



## **Societas physicomédica erlangensis**



gegründet 1808

**Vorstand:**  
Prof. Dr. med. C. Bogdan  
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### **Die Physikalisch-Medizinische Sozietät Erlangen**

lädt Sie zu folgendem Vortrag ein:

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#### **CTDI and Patient Dose: A European Perspective**

**Prof. Dr. Dr. h. c. mult. Willi A. Kalender, PhD**

Institut für Medizinische Physik  
Friedrich-Alexander-Universität Erlangen-Nürnberg

Der Vortrag beleuchtet die aktuelle Diskussion zu Scanner- und Patientendosimetrie in der Computertomographie und präsentiert alte und eigene neue Konzepte.

Der Vortragende wurde zu diesem Thema zur Jahrestagung der American Association of Physicists in Medicine (AAPM) in Charlotte, NC, USA eingeladen - s. angehängtes Abstrakt. Er würde sich freuen, wenn diese international kontrovers diskutierte Thematik auch in Erlangen Interesse findet.

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**Mittwoch, 11. Juli 2012, 16.15 Uhr**

**Veranstaltungsort:**

Hörsaal ZMPT  
Henkestr. 91, Erlangen

Wir freuen uns auf Ihr Kommen!

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Für Rückfragen wenden Sie sich bitte an:

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## Program Information

- [Computed Tomography 5 CTDI and Patient Dose: A European Perspective](#)
- [All Imaging Educational Course](#)
- [All Sessions](#)
- [Program Home](#)

### CTDI and Patient Dose: A European Perspective

W Kalender\*, University Of ErlangenErlangen

TU-D-217A-1 Tuesday 11:30:00 AM - 12:30:00 PM Room: 217A

Dose in CT has been a dominant topic in Medical Physics for at least a decade. This was for good reason since increasing use of CT necessarily led to an increase of cumulative dose to the population and inappropriate use of CT in some cases led to an unnecessarily high exposure of patients with subsequent coverage in the U.S. media. Fortunately, this situation also triggered a number of positive technical developments and fruitful initiatives worldwide. Currently, even "sub-mSv CT" is a realistic topic.

However, we also engage in extensive discussions of the topic "CTDI and patient dose". They do not always seem to be pragmatic and sometimes are unnecessarily complicated. One reason may be that the topics computed tomography dose index (CTDI) and patient dose are seen necessarily combined. This lecture aims at discussing and hopefully helping to resolve some of the issues. Key points and suggestions are the following:

- CTDI is a proven and reasonably good concept for scanner dosimetry and quality control (QC) on standard 64-row scanners. There is no major debate on CTDI efficiency and similar issues in Europe.
- The new IEC scanner dosimetry concept to be used for wider detectors is acceptable; there is no need for new and heavy phantoms.
- There still is a need of phantoms and concepts for QC of automated exposure control systems in CT.
- CTDI should not and need not be changed and expanded to assess patient dose.
- Patient dose estimates (both organ and effective dose) are based on air kerma measurements (without a CTDI phantom) and MC calculations using mathematical phantoms and/or voxel models. The DLP-to-E conversion which is accepted in Europe for more than a decade was based on this approach.
- Patient dose estimates, both organ and effective dose, should be scanner- and patient-specific. Fast MC programs and dose software allow for this. Manufacturer cooperation is a necessity, and there are first positive examples.
- The concept of diagnostic reference levels (DRL) which was started in Europe in the 1990s and is in wide use today has to be revisited. It need not be based on CTDI further on but, for example, on a revised scanner- and patient-specific DLP-to-E conversion.
- An international consensus on the topics CTDI and patient dose appears desirable.

All these points do not mean a revolution but rather aim at staying with established equipment. The two major objectives are to

- avoid unnecessary QC burden of medical physicists who are threatened with extended CTDI measurements
- provide more reliable and understandable information regarding patient dose in real time. Organ dose and effective dose are preferable to DLP.

Learning objectives:

- Understand that CTDI is a technical concept for scanner acceptance and constancy testing
- Learn about concepts for patient- and scanner-specific patient dose estimates
- Learn about the concept of diagnostic reference levels and its strengths and weaknesses

Research sponsored by Siemens Healthcare and by CT Imaging GmbH, both in Erlangen, Germany

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