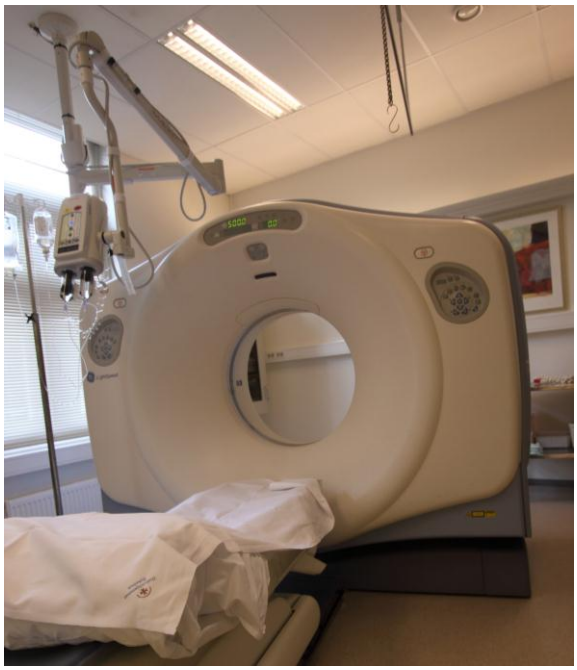
Statens strålevern
Norwegian Radiation Protection Authority

NRPABulletin 16•12

# Data collection and dose reconstruction in paediatric CT

**The Cancer Registry of Norway (CRN) and the Norwegian Radiation Protection Authority (NRPA) are partners in a multinational epidemiological survey aimed to quantify the risks related to computed tomography (CT) examinations during childhood. A Norwegian cohort of 35000 children is established so far (CRN); the first installation of software for dose reconstruction based on PACS data is being tested in hospitals in mid Norway (NRPA). This bulletin summarises the status and plans for data collection in Norway, and two approaches to reconstruct information about radiation doses from information in RIS and PACS.**

*The EU project EPI-CT (http://epi-ct.iarc.fr/) involves 11 institutions from 18 countries and aim to establish a cohort of more than 1 mill children that underwent CTs during childhood (0 – 20 year) including individual dose estimates.*

## RIS data collection – establishment of cohort

The Cancer Registry of Norway (CRN) is responsible for the RIS queries in the EPI-CT study. Target group are all patients in the age group 0-20 years that have undergone a CT examination, and all hospitals were invited to participate in 2011. Currently the cohort is made up of about 35000 children, and all four health regions in Norway are represented. We still anticipate data from three big pediatric departments situated at Oslo University Hospital and Haukeland University Hospital, and urge all who have data to join the project. The RIS queries will be finalised by the CRN at the end of 2012.

## Data flow in EPI-CT

The program PerMos (Partner Henry Tudor, Luxembourg) uses patient IDs from the RIS queries to collect individual scan protocols from the hospitals' PACS and calculate organ doses automatically. The Norwegian Radiation Protection Authority (NRPA) facilitates the installations of PerMos in close collaboration with the RIS/PACS administrators locally, and ensures the quality of data. CRN manages a database with identifying info, selected DICOM header parameters from the PACS, patient doses, the patient's health status, confounders, etc. The central PerMoS database in Luxembourg will contain all the CT examinations, but no personal information. The International Agency for Research on Cancer (IARC), Lyon, manages the epidemiological database. Finally, the

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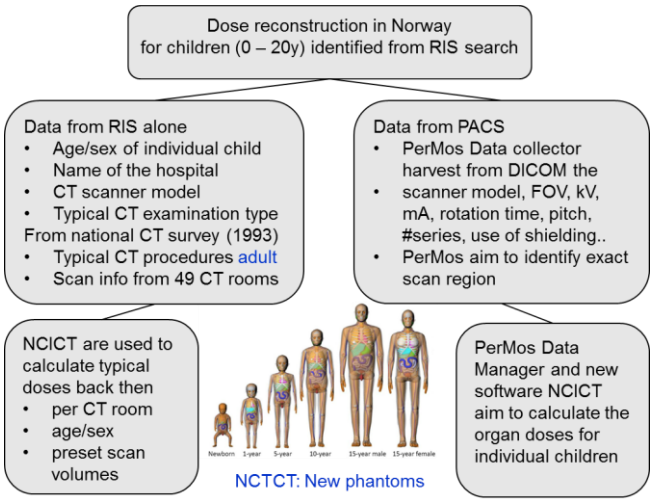
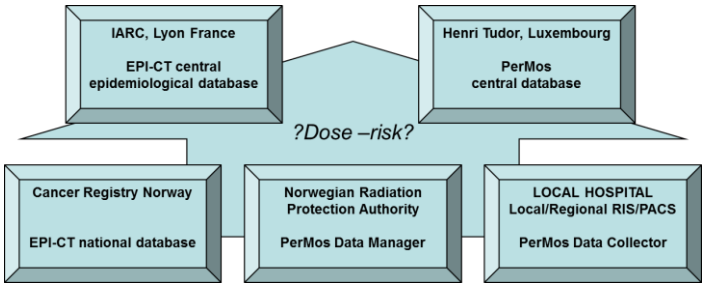
de-identified Norwegian data will be combined with the data from all other European participant countries for epidemiological analysis.

## Protocol for dose reconstruction

The Norwegian cohort currently includes CT examinations dating back to 1980, i.e. long before the introduction of PACS. Based on data from RIS alone we may however reconstruct typical dose values based on a national CT survey carried out in 1993. For the dose estimations our current hypothesises is that the hospitals used the same scan parameters for children as they did for adults. The new software NCICT (National Cancer Institute, NIH, DHHS Rockville MD 20852 leechoonsik@mail.nih.gov) is used in the calculations, which otherwise make an integrated part of PerMos Data Manager.




*Two scenarios for dose reconstructions in Norway*



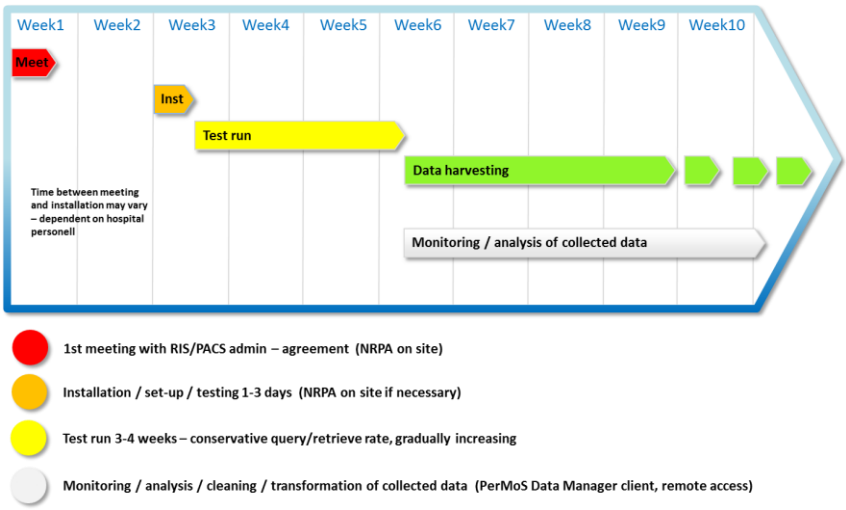

*The central actors in the data flow from PACS harvesting in Norway with the PerMoS software*

## Plan for PerMos installations 2012/13

When PACS data are available the PerMos software makes more accurate dose estimates feasible. The PerMos Data Collector will be installed locally during 2012/13. The first installation is currently being tested in the Trondheim region; we anticipate the Kristiansand region to be the next.

Many steps and actions are made to ensure confidentiality and data security in the EPI-CT project; the project and data collection methods have received ethical approval in Norway. To achieve the EPI-CT aims we still need goodwill from the RIS/PACS administrators and the radiological departments. The time needed to harvest relevant data will be dependent on local circumstances, in humble recognition of the clinical needs in the radiological departments.

*The EPI-CT project is a significant joint effort to increase the knowledge about possible risks related to doses in diagnostic imaging, with special relevance to paediatric radiology.*




*Typical timeline for PerMos Data Collector deployment*