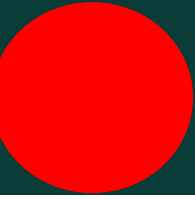
Focus on **3 main topics (sections of the questionnaires)** for answering our key question:

Introduction

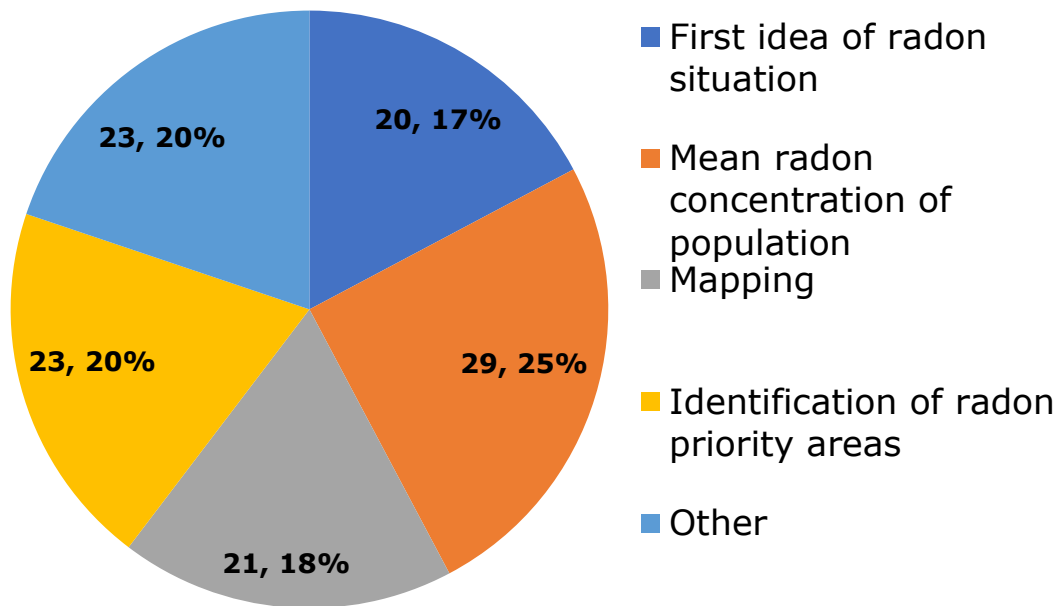
- 1) Characteristics of indoor radon surveys - design
- 2) Measurements methods
- 3) Data management, statistical treatment, aggregate and mapping

Policy on Indoor Radon

1) Characteristics of indoor radon surveys -design

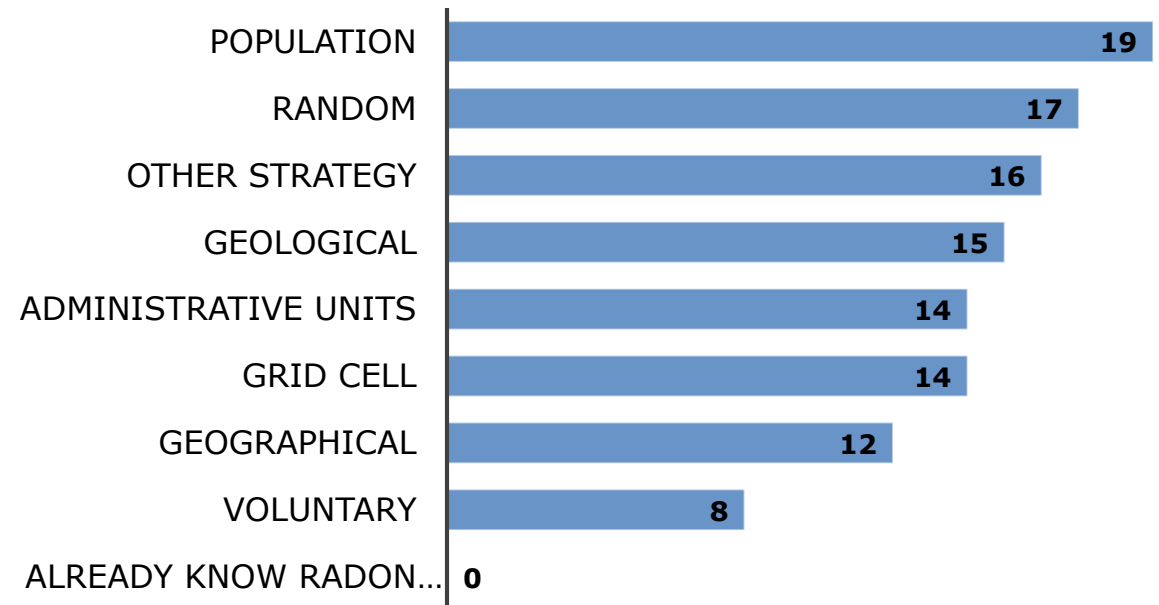


Please select the main purpose of the survey:



- More than 60% of surveys have more than one purpose
- Among *other*: risk assessment of workers and limited target population

Please select the main sampling strategy on which the survey was based:

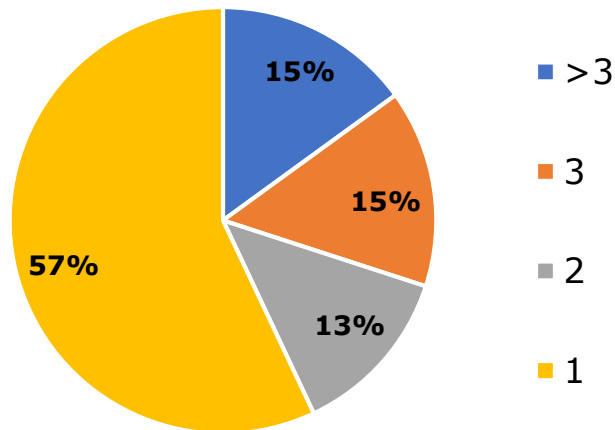


- Among *other*: Rn concentration in schools-kindergartens; workers etc...

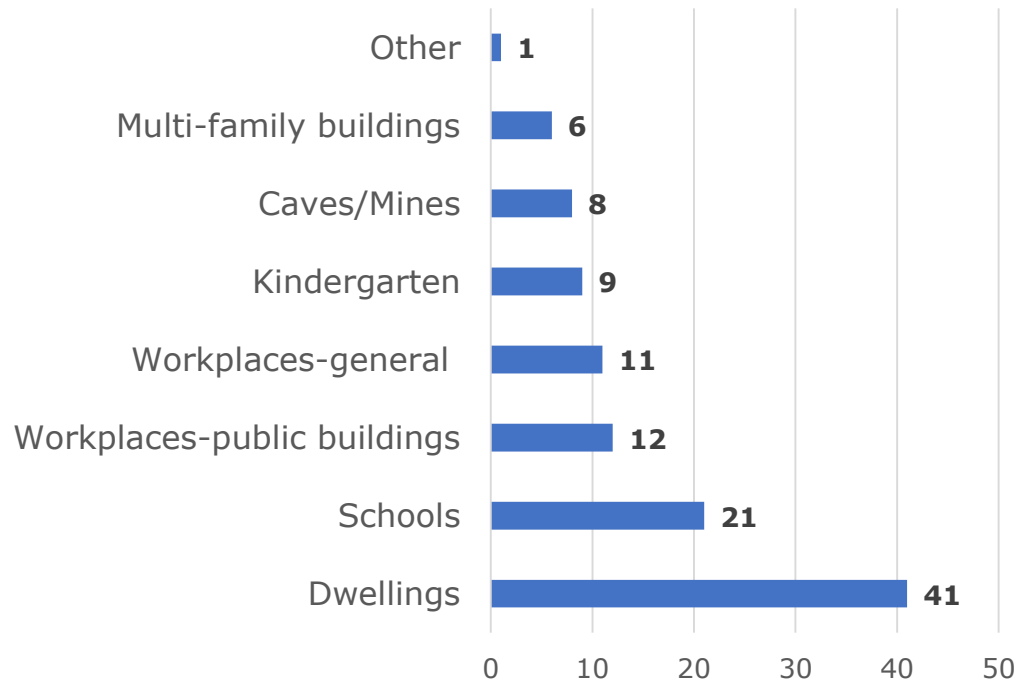
1) Characteristics of indoor radon surveys -design

Which building types have you considered in your survey:

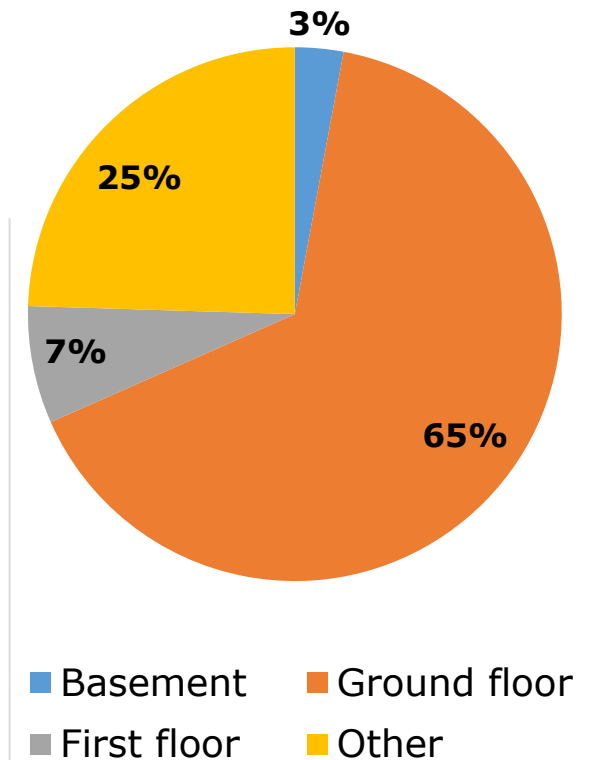
Number of building types considered in surveys



Surveys in which the following building types were considered:



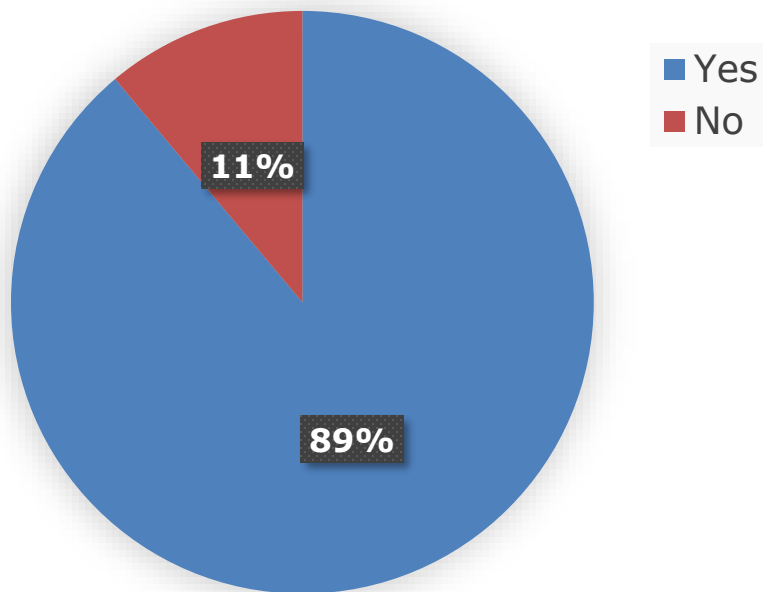
Preferred measurements location in dwellings



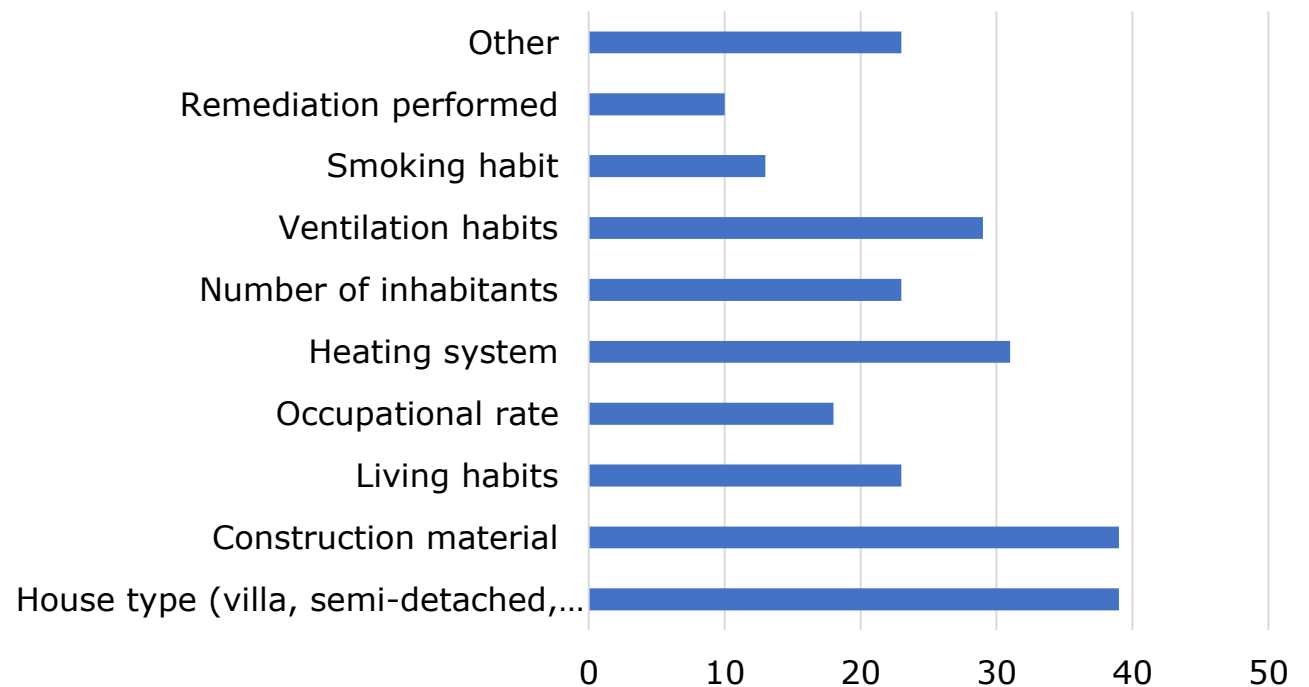
1) Characteristics of indoor radon surveys -design



Have you collected information about the measurement site through a questionnaire?



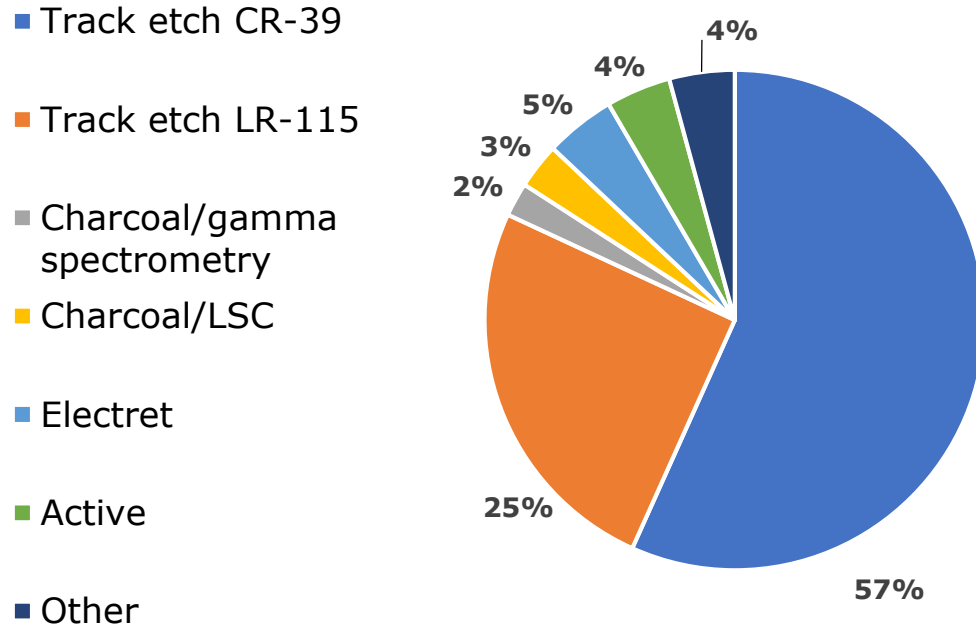
Description of the content of questionnaire



2) Measurements methods

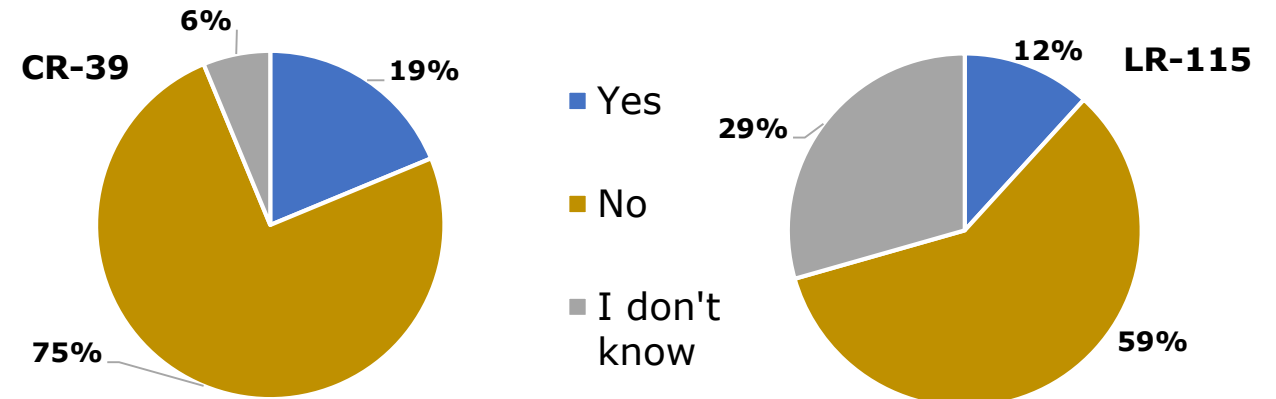


Detectors used in the surveys

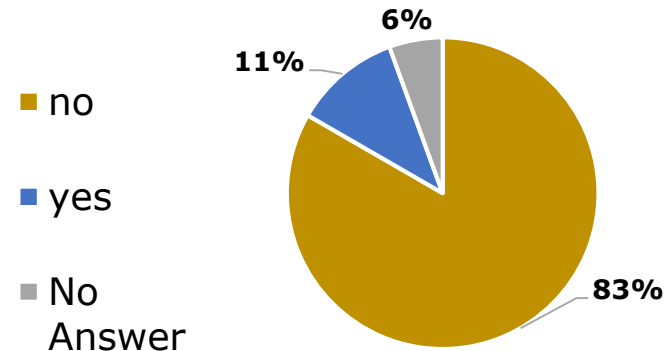


- 80% track etch passive detectors
- 68.5% reported the use of only one measurement method

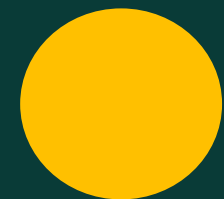
Are the detectors you used sensitive to thoron?



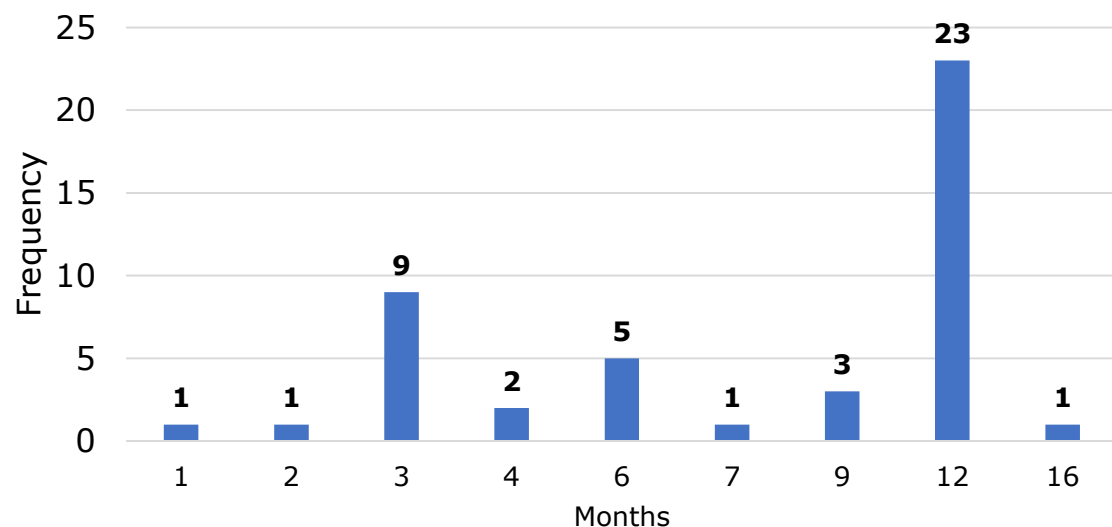
Has thoron been measured?



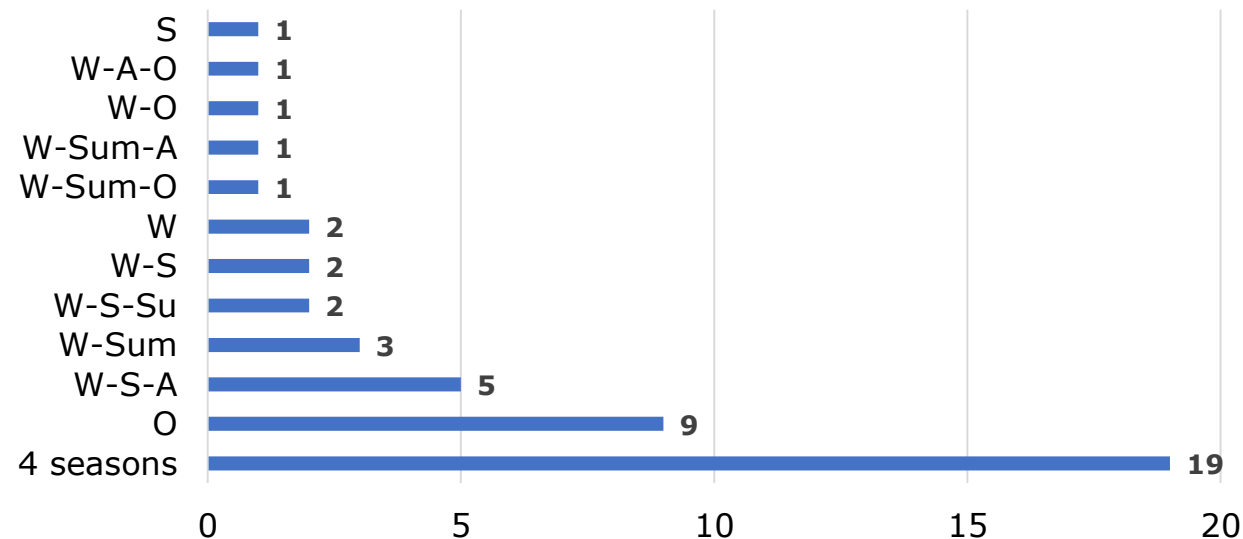
2) Measurements methods



Duration of measurements performed with SSNTD (CR-39, LR-115 and Makrofol)



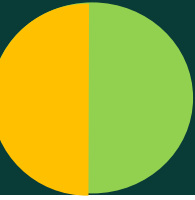
Measurement seasons



25 respondents (44%) performed 1-year measurements (indicating the 4 seasons or specifying it in other).

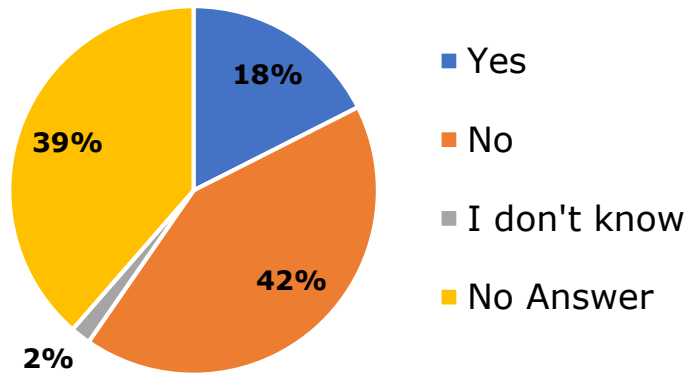
In the other cases, measurements were performed mostly during the winter but often covered more than one season.

3) Data management, statistical treatment, aggregate and mapping

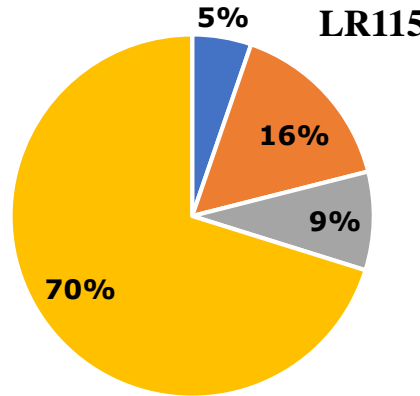


Have you applied seasonal correction?

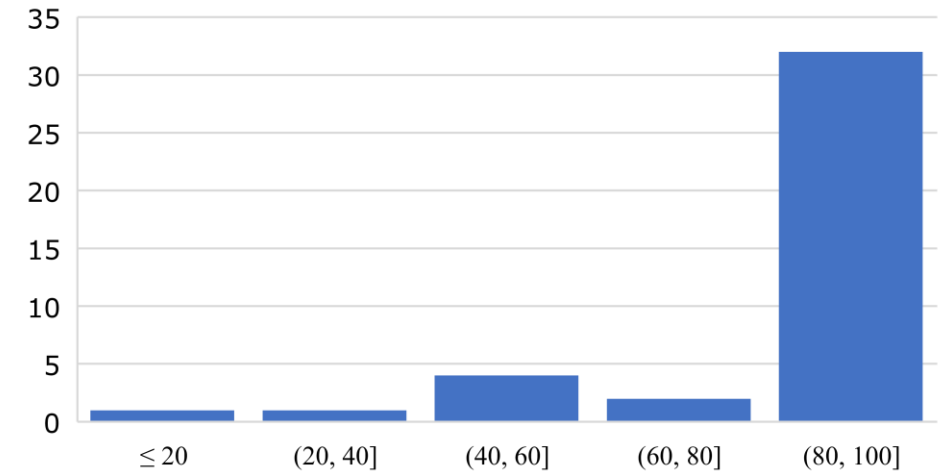
CR39



LR115

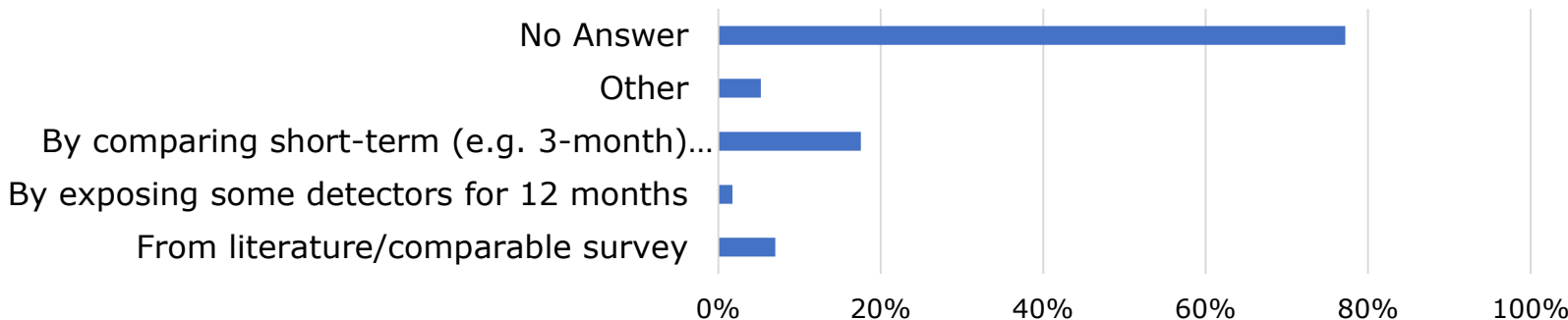


Return rate %



Replies from more that 70% of respondents

How the seasonal correction factor has been applied?

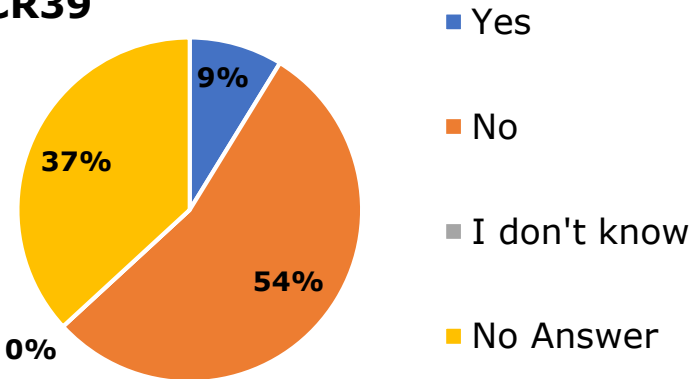


3) Data management, statistical treatment, aggregate and mapping

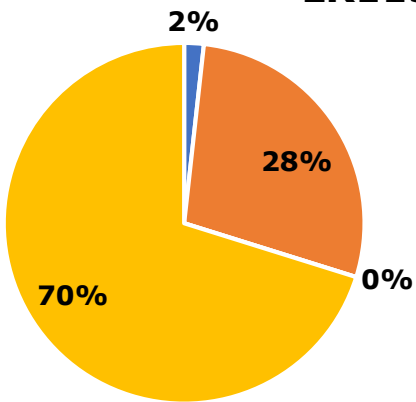


Have you applied any correction linked to building characteristics, in particular floor level?

CR39

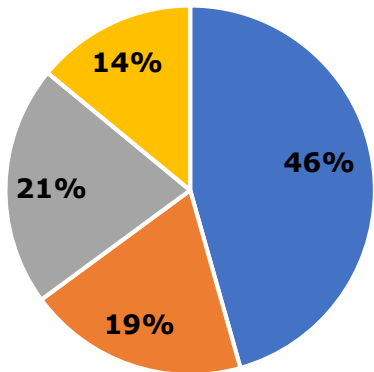


LR115



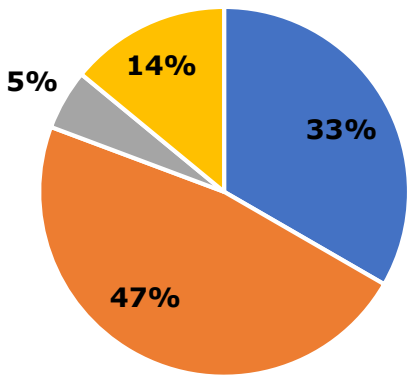
Please indicate how data from the survey were aggregated:

Simply target descriptive statistics of raw data

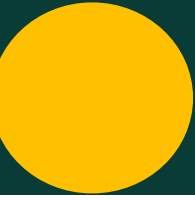


■ Yes ■ No ■ I don't know ■ No Answer

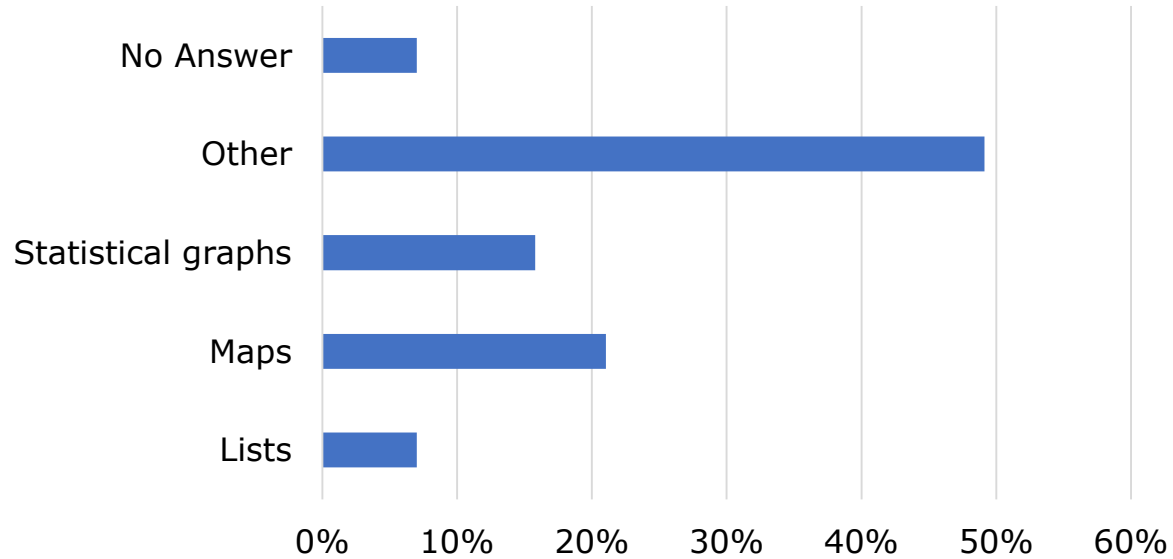
Modelling of raw data (standard house, spatial models - kriging, average within municipality, etc.)



3) Data management, statistical treatment, aggregate and mapping



Please indicate how data are presented to the population/authority



Other

- Direct communication (result letter) to the responsible of the administrative buildings, kindergartens, schools
- Result letter/single report to all households;
- Reports and scientific papers
- Reports for authorities
- Maps on web sites

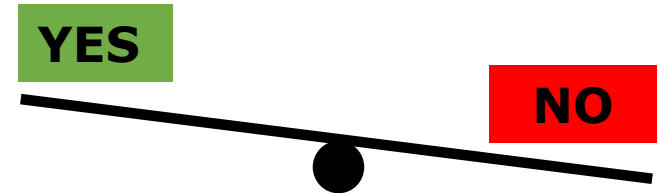
Key question

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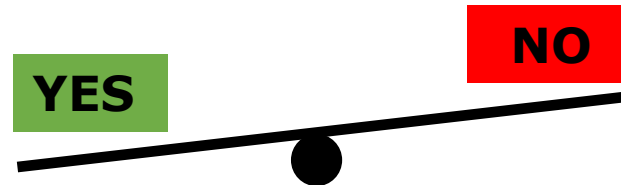
***include rationale, design, measurement methods, data analysis etc.**

Conclusion

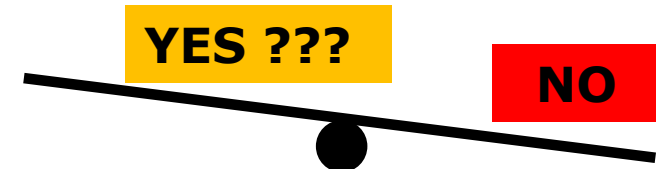
1) Characteristics of indoor radon surveys – design



2) Measurements methods



3) Data management, statistical treatment, aggregate and mapping



Conclusion

We are working on a document reporting a detailed analysis of all the replies.

**Let's keep you informed on the status of the report on the MetroRADON website:
metroradon.eu**



Grazie per l'attenzione



Any questions?

Please contact us at

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