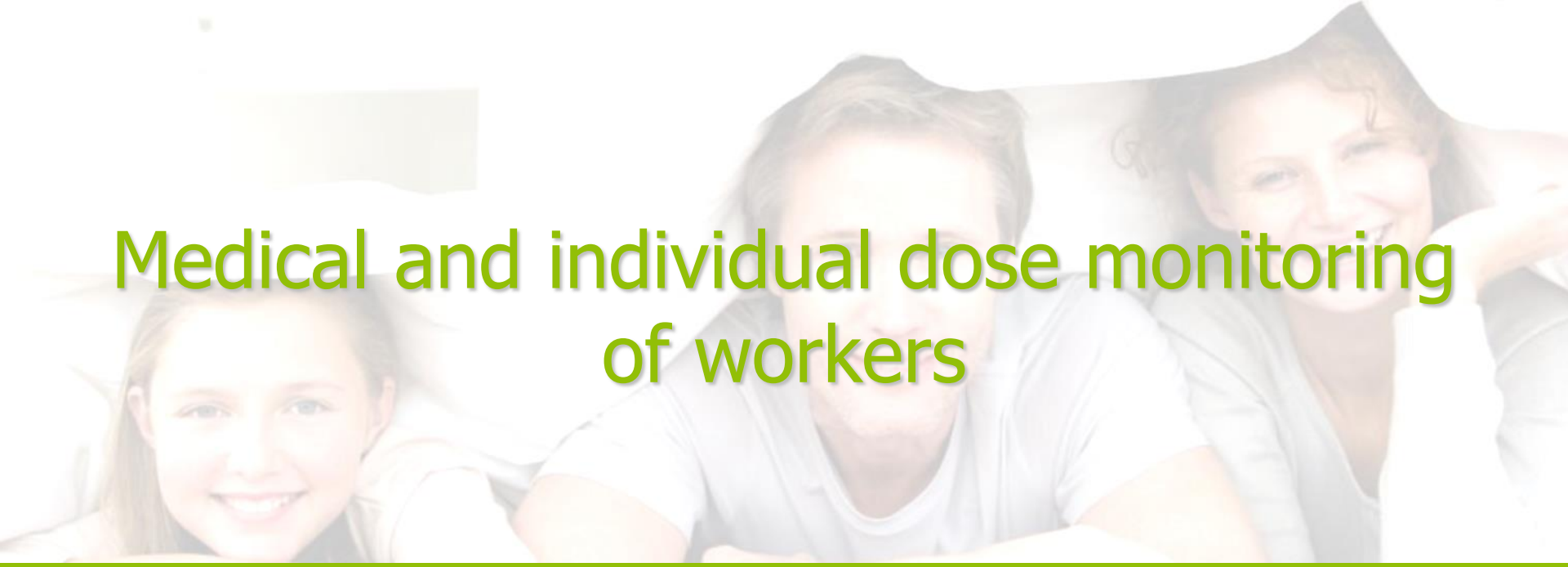

Medical and individual dose monitoring of workers

Sophie Léonard

Health & Environment – Health Protection

FANC AFCN

federaal agentschap voor nucleaire controle
agence fédérale de contrôle nucléaire

www.fanc.fgov.be

Past experience – 1st contacts with radiation protection

- 2001-2005: PhD thesis (VUB): « Spatial resolution Study of PET Detector Modules Based on LSO Crystals and Avalanche Photodiode Array »

  In the context of the development project of PET scanner prototypes:
  - ClearPET for small animals (biomedical & pharmaceutical research)
  - ClearPEM for detection of malignant breast tumors at an early stage

  ⇒ Technological challenge: improvement of spatial resolution and sensitivity with respect to contemporary PET-scanners

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Past experience – 1st contacts with radiation protection

- Familiarization with medical imaging techniques from detector point of view => experience with radiation measurements
- Sensibilisation to ionising radiation risks inherent to some techniques (e.g. compromise between image quality and radiation protection)
- Big interest for scientific/technologic development (in particular in the medical field) but also attentive that this evolution is done in the respect of public/workers health and of the environment => open for job opportunities in this direction
- December 2005: very enthousiastic to join the Health protection section of the FANC!

Health protection Section

RX Applications	Radio-therapy	Nuclear medicine & radiopharmacy	Medical & dosimetric surveillance	Health risk assessment	Inspections	Undertakings & Licenses

Medical sector — Workers — Population

Activities

- Licenses and recognitions
- Inspections
- Incidents and vigilance
- Regulation
- Information et sensibilisation
- Research & development

External collaboration

- Other competent authorities
- Academic/research world
- International organisations/bodies
- Professional associations
- Scientific organisations

Dialogue with stakeholders

- Round tables
- Fairs for professionnals
- Training

Medical and dosimetric surveillance of the workers

About 50 000 occupationally exposed individuals **(risk E ≥ 1mSv/an)** subject via the operators/employers to **medical & dosimetric surveillance** controlled by FANC by means of **granting of recognitions** to:

- Occupational physicians
- Dosimetry services (including the offered types of dosemeters)
- Health physics experts & control bodies

and by the **creation and use of an exposure register**

Medical surveillance

- ≈140 recognized occupational physicians (classes II-III/class I)
- Recognition granted (or extended) on basis of a theoretical (continuous) education and a training (professional activities)
- Maintaining a constructive dialogue with this sector:
  - Clarification/elaboration of criteria for theoritical/continuous education and training (in 2008, now published on the website)
  - Round table 29/05/2009: « Medical & dosimetric surveillance »
  - REX incidents in 2013 :
    - Availability of recognized physicians (classe I!)
    - Up to date knowledge/appropriate reaction
    - Collaboration with the health physics department

Particularly important In case of incident !!!

FANC actions in concertation with Co-Prev/VVIB/ABR: Stimulate creation of WG in the sector and support the offer of continuous education

- ***4/10/2013: « How to respond to incidents? »***
- ***17/10/2014: "How to handle contaminations & internal dosimetry put into practice"***

Dosimetric surveillance

Art 30.6 of the RD 20/07/2001 describes the main modalities of this monitoring:

- Every occupationally exposed individual wears a dosimeter at chest level
- Specific dosimetry in some situations:
  - Double dosimetry (lead apron & E ≥ 6mSv/12csm)
  - Extremities (H_{ext} ≥ 150mSv/year)
  - Lens (H_{lens} ≥ ~~45~~ mSv/year) **6 mSv/y**
  - Direct reading (E ≥ 500µSv/week)
  - If no adequate dosimeter, use another method (ex: low energy β, internal exposure)

- *EXDOS study (Belgium)*
- *ORAMED (European WG)*

Dose & RP studies of medical staff for Complex Interventional Procedures and in Nuclear Medicine

Some provisions need to be further elaborated in collaboration with stakeholders when BSS will be transposed: double dosimetry, background substraction, lens dosimetry, …

→ **Consultation before June 2015**

Recognition of the dosimetry services

- The individual dose monitoring must be based on measurements performed by a recognized dosimetry service
- Recognition criteria for services performing external dosimetry in application since 1/08/2010:
  - Accreditation ISO/IEC 17025
  - Recommendations RP 160
  - Technical requirements for dosimeters (normes IS0/IEC)
  - Participation in periodical intercomparison exercises
- 9 services recognized for external dosimetry
- Recognition criteria for services performing internal dosimetry currently under development (on basis of ISO 20533:2006; ISO 28218:2010; ISO/DIS 27048:2011 and the IDEAS guidelines).

Petra Willems Petra.WILLEMS@FANC.FGOV.BE

Exposure register
Origin & context

Situation in 2007:

- Competence for creation/management of a dose register allocated to FPS Employment
- Reporting process to the authorities by means of paper exposure tables
- Existing register but not very functional
- No system in place to sustain the follow-up of outside workers!!
  - ⇒ Communication between operator & outside undertaking not always optimal!
  - ⇒ Possible gaps/duplicates in exposure register

While European obligation: Euratom 96/29 'Old BSS'+ Euratom 90/641 'Outside workers'!!! ~> new BSS: 2013/59/EURATOM (Art. 41-44 and annex 10)

The FANC and the FPS Employment decide:

- Developing a new more efficient system
- Transfering the mission to the FANC

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Exposure register

Objectives

To ensure radiological protection both to permanent workers and to outside workers in an more efficient way

- Dosimetric surveillance: verifying respect of dose limits
- Tool for ALARA dose optimisation
- Statistics and overviews
- Epidemiologic studies
- Centralized communication and support tool for the sector. E.g:
  - Communication operator/outside undertaking for outside workers
  - Radiological documents for cross-boundary outside workers
  - Dose validation by recognised occupational physicians
  - ...

Stakeholders consultation required!!!

Exposure register –
System for follow up of outside workers

- **Mission in Belgium:** Fully supported by dose register
- **Mission abroad:** Dose register + paper radiation passbook

Fully operational in a later stage

European working group HERCA

"Outside workers and radiation passbook"

- To ensure that permanent/outside workers are treated in the same way
- To harmonise dose passports data content requirements within UE
  - **Passbook model**
  - **Mandatory fields in new BSS**
  - **Guidance** « How to use and implement a radiation passbook »
- To investigate on transition from paper towards electronic system
  - ***Funding for developement promised by EC***
  - ***Future role of our WG : support for business analysis, use cases, workflows, …***

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Exposure register
Progress

- 2007-2008: Business analysis with stakeholders & International benchmarking
- 2009-2010: Pilot version developed, presented to the sector, tested with a small representative group of external users => feedback
- Since April 2010: Annual electronic data transfer by HPD's & ADS to the FANC (voluntary basis) according to FANC format in // to the reporting by exposure tables to the FPS Employment
- December 2010 : Pilot version not strong enough for large data amounts => other technological solution : to build up the register as a module of the future FANC information system => stand-by up to june 2014
- January 2011: Workshop HPD's & ADS: data content/channels
- March 2014: Official replacement of paper reporting by electronic reporting & Publication of the law "exposure register"

Exposure register
Further development

Phase 1: Database with possibilities for statistics & overviews – only accessible to the FANC (external users: on request/periodical reports sent by the FANC)

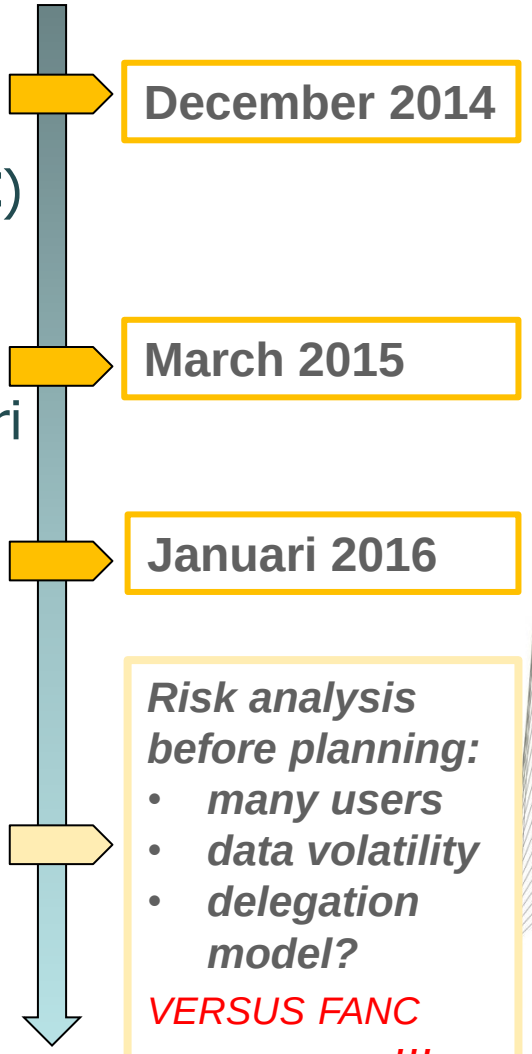
Phase 2: Data upload via 'light' e-portal & regulation

- 1st annual transfer (frequency increases progressively up to monitoring frequency in Januari 2018)
- Royal Decree & FANC Decree: detailed content & technical modalities

Phase 3: Stakeholders consultation of the data + validation by occupational physicians

Phase 4: Functionalities « outside workers »

Phase 5: Other types of radiological data: medical fitness, RP training



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Past challenges

- Signature of the cooperation protocol between the FANC and the FPS Employment to clarify the collaboration & the distribution of the respective roles concerning the protection of the exposed workers (2008)
- Development of the recognition conditions & modalities for external dosimetry services
- Establishment of a constructive dialogue with recognized occupational physicians
- Development and clarification of the recognition conditions & modalities for occupational physicians
- Publication of the basic Legal framework for creation and use of an exposure register by the Agency

Present/continuous challenges

- To keep aware of the scientific/technological/normative evolution in order to fulfill our mission in line with current reality.
- To adapt regulation according to the new BSS before January 2018
- To consult the stakeholders (Occupatiobal physicians, HPS & ADS) for developing legal provisions regarding individual dose monitoring taking also new BSS requirements into account by June 2015
- To finalize the development of the recognition conditions & modalities for internal dosimetry services
- To elaborate an exposure register with functionalities for analysis and for periodical upload by providers & to finalize the legislative framework
- To support the offer in continuous education for recognized occupational physicians by organising annual continuous education activities

Future challenges

- Opening of exposure register and its functionalities to external users
- Implementation of functionnalities for the follow-up of outside workers
- Realization of statistical studies of occupational dose that will allow:
  - To get additional information to guide inspections
  - To identify more sensitive/critical groups and to initiate actions (sensibilisation, training, …) towards these groups
  - To publish official reports
- Extension of the exposure register to other type of radiological data (medical fitness and RP education of workers) for a more comprehensive radiological follow-up of workers
- Contribution to the elaboration of a European electronic exchange platform for radiological data of workers

Q&A

Sophie Leonard

Sophie.LEONARD@FANC.FGOV.BE

Veasy