KURSBESKRIVNING

1. Utbildningens titel

CT optimization course
Kurs arrangerad av NACP 2019

2. Typ av utbildning

CPD/ST-kurs

3. Ämnesområde

Medical radiation physics, diagnostic radiology, CT Optimization, Image quality, Radiation Safety

4. Kort sammanfattning av utbildningen

The aim of this course is to give medical physicists the tools that are needed to be able to be responsible for and lead the optimization process in an X-ray department. Therefore, it will discuss technical developments during the years and how the technical parameters are used in a proper way, It will discuss different approaches of the optimization process, and give tools for estimating image quality and radiation dose.

5. Målgrupp

Mainly Medical Physicists from the Nordic countries, but we also welcome other nationalities or clinicians, radiographers and other interested professions to join.

6. Behovsbeskrivning

Computed tomography is a very important modality in diagnostic radiology, and the technical development is going fast. Computed tomography is the main source for patient radiation doses from diagnostic x-rays. The optimization process is therefore important in CT, and the medical physicist has a main role in this work. The aim of this course is to give the tools that are needed to be able to be responsible for and lead the optimization process in an X-ray department.

7. Utbildningsmål

Knowledge and understanding

- Understand the development of CT technology over the years
- Understand how DICOM data can be used to extract patient doses (structured dose reports, DICOM metadata)
- Understand how tube current modulation depends on patient thickness and centring in the gantry.
- Understand which parameters are most important in optimizing paediatric examinations
- Understand advantages and limitations in using phantoms in CT optimization
- Understand how metal artifacts can be reduced and how different vendors have solved the problem

- Understand how iterative reconstruction algorithms are used and influence image quality: advantages and pitfalls
- Understand how different dual-energy techniques work and can be used to increase image information: advantages and pitfalls in a clinical practise
- Understand which parameters are important in optimizing metal implants, cardiac examinations as well as in optimizing paediatric examinations and examinations of young adults,
- Understand how Monte Carlo methods can be used to calculate patient doses
- Understand how post-mortem scanning can be used in CT optimization
- Understand how software can be used for dose measurements in connection with CT optimization
- Understand how model observers can be used for quality control and CT optimization
- Understand how model observers can be used to detect changes in CT protocols
- Understand what will be important for future work of CT optimization

Competence and skills

- To summarize the specific challenges when optimizing protocols for cardiac CT, metal implants, paediatrics and examinations of young adults
- To identify patient specific factors in the optimization process and how to handle them
- To identify differences in organ doses using available tools: DICOM meta data, Monte Carlo simulation of dose distributions, available software
- To have insight into how model observers can be used for or quality assurance (detection of changes in CT protocols) and optimization

Judgement and approach

- To judge and value advantages and limitations of using phantoms in CT optimization
- To judge and value advantages and limitations in dual- energy and iterative reconstruction algorithms depending on vendor specific differences
- To judge and value how model observers can be used for optimization, advantages and limitations in current models
- To judge and value how technique factors, patient anatomy and patient centering influence algorithms for image quality and patient dose in relation to reduction of image artefacts and tube current modulation
- To judge and value different aspects of using post-mortem scanning in optimization

8. Program

SCHEMA

Onsdag 3 april

Registration from the onsite Secretariat desk	08.30-09.00
Introduction: Purpose of the course (AÖ)	09.00-09.10
Practical information on course activities (DA)	09.10-09.15
CT-technology- from the beginning to this day (MK)	09.15-09.45

The physicists role in CT optimization (ATK)	09.45-10.15
What can be gathered from Radiation Dose Structured Reports (H-EK)	10.15-10.45
Coffee break in the exhibition area	10.45-11.15
Advantages and limitations of image quality phantoms in CT optimization (XX)	11.15-12.15
Discussion	12.15-12.30
Lunch break and exhibition	12.30-14.00
Experiences with metal artifact reduction algorithms from different CT vendors (KB)	14.00-14.30
Optimization of cardiac protocols (TK)	14.30-15.00
Vendor presentations of new CT technology –scanners/software/algorithms	15.00-16.30
Panel discussion with vendors about optimization	16.30-17.00
Transportation to hospital	17.00
Practical training (optional)- Exhibition and case studies for protocol optimization at Haukeland University Hospital	17.30-18.30

Torsdag 4 april

Monte Carlo simulation of dose distribution from CT scans- example with an open-source tool (EA)	08.30-09.00
The importance of proper patient centering in CT (TK)	09.00-09.30
How does patient thickness affect tube current modulation and image quality (ID)	09.30-10.00
Impact of scan settings on automatic tube current modulation using a novel phantom (RB)	10.00-10.45
Coffee break in the exhibition area	10.45-11.15
Image quality assessment of iterative reconstruction: pitfalls and future directions (ES)	11.15-12.15
Discussion	12.15-12.30
Lunch and exhibition	12.30-14.00
Estimation of radiation dose and image quality in pediatric and young adult CT studies (HN)	14.00-14.30
Working with dual-energy CT protocols-tips for optimization (PN)	14.30-15.00
When is dual-energy CT really useful? Reflections from a radiologist (PMK)	15.00-15.30
Discussion	15.30-
Evening cruise and dinner at the Cornelius Seafood Island Restaurant	19.00-23.00

Fredag 5 april

CT optimization using post mortem scanning-methods and possibilities (HP)	08.30-09.00
The role of dose monitoring software in CT optimization (AK)	0.900-09.30
Development of software for detecting changes in CT protocols- -a tool for optimization (RB)	09.30-10.00
Discussion and coffee break	10.00-10.30
Model observers in CT optimization (FV)	10.30-11.30
Model observers applied to quality control in computed tomography (IHG)	11.30-12.00
CT optimization in the future (MK)	12.00-12.45
Discussion and summary	12.45- 13.00

Course Exam (optional) + Lunch to-go	13.00
End of course	13.30

Lecturers:

ES- Ehsan Samei USA PhD, Professor
MK- Mika Kortesniemi Finland PhD, medical physicist
ATK- Anne Thilander Klang Sweden PhD, docent, medical physicist, specialist, universitetssjukhusöverförstesjukhusfysiker, Sahlgrenska university hospital
H-EK- Hans-Erik Källman Sweden PhD, medical physicist, specialist, Landstinget Dalarna
RB- Robert Bujila Sweden M.Sc., medical physicist, specialist, Karolinska University Hospital
PN- Patrik Nowik Sweden M.Sc., medical physicist, Karolinska University Hospital
ID- Ingvild Dalehaug Norway M.Sc., medical physicist
KB- Kirsten Bolstad Norway M.Sc., medical physicist
FV- Francis Verdun Switzerland PhD, medical physicist
HP- Helle Precht Denmark PhD, radiographer
TK- Touko Kaasalainen Finland PhD, medical physicist
EA- Erlend Andersen Norway M.Sc., medical physicist
PMK Per Martin Kristoffersen Norway Radiologist
AK- Antti Kotiaho Finland M.Sc., physicist

9. Metodik

Pedagogisk metod
Presentations, discussions, Practical exercise and examination.

Utbildningsmaterial
The presentations will be published online

Rekommenderade förberedelser
Have a look on the webpage for this information.

Kontroll av förvärvad kunskap och kompetens
Every speaker supplies two multiple response questions related to their talk, and an examination will be hold in the end of the course. The exam is pass/fail where 50% of the questions must be answered correctly. For ST physicists from Sweden examination is performed as stated below.

10. Uppföljning

Stöd för att föra kunskapen vidare på hemmaplan
It is a requirement for Swedish ST course participants (ST physicists) to have an oral presentation in their home hospitals in agreement with their tutors. Certificate about approved ST course according to a proved pattern see www.sjukhusfysiker.se/CPD&Specialist is sent to Kursrådet: kursradet@sjukhusfysiker.se Also see point 9 ”Kontroll av förvärvad kunskap och kompetens”

11. Utvärdering

Lipus method for course evaluation will be used; see **http://sjukhusfysiker.se/cpd-specialist/specialist/dokument**

12. Formalia

Startdatum

2019-04-03 at 08.30

Slutdatum

2019-04-05 at 13.00

Andra tidsuppgifter

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Kursort och plats

Bergen, Norway at Grand Hotel Terminus

Sista anmälningsdag

First stop: 2019-02-15

Avgift

Early registration (before February 15th 2019) NOK 8,000.- including 25% VAT
Late registration (after February 15th 2019) NOK 9000.- including 25% VAT

Resa, kost och logi

The conference fee includes all coffee breaks, lunches, scientific program on April 3, 4 and 5 and the conference dinner on April 4.

Travel, salary and accommodation during the course is payed by the participants or their employer.

Antal deltagare

70-140

Språk

English

Utskick av programinformation och förberedande uppgift inför kursstart

On the webpage: http://eventsforce.net/nacp

Krav för godkänd utbildning

Närvaro vid samtliga utbildningsmoment samt godkänd kunskapskontroll (ST-kursdeltagare).
Intyg om genomförd specialistkurs för ST-fysiker registreras enligt punkt 10 ovan.

Kursintyg utfärdas av kursansvarig och utdelas efter utbildnings slut.
Kursen tilldelas 14 ST poäng
Kursen tilldelas i det svenska meritsystemet
17 CPD poäng, 34 CPD poäng (vid godkänd kunskapskontroll)
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Kursintyg
Kursintyg utfärdas av kursansvarig och utdelas efter utbildnings slut.

Kontaktperson för deltagare

*Local committee**:***

- Daniel Aadnevik (daniel.aadnevik@helse-bergen.no)
- Kirsten Bolstad (kirsten.hansine.helene.nygaard.bolstad@helse-bergen.no)

*Scientific committee**:***

- Daniel Aadnevik (daniel.aadnevik@helse-bergen.no) [Norway]
- Andreas Österlund (andreas.osterlund@ltdalarna.se) [Sweden]
- Ahmed Abdi Jibril (ahmed.abdi@rsyd.dk) [Denmark]
- Joanna Sierpowska (joanna.sierpowska@siunsote.fi) [Finland]
- Jenu Saana (saana.jenu@hus.fi) [Finland]

Övrig info
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Webbsida
https://www.eventsforce.net/nacp

13. Antagning

Antagningsförfarande
Online registration

Antagningsbesked
Confirmation email when the minimum of participants is reached

14. Koppling till andra utbildningar

Serie där utbildningen ingår
NACP-RPC courses are arranged once a year, with the aim to share relevant knowledge and tools between medical physicists in the Nordic countries

Fortsättning på utbildningen
No continuation of the course is planned. NACP-RPC will organise courses yearly with different hot topics in the radiological physics field.

15. Utbildningsansvariga

Initiativtagare
NACP-RPC

Teoretiskt innehåll
Scientific committee, planning the scientific program

- Daniel Aadnevik (daniel.aadnevik@helse-bergen.no) [Norway]
- Andreas Österlund (andreas.osterlund@ltdalarna.se) [Sweden]
- Ahmed Abdi Jibril (ahmed.abdi@rsyd.dk) [Denmark]
- Joanna Sierpowska (joanna.sierpowska@siunsote.fi) [Finland]
- Jenu Saana (saana.jenu@hus.fi) [Finland]

The lecturers are responsible for the content of their lectures

Övergripande kursansvar
NACP-RPC

Praktiskt genomförande och kursadministration
Local committee, planning organization and administration

- Daniel Aadnevik (daniel.aadnevik@helse-bergen.no)
- Kirsten Bolstad (kirsten.hansine.helene.nygaard.bolstad@helse-bergen.no)

Samarbetspartners
Some vendors in the field will be invited to have short presentations, probably Canon, Philips, Siemens, GE.

Representant för målgruppen

For the Swedish ST physicists:
Michael Sandborg, PhD, professor of Medical radiation physics, specialist, förste sjukhusfysiker universitetssjukhuset i Linköping

16. Finansiering

Aktörer som ställer resurser till förfogande för utbildningens genomförande
The costs for the course will be covered by the fees from the participants and the sponsors.

Kringarrangemang och deras finansiering

Sponsorers närvaro
Yes, but not confirmed yet