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PhD in Medical Sciences
2018-2019

INVITATION to the Public defence of

Caroline ERNST

To obtain the academic degree of '**DOCTOR IN MEDICAL SCIENCES**'

Dedicated lowered dose protocols in pediatric radiology.

Monday 05 November 2018

Auditorium **Piet Brouwer**, 17:00
Faculty of Medicine and Pharmacy, Laarbeeklaan 103, 1090 Brussel

How to reach the campus Jette:

<http://www.vub.ac.be/english/infoabout/campuses>

Summary of the dissertation

Diagnostic radiological imaging is an indispensable tool in medical practice for an adequate diagnosis of pathological processes and for the planning and execution of the treatment of patients. Because children are more sensitive to the effects of radiation than adults, young patients must receive the necessary protection against this ionizing radiation.

The aim of this work was to develop dedicated low dose protocols for both CT and RX examinations and this without loss of the diagnostic quality of these studies.

In a first project, an ultra low dose chest CT protocol was evaluated on the basis of image quality in pediatric Cystic Fibrosis patients. We found that a specific CT thorax protocol can replace the biennial follow-up chest X-ray without a major dose penalty and with a diagnostic quality similar to that of a conventional chest CT. A similar study was conducted in the second project, where an ultra low dose head CT protocol was evaluated in patients with suspected craniosynostosis. We concluded that with a dose reduction of 97% the diagnostic image quality for craniosynostosis was comparable, and sometimes even superior, compared to a conventional head CT. For our third project we evaluated the image quality of a reduced dose full-spine X-ray exam performed in pediatric patients with idiopathic scoliosis. As in the previous studies, we also concluded that a dedicated reduced dose protocol can replace the standard protocol without loss of diagnostic image quality.

The results obtained in this thesis show that specific low dose protocols can be developed in pediatric radiology so that, depending on the indication, the radiation dose can be significantly reduced without sacrificing the image quality.

Curriculum Vitae

Caroline Ernst was born on November 11th 1968 in Brussels. After finishing her secondary school in Mathematics at the Konininklijk Atheneum in Zaventem, she started her medical studies in 1986 at the Vrije Universiteit Brussel. She graduated as 'Dokter in de genees-, heel- en verloskunde' at the VUB in 1994. Afterwards she started her specialization in Radiology at the AZ-VUB, the current UZ Brussel, under supervision of Prof. Dr. Michel Osteaux and graduated as a radiologist in June 1999. During this period she worked at the Algemeen Ziekenhuis Vesalius in Tongeren and the AZ-VUB in Jette. After her graduation as a radiologist she became a staff member at the Pediatric Radiology Department at the UZ Brussel where she still works at this time. It was here that her interest for radioprotection arose, in 2010 she started combining clinical work with research focusing on optimizing X-ray and CT protocols for pediatric imaging.

In September 2014 she enrolled for her PhD under the supervision of Prof. Dr. Johan de Mey and Prof. Dr. Nico Buls.

She lives in Zaventem and is the proud mother of Jérémy and Emilie.