The Canadian National Dose Registry and Its Contribution to Occupational Radiation Protection

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Prepared for the International Conference on Occupational Radiation Protection: Enhancing the Protection of Workers – Gaps, Challenges and Developments
Outline

- National Dose Registry (NDR) Background information
- The history of the NDR
- Data Collection
- Snapshot of current NDR operations
- Discussion
- Conclusion
Background Information on National Dose Registry

Health Canada (HC) - Federal department responsible for helping Canadians maintain and improve their health

Radiation Protection Bureau (RPB) - Promotes and protects the health of Canadians by assessing and managing risks posed by radiation exposure in living, working and recreational environments

The Canadian NDR operates within the RPB to support the mandate of HC and Regulatory Authorities to protect workers exposed to occupational radiation

Key Functions

• Maintain individual and cumulative dose records for workers
• Provide dose histories to workers, employers for work planning, and to Workers Compensation Board(s) across Canada for compensation and litigation cases
• Assist Regulatory Authorities by notifying them of overexposures within their jurisdiction
• Contribute to health research and to the scientific knowledge of risks from occupational exposure to ionizing radiation
Historical Highlights of the National Dose Registry

• 1951 - HC’s National Dosimetry Service (NDS) began to monitor workers exposed to ionizing radiation. At that time there were two other organisations performing dosimetry services in Canada.

• mid-1970s – NDR is created within NDS and begins to collect dose records in a database, from NDS and other dosimetry providers.

• mid-1980s - all existing Canadian nuclear power stations, Atomic Energy Canada Limited (AECL), and Canadian uranium mines were submitting records to the NDR.

• mid-1990s - the first commercial DSP (Landauer) began submitting records to the NDR.

• 2000 – the Radiation Protection Regulations came into effect and submitting dose records to the NDR became a requirement for licensed DSPs.

• 2009 - the NDR dissociated from the NDS.
The NDR operates independently from DSPs and Authorities who regulate occupational exposure to ionizing radiation.

In Canada occupational exposure to ionizing radiation is regulated:

- at the federal level for Nuclear Energy Workers (NEWs) or non-NEWs when the employer is the federal government;
- by the provinces and territories (13) in all other cases.

To support harmonization of practices for dose reporting and management of different exposure limits, the NDR is:

- a regular participant in the Federal Provincial Territorial Radiation Protection Committee (FPTRPC), which includes regulatory authorities from all jurisdictions;
- an active member of the associated Radiation Dosimetry Working Group.
Data Collection (continued)

Canadian Occupational Radiation Exposure – Dose information reporting to NDR

Federal, Provincial & Territorial

Regulatory Authority (RA)

Federal (CNSC)

Not Mandatory to use a CNSC licensed DSP (except Alberta)

Licensee

Mandatory to use a CNSC licensed DSP

Licensee

Non Nuclear Energy Employer (Non NEE)
Employer from Federal, Provincial or Territorial jurisdiction that monitor occupational exposure to radiation from X-rays equipment

Dosimetry Service Providers (Processors) (external or in house)

Technical and Quality Assurance Requirements for Dosimetry Services (C-0030-00)

Not Mandatory to report dose to NDR (except Alberta & Saskatchewan)

Mandatory to report dose to NDR

Making Changes to Dose-Related Information Filed with the National Dose Registry (B-240)

Nuclear Energy Employer (NEE)
Employer from Federal jurisdiction that monitor occupational exposure to radiation from nuclear reactions and radioactive decay material

Health Canada National Dose Registry (NDR)

Nuclear Energy Workers (NEW)

Fig. 1

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Legislation requires DSPs to submit data to NDR in a compatible format.

For quality assurance, the NDR facilitates the incorporation of records in the database by providing the DSPs with:

- documentation, including the Input File Specification that explains exactly how data should be submitted
- hands-on training to help reduce the number of rejects
- constant support while processing the records

Dose records in the NDR are associated with a worker according to a unique employee profile, including the Social Insurance Number (a unique nine digit Code required to work in Canada), name, gender, date of birth and birth place.

Dose Records Information includes type of dose, dose quantities, dosimeter number, monitoring period, job class, and process date, among other details.
NDR has a total of 112 job classes in 21 job categories as presented in Fig.2.

Job class is a particularly important field for extracting and compiling data for research.

Podiatrist is the latest job class created in the registry, in 2014.
The NDR contains information on 869,735 workers and 35,232 employers, with approximately 160,000 workers monitored in 2013.

Each year, 1.25 million dose records are processed and incorporated into the database via an average of 900 batches per year.

Close to 7,000 Dose History Summaries are processed annually by NDR.

Every time a new record is entered for an individual worker, their accumulated dose for the current regulatory period is calculated and compared against the appropriate limit.

- if it exceeds the limit, a High Exposure Notification is automatically generated and immediately transmitted to the appropriate Regulatory Authority for follow-up.

- on average fewer than 20 High Exposure Notifications are triggered every year.

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NDR data is also used for research by internal and external clients.

The database structure and required fields enables researchers to quickly compile data sets to evaluate dose trends over a variety of parameters, including specified workplace(s) and/or job categories.

For example, the analysis of average annual doses among Canadian radiological technologists for the past two decades, based on data from the National Dose Registry of Canada, is shown on the next slide.
Snapshot of current NDR operations (continued)

Changes of average annual doses over 20 years:
- Canada: +58%
- BC: +75%; ON: +96%; NB: +121%; NS: +135%

Average annual effective dose for job class: radiological technologist
Current situation

• Over past years HC has modernized the NDR in order to adopt new technologies and remain current with legislative requirements and client demands

• NDR System Upgrade v 3.0 was released at the end of August 2014 and the registry is supporting the DSPs during transition

• Effort has gone into ensuring that personal information in the NDR is protected and secure, and that protocols conform to relevant Canadian privacy legislation

• Work is underway to develop and implement secure mechanisms to allow access to DSPs (to upload data) and Regulatory Authorities (to query the database)

• Agreements have been formalized and safeguards put in place to ensure that disclosure of information is in conformance with privacy regulations

• NDR recently leveraged the FPTRPC to successfully negotiate a protocol for submitting dose change requests that has been adopted by all jurisdictions
Challenges

• Access to the database is restricted to NDR staff due to constraints imposed by privacy requirements
  ➢ NDR staff are required to monitor and upload batches on behalf of DSPs, and to provide reports back to DSPs

• Requirements for dose monitoring are more prescriptive for Nuclear Energy Workers (NEW) who could receive an effective dose greater than 5 mSv/year than for other workers

• Historical records, where key information is missing, can be difficult to import into the database

• Collecting data and reporting on High Exposure Notifications, given that practices for reporting doses and maximum exposure limits can differ between jurisdictions
Plans for the future

- Develop protocols for registering new types of radiation exposures, including doses received by Canadians outside of Canada and doses received by emergency workers responding during a nuclear emergency.
- Investigate if low-or zero-doses are under-reported in some job classes.
- Improve the ability to address research questions by identifying and updating the registry with emerging job titles/classes, new occupations and new applications for radioactive materials in the workplace.
- Modernise NDR reporting to the public (annual or bi-annual reports).
The Canadian National Dose Registry operates within the Radiation Protection Bureau to support Health Canada and the Regulatory Authorities in their mandate to protect workers exposed to occupational radiation.

The registry continues to evolve in response to technological, legislative and operational challenges, and to play an essential role in protecting the health and safety of Canadian workers.

THANK YOU
Environmental and Workplace Health

National Dose Registry

The National Dose Registry (NDR) contains the dose records of individuals who are monitored for occupational exposures to ionizing radiation. The NDR started collecting data from 1951 and now has records for over half a million workers, including well over 100,000 current employees. The database covers a wide range of industries and the radiation hazards associated with each.