

IRSN

INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

Faire avancer la sûreté nucléaire

The System of Radiological Protection: Is it fit for purpose?

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Director General IRSN

contents

- The international RP system has achieved major results
- However, new challenges must be overcome to meet rising societal concerns
- New scientific approaches are needed for this purpose
- Concluding remarks

The long lasting wisdom of RP fundamental principles

- Justification

- Optimisation

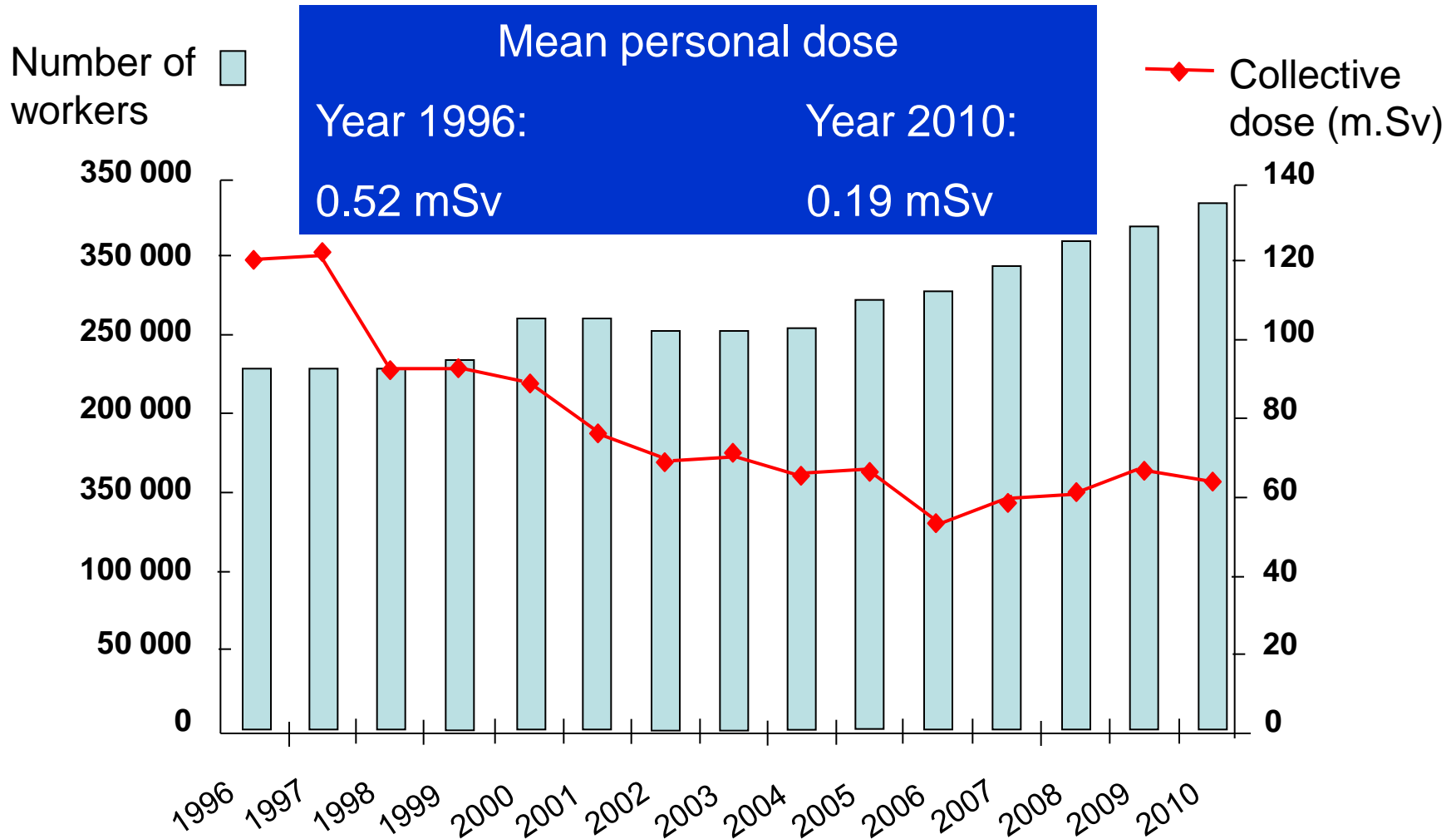
- Limitation

Justification

- Competent authorities are responsible for assessing the justification of a given nuclear activity / practice
 - Social, technical and economical considerations
- This is the role of TSO such as IRSN to advise on technical issues (e.g.: backscatter X-ray body scanners, neutron interrogation...)

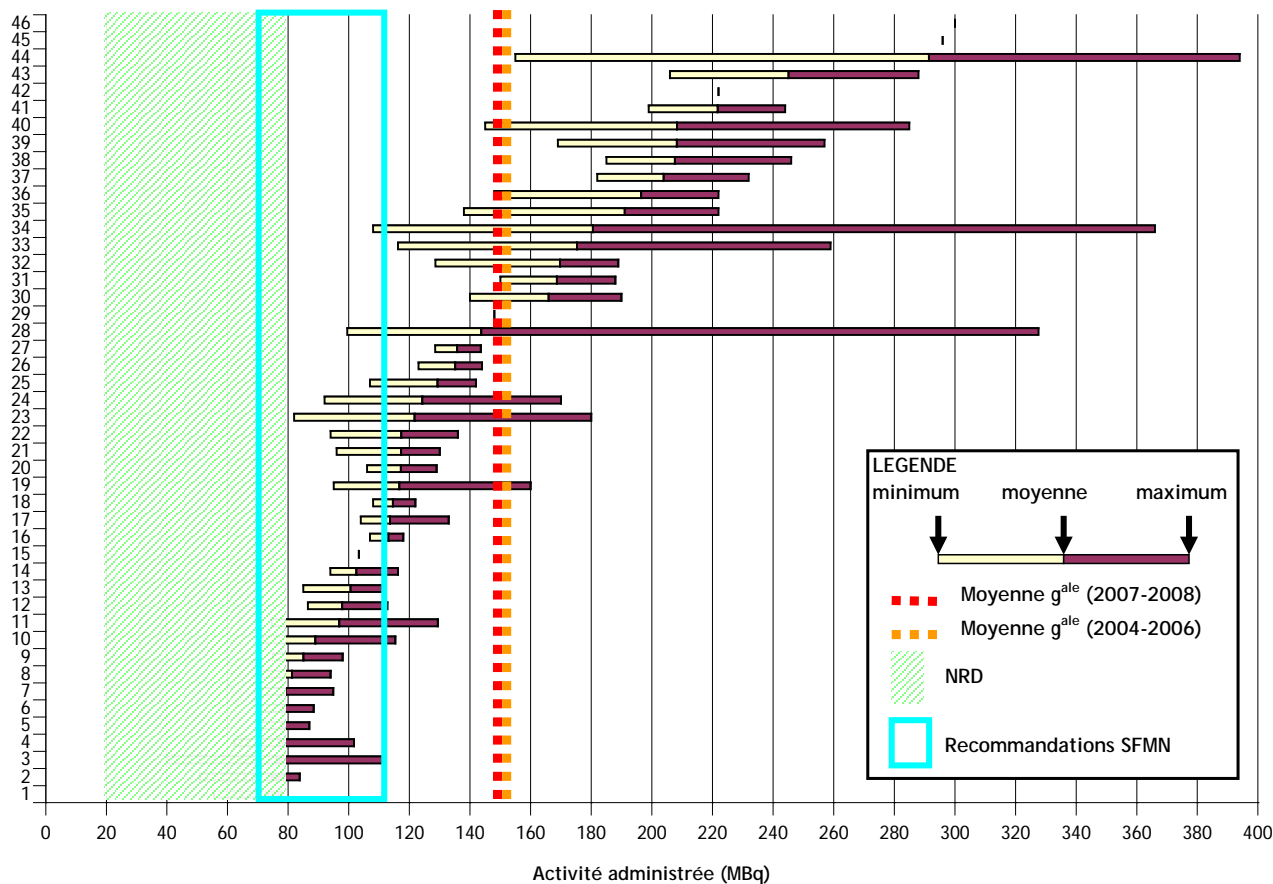


Optimisation in occupational activities

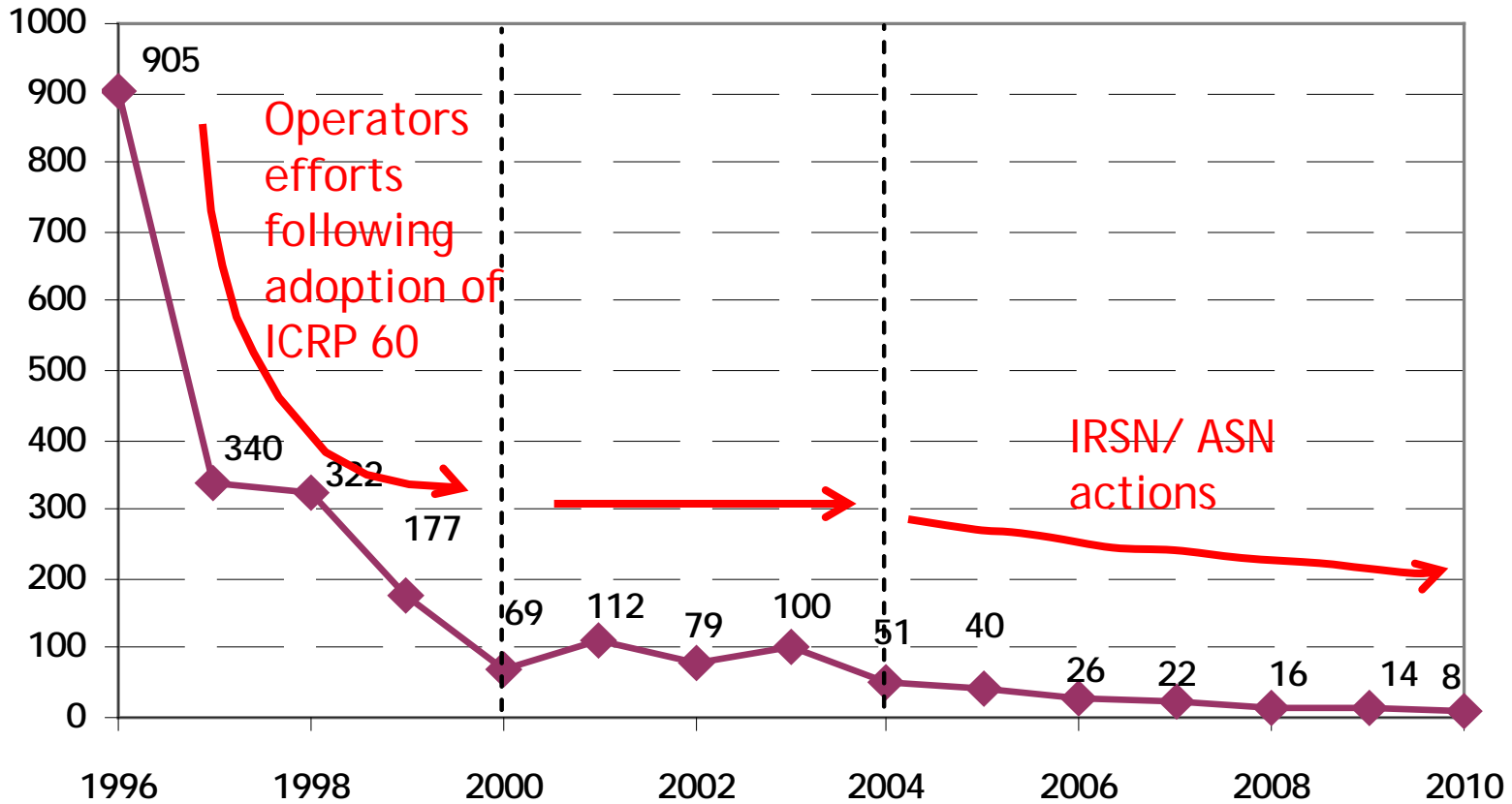


Trend in occupational exposure in France

(non)Optimisation in medical applications: the case of thyroid scintigraphy in FRANCE



Dose limitation



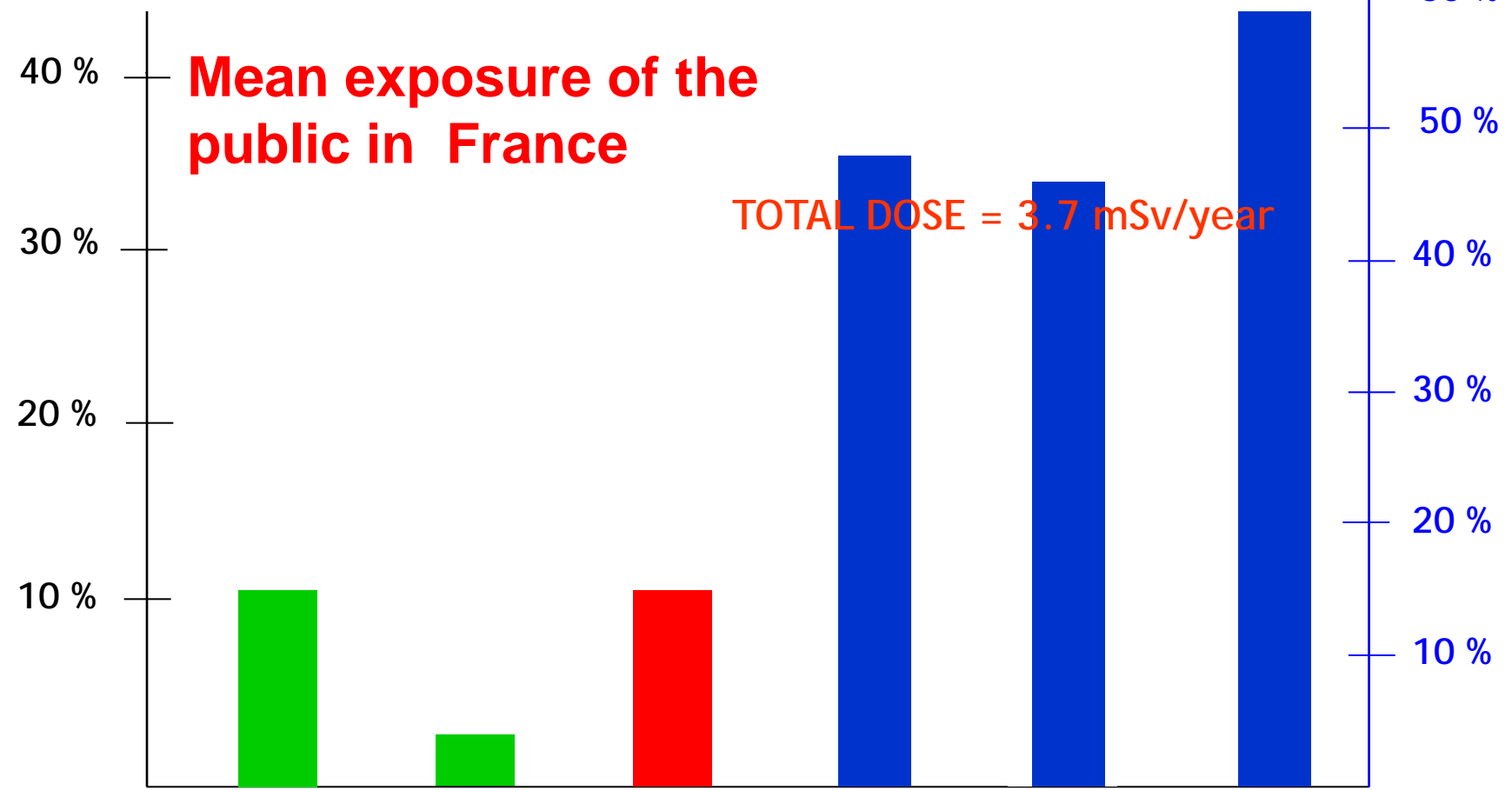
Workers with annual external dose > 20 mSv (France)

New challenges appear...

- Low dose / low dose rate chronic exposure issues are becoming a significant societal concern, with often misguided perceptions of risk by members of the public
- These concerns can severely impair the functioning of society following accidental environmental radioactive contamination (chronic internal exposure situations)
- Questions on individual (in)equity could also become prominent
- The extent of non cancer effects domain at low dose /low dose rate exposure is questioned

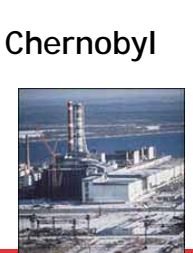
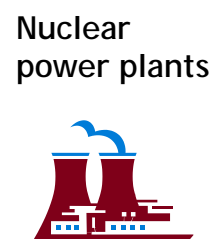
Low dose risk perception in France

% answers :
Very high or high risk

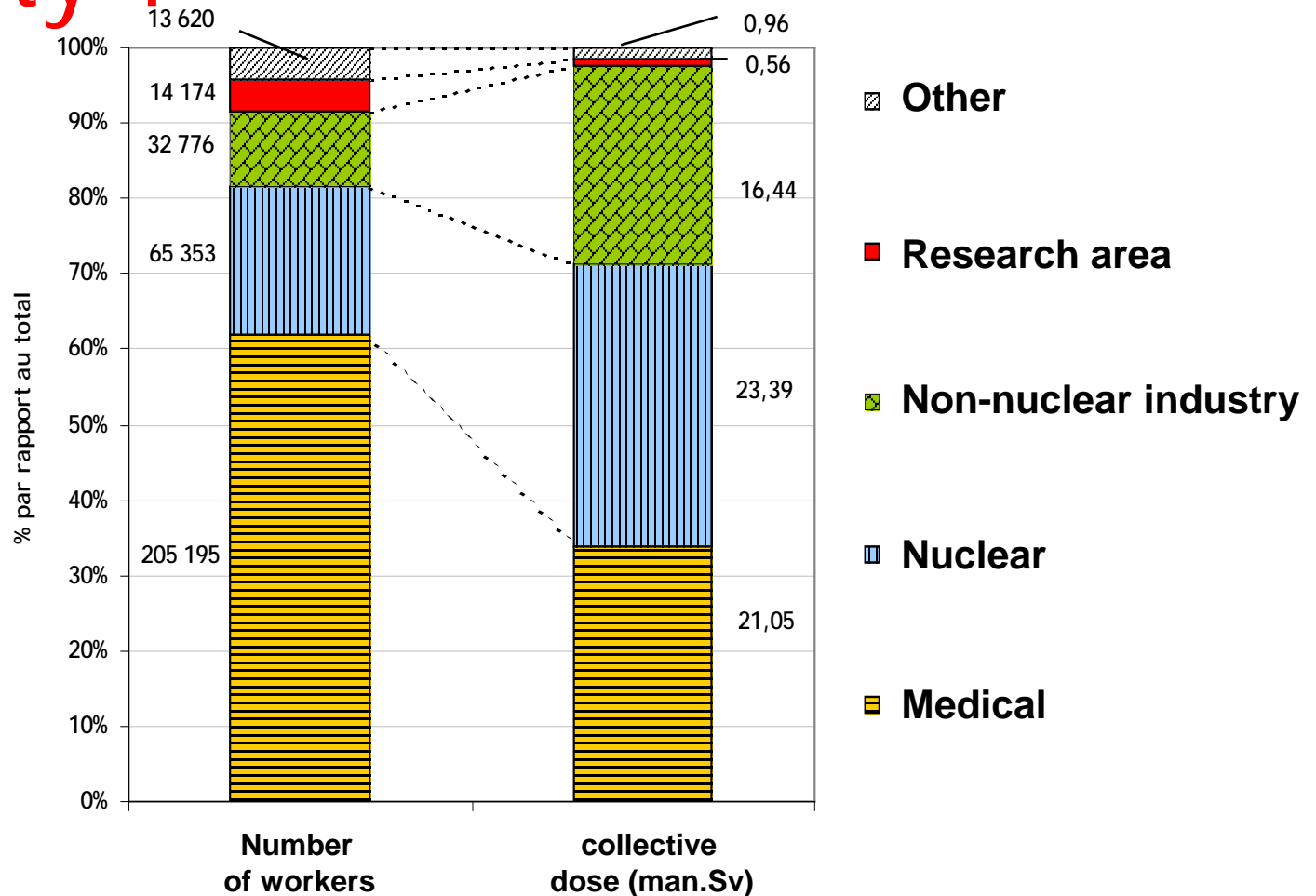


Mean exposure of the public in France

TOTAL DOSE = 3.7 mSv/year



(in)Equity 1

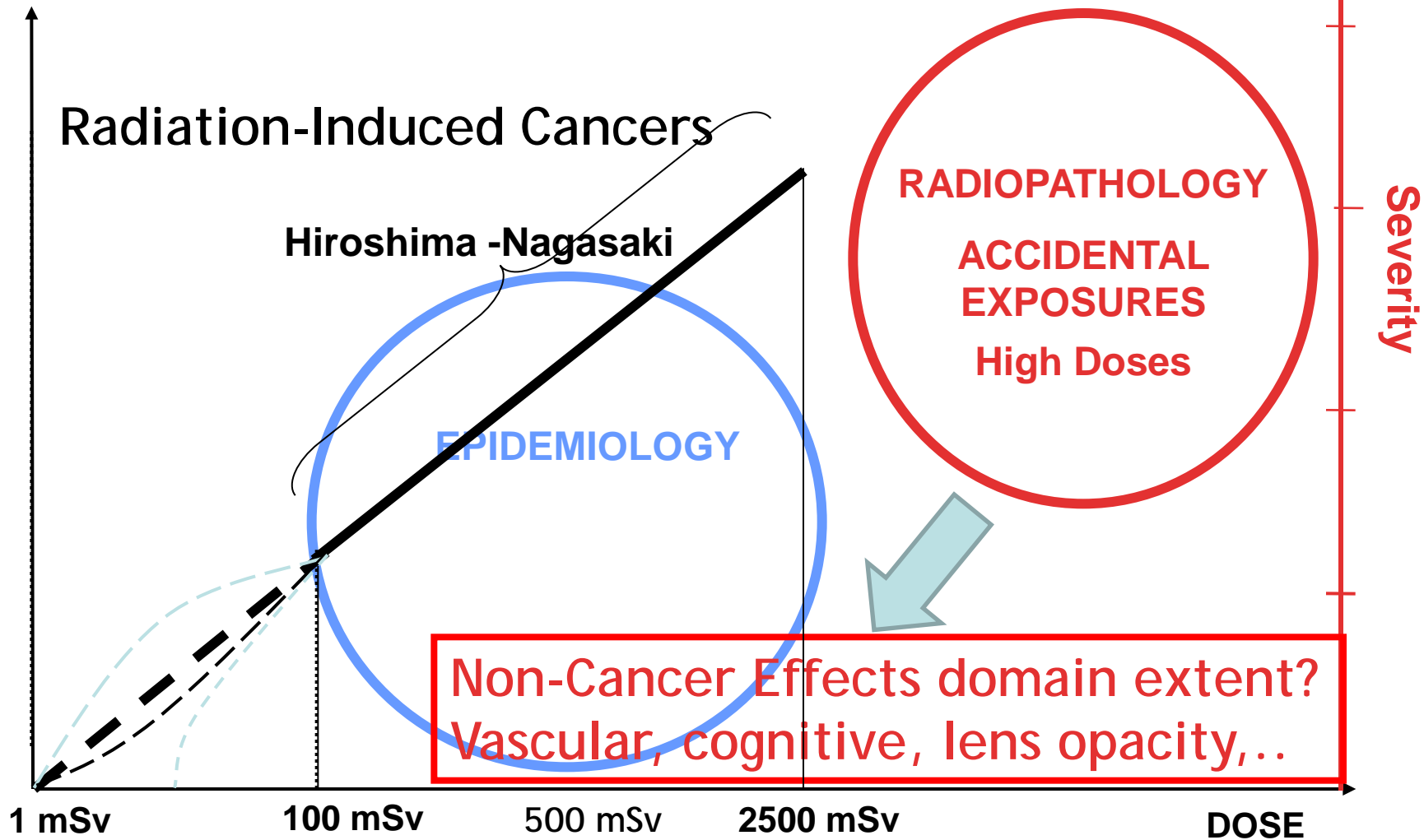


Workers monitored in France in the different domains of activities

(in)Equity 2: individual sensitivity: a potentially sensitive societal issue

- Radiation protection of professionals
- Multiple medical radio-diagnostics
- Interventional radiology
- Radiotherapy
- Gender, age, ...

Non cancer effects as dose goes down?



How to address these challenges?

- Selfstanding epidemiological studies, even with very large good quality cohorts, are reaching their limits when addressing low dose /low dose rate exposure effects (cancer and non-cancer)
- Uncertainties also affect existing ICRP models, which are difficult if not impossible to overcome in the domain of low dose rate chronic exposures



new scientific strategies are required

Towards multinational multidisciplinary multidimensional research on low dose effects

- Availability of costly experimental infrastructures
- Developing a strategic research agenda and co-operating for its implementation
- Associating all needed disciplines, to take advantage of the huge progress made in physics, biology and medicine over recent years
- Building international consensus on future paradigms for radiation protection for low dose rate chronic exposure

Availability of advanced experimental infrastructures

- Microbeams and microdosimetry
- Chronic exposure animal facilities
- Advanced clinical research (heavy ions, etc...)
- « Omics » facilities
- Stem cell research
- Specialised cohorts and tissue banks

A strategic research agenda for the EU, a multidisciplinary scientific approach

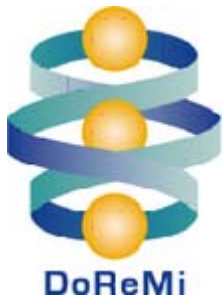
■ The European MELODI initiative



→ Rome (Italy) Workshop 2 / 4 November 2011

<http://www.melodi-online.eu/>

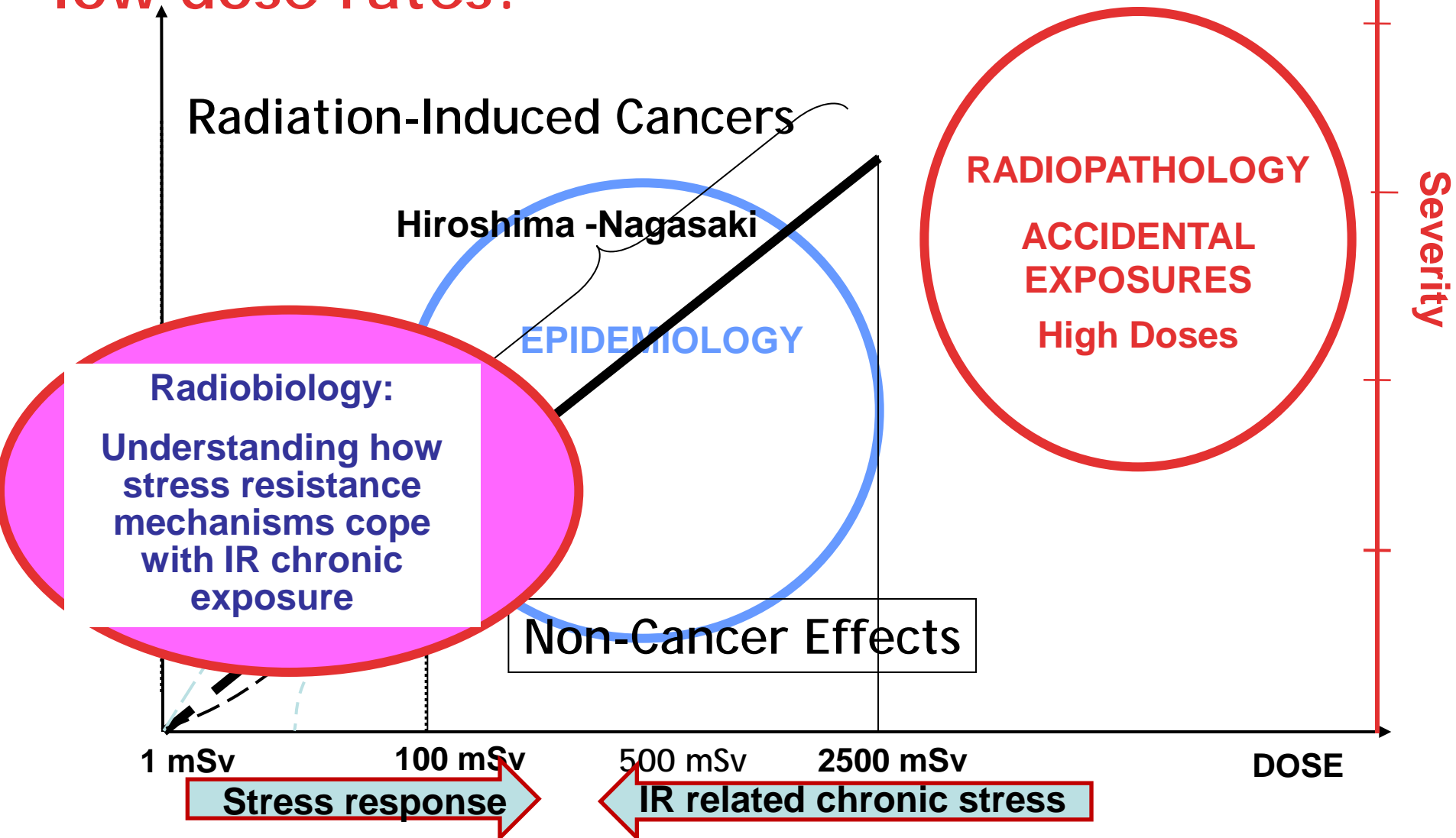
■ DoReMi European « Network of Excellence »



<http://www.doremi-noe.net/>

■ STAR NoE and « The Alliance »: new European scientific approaches to environmental radiation protection issues

Towards complementary paradigms for RP at low dose rates?



Concluding remarks

- The low dose /low dose rate radiation protection issues are key for the future of nuclear industry in advanced societies.
- They are equally important for the optimal development of radiodiagnostic, radiological interventions and radiotherapy.
- Low dose rate R&D will be expensive, will need to attract the best teams worldwide, and to keep an open mind. But the rewards are likely to be huge.
- Useable R&D results on these issues will not be available for some years, but the ICRP scientific expert community can help make it happen in an optimal way.



More at the ICRP / IRSN seminar, Paris 2012

Thank you for your
attention

More on www.irsnn.fr