

The EURADOS intercomparison action on internal dose assessment for occupational exposures: ICIDOSE 2017

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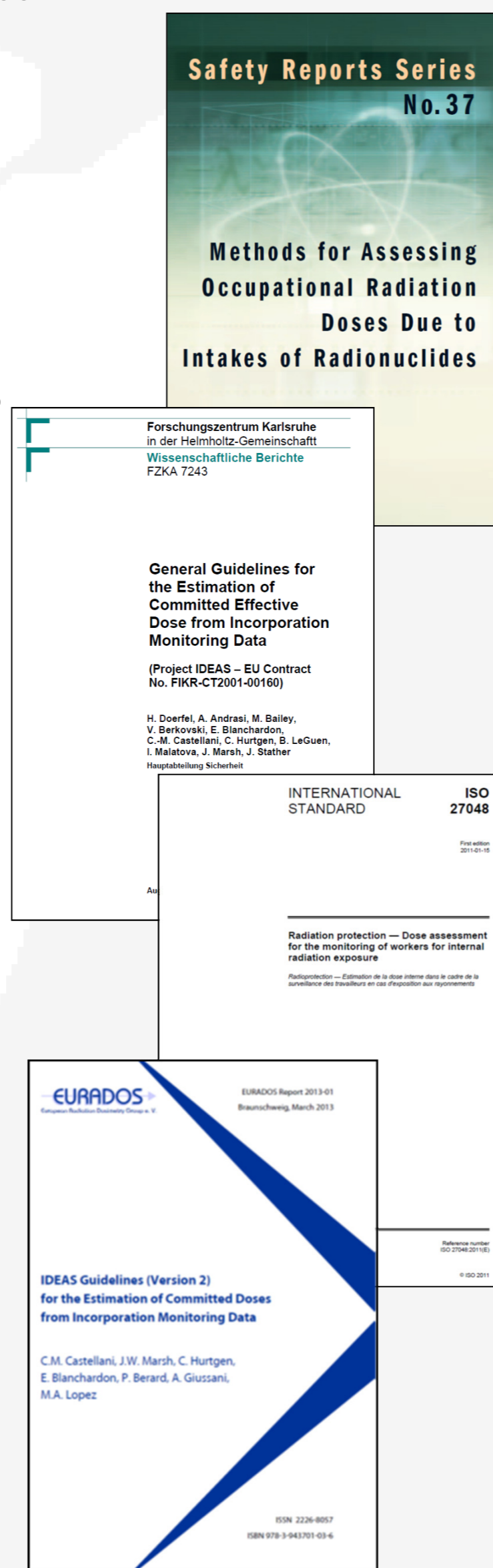
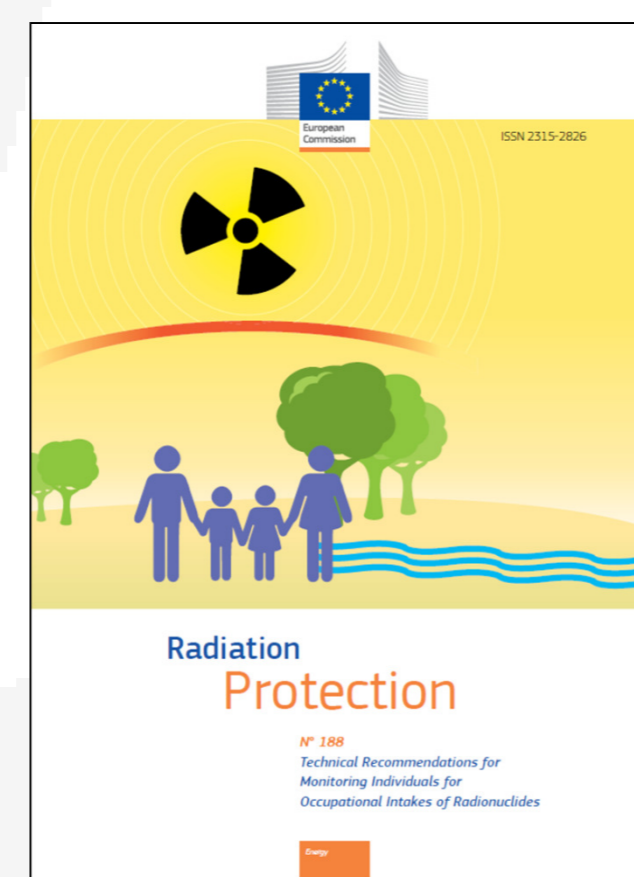
Background

The retrospective dose assessment after incorporation of radionuclides is investigative in nature. The unique unknown quantity (intake) needs to be inferred from combined measurement data and is subject to decision-making processes with multiple choices, which can lead to a wide range of non-unique results.

Need of intercomparison exercises at international levels (previous exercise: IDEAS/IAEA in April 2005).

Recent availability of reference documents:

- IAEA-SRS-37 (2004)
- IDEAS Guidelines (2006)
- ISO-27048 (2011)
- IDEAS Guidelines v2 (2013)
- **Technical Recommendations for Monitoring Individuals for Occupational Intakes of Radionuclides EC-RP 188 (2018)**

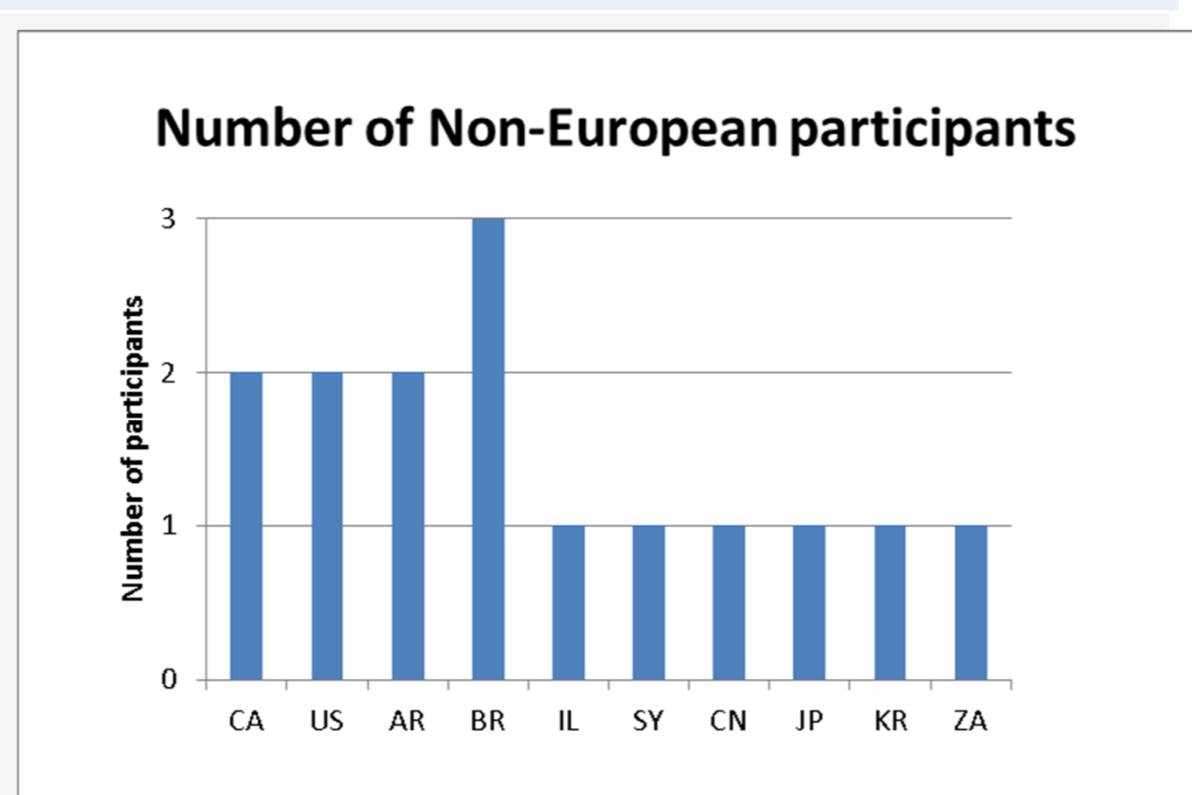
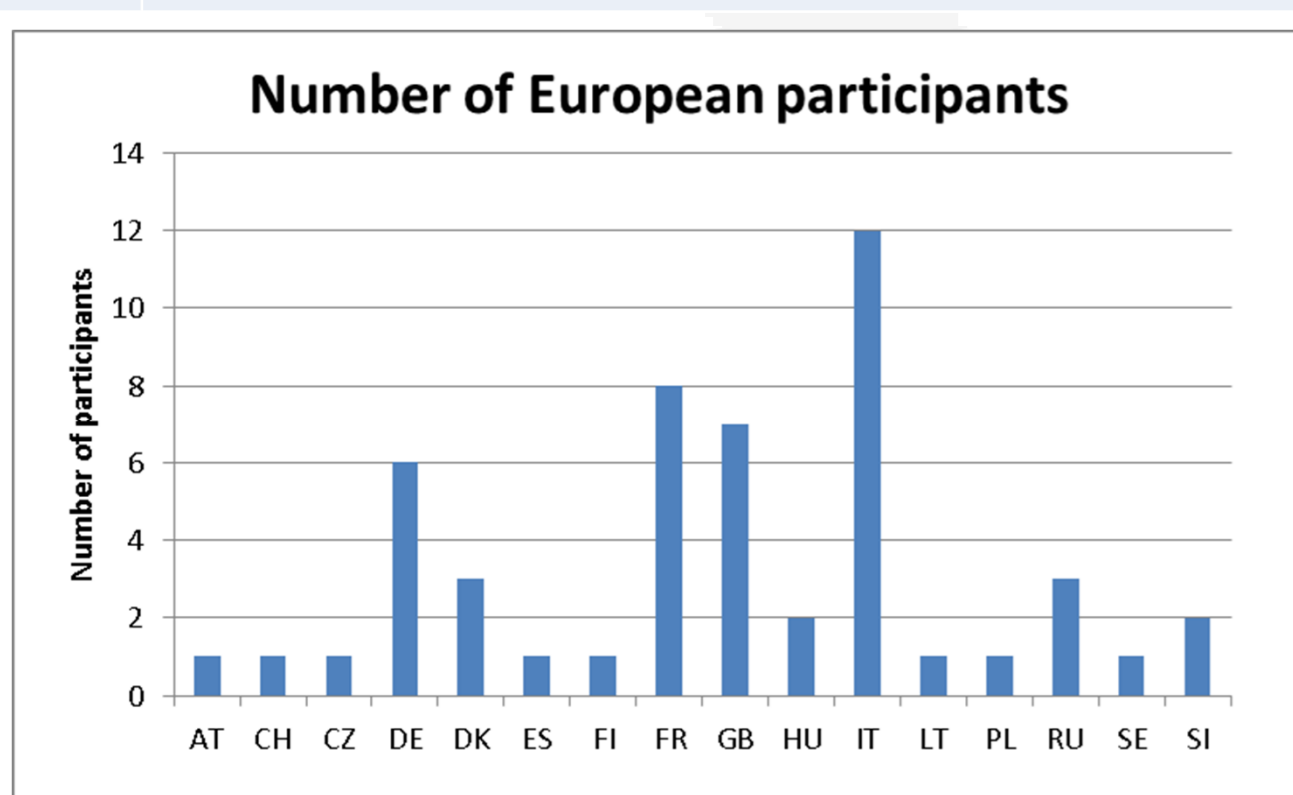


Case studies & Participants

ICIDOSE 2017 Intercomparison

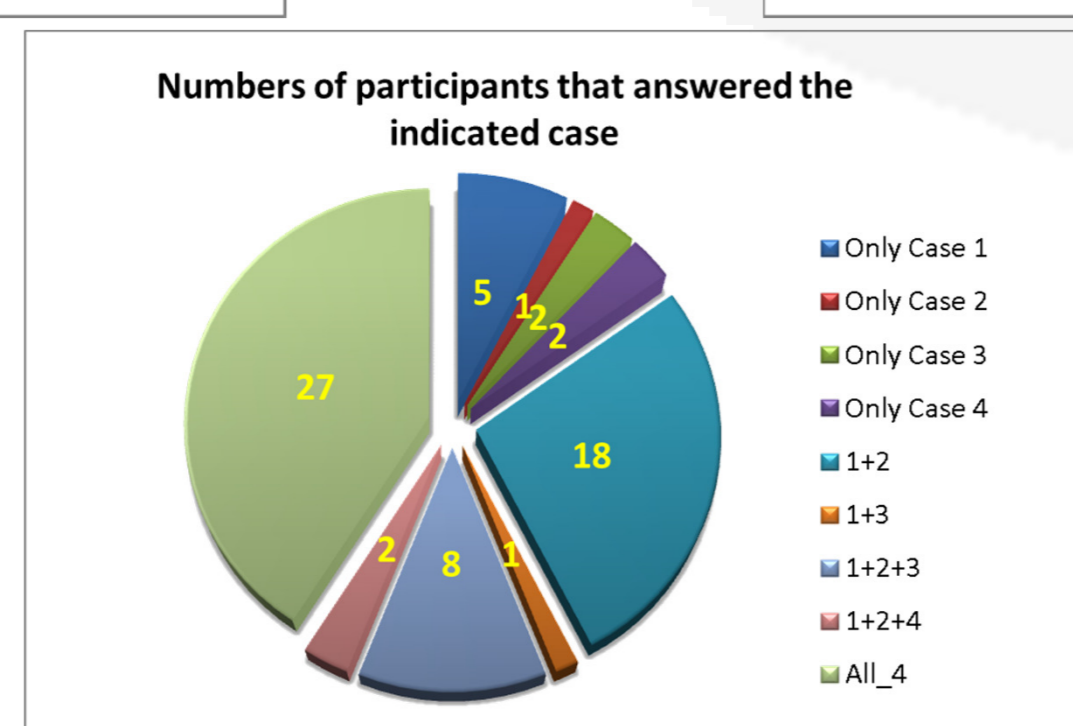
4 case studies for verification of the applicability of EC RP-188

#	Description	Secondary aim
1	Hypothetical acute exposure to an airborne release of ⁶⁰ Co aerosol	Application of new ICRP OIR model and data for ⁶⁰ Co (first time, courtesy ICRP C2)
2	Actual instance of multiple exposures to ¹²⁵ I vapour over a thirteen months period	Calculation of contributions due to previous evaluated intakes
3	A confirmatory monitoring programme for U isotopes which led to a special monitoring programme	Treatment of U isotopes data for unique dose assessment
4	Accidental inhalation of ²⁴¹ Am aerosol, followed by DTPA decorporation therapy	Selection of data affected by DTPA treatment



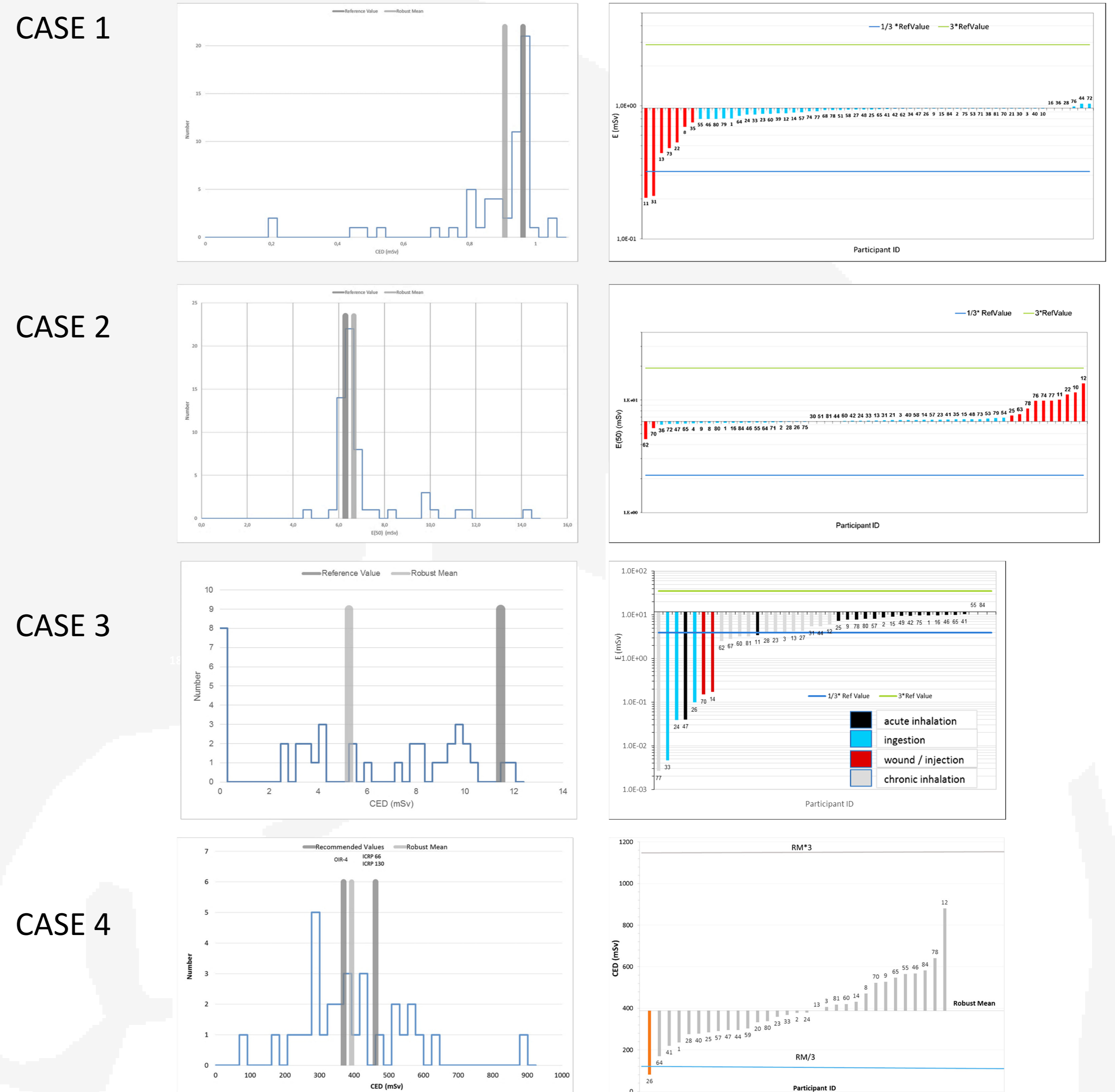
↑ **51 participants from 16 European countries.**

186 replies submitted



↑ **15 participants from 10 countries outside Europe.**

Results & Discussion



- EC RP-188 methodology was implemented (to a greater or lesser extent) by all 66 participants.
- For the more straightforward cases (1 and 2) the values are close to the reference solution value, developed by Core Group following the EC RP-188 methodology.
- For the more complex cases (3 and 4) the practical application of RP-188 is effective primarily as an indicator for when to refer to expert assistance.
- The overall results indicate an improvement with respect to previous retrospective dose assessment intercomparison exercises.

↑ **Dark grey bar:** reference solution (Ref)
Light grey bar: robust mean (RM), as defined in ISO13528
Interval of acceptance: [Ref/3; 3*Ref]
CASE 4: Only recommended solution (no reference)
Interval of acceptance: [RM/3; 3*RM]

Comparison with previous exercises

For Case 1

Inter-comparison	Radionuclide	N submitted	N outliers	GSD
3 rd European (Case 2)	⁹⁰ Sr	38	4 (11%)	1.78
IDEAS/IAEA (Case 3)	⁶⁰ Co	62	6 (10%)	1.40
ICIDOSE 2017	⁶⁰ Co	58 ^(a)	7 (12%)	1.07

For Case 2

Inter-comparison	Radionuclide	N submitted	N outliers	GSD
3 rd European (Case 3)	¹²⁵ I	38	2 (5%)	1.50
IDEAS/IAEA (Case 4)	¹³¹ I	63	13 (21%)	1.07
ICIDOSE 2017	¹²⁵ I	56	12 (21%)	1.04

For Case 4

Inter-comparison	Radionuclide	N submitted	N outliers	GSD
3 rd European (Case 6, Subject A)	²³⁹ Pu	33	3 (9%)	2.40
IDEAS/IAEA (Case 6, Part 1)	²⁴¹ Am	35	3 (9%)	2.13
ICIDOSE 2017 (DTPA therapy)	²⁴¹ Am	31	1 (3%)	1.43



Participants at the ICIDOSE 2017 Workshop 18-19 October 2018 at BfS (Munich)

Acknowledgements

George Etherington, formerly PHE, UK (external reviewer)
 All participants to the ICIDOSE 2017 exercise

References

EC-RP188: https://ec.europa.eu/energy/sites/ener/files/rp_188.pdf

Final report ICIDOSE

<http://www.eurados.org/-/media/Files/Eurados/documents/EURADOS-Report-2019-01.pdf>