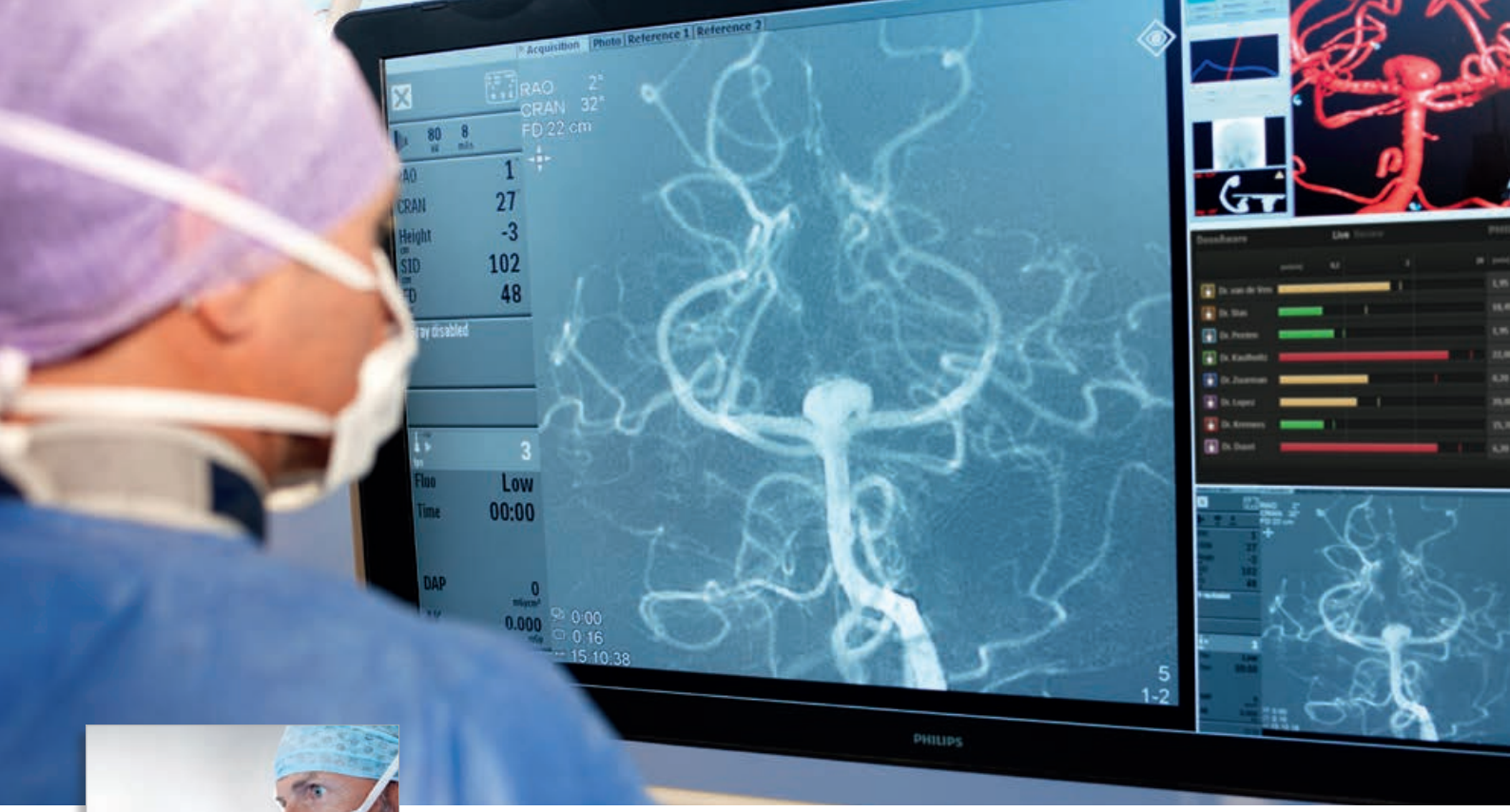


Making the difference where it really matters

With the Philips DoseAware family

Real-time dose feedback to increase radiation awareness and promote healthy working practices. Together we make the difference in minimally invasive treatment to improve patient outcomes and save lives. With our DoseAware family of real-time staff dose feedback tools, we aim to remove barriers to a healthy working environment, delivering relevant value where it's needed most – at the point of (patient) treatment.

Key benefits

- Removes barriers to a healthy working environment
- Empowers staff to manage their personal X-ray dose exposure
- Gives staff real-time feedback
- Provides procedure-based data for deeper insight into staff exposure trends and behaviors

PHILIPS

"DoseAware is one of the most important new tools available to help manage occupational medical radiation exposure to physicians and staff. It's a much easier and practical way to monitor levels than conventional methods. Creating a better work environment is not only the right thing to do but our obligation."

J. Kiah, MS, RN, Lab Manager,
Director Cardiac and Vascular Services
Baptist Cardiac & Vascular Institute, Miami, USA

Staff can act immediately upon real-time dose feedback

The number of minimally invasive interventions supported by live fluoroscopy image guidance has increased significantly over the past two decades. The benefits that these procedures offer to patients are well-documented. However, long fluoroscopy-guided procedures can lead to relatively high X-ray doses to medical staff who are mainly exposed to radiation scattered by the patient. Finding ways to more effectively manage radiation exposure is a growing concern for medical practitioners and hospital management.

Currently, different kinds of dose measuring instruments are used to measure the amount of radiation exposure received by medical staff in the interventional room. A thermoluminescent dosimeter (TLD) measures the cumulative amount of exposure received by an individual, usually over a one to three month measuring period. Since this data are only processed after the measuring period, medical staff cannot use this information to correct their behavior in daily practice.

Instant information about X-ray dose levels

Philips DoseAware family addresses this issue with real-time dose feedback tools for the interventional suite that make it easy for medical staff to monitor and track their radiation exposure during their shift. The information that DoseAware provides during and after procedures is designed to increase radiation awareness for people who work in X-ray environments and to promote healthy working practices. DoseAware is part of our Live Image Guidance solutions, which aim to protect patients and clinical staff in X-ray environments.

The Personal Dose Meters (PDM) used by DoseAware and DoseAware Xtend do not replace the TLD as a legal dose meter. They are designed to complement TLDs by giving detailed real-time information to staff about exposure levels, so they can change their behaviors, if needed. TLDs measure accumulated X-ray dose exposure for a period of time, but do not provide procedure-based data, include a time stamp, or indicate where and when the X-ray dose was acquired.

DoseAware for real-time feedback

DoseAware is the first personal dose measuring system to measure and display an individual's exposure to radiation in real time. It gives staff immediate feedback on their level of scattered X-ray exposure and how their behavior affects it. The information provided by DoseAware helps staff track when and where dose was acquired, so they can take appropriate action during a procedure or work shift, if required.

DoseAware Xtend for detailed procedure-based feedback

DoseAware Xtend makes real-time dose measurement even more precise and useful in a single display. It gives immediate feedback on scattered X-ray dose per procedure to help staff continually learn and improve their behavior. DoseAware Xtend also reminds staff to better protect themselves at certain moments during a procedure, and provides other useful information to help them easily identify trends in their exposure levels.

DoseAware Xtend – dedicated room solution

DoseAware Xtend is a new dedicated solution for a treatment room that is integrated with the Allura FlexVision XL display and Allura X-ray systems. This integration allows DoseAware Xtend to provide more detailed feedback per procedure on scattered X-ray dose levels. It makes DoseAware more flexible, since you can place its screen anywhere on the FlexVision XL display. This is another example of the intuitive integration in our Live Image Guidance solution.

Dose screen in FlexVision XL

The DoseAware Xtend screen appears in FlexVision XL, so no separate dose screen is required. The screen automatically puts people on and takes them off as they enter and leave the room. It can be placed anywhere in the FlexVision XL display or be hidden as needed.

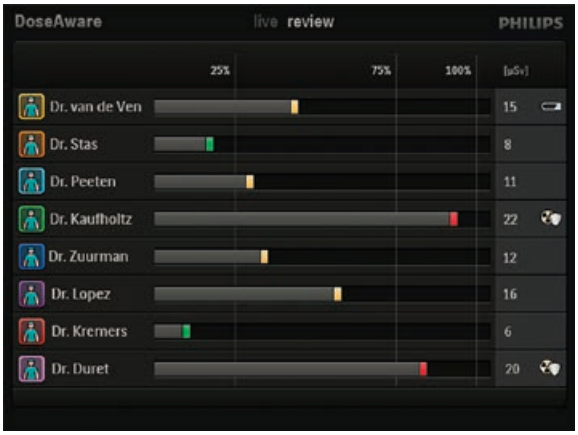
Live feedback to guide behavior

During the procedure, the DoseAware Xtend live screen provides extra information to guide staff behavior. It shows the amount of real-time scattered X-ray dose per hour as a colored bar and the staff dose accumulated during the procedure in microsievert (µSv).

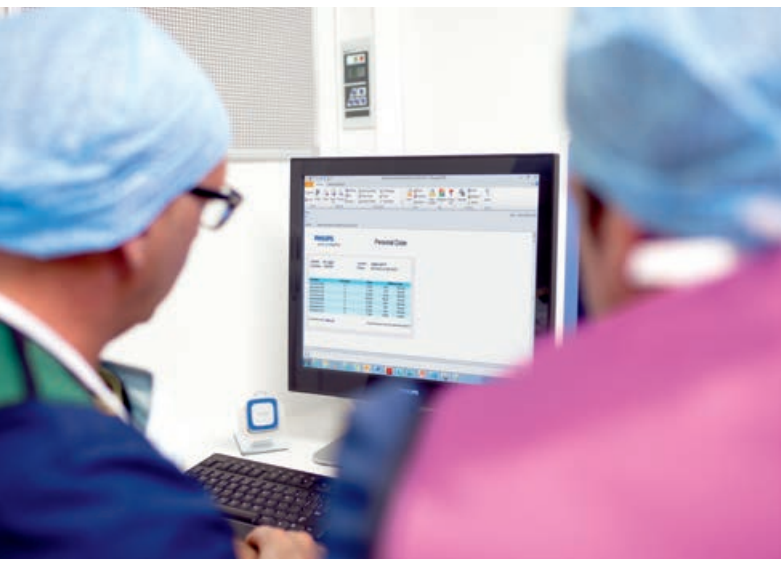
During a procedure, sterile sheets often hide lead shielding so staff may not realize it is not in place. When this occurs, an icon appears on the right of the live screen to remind staff to use the lead shielding or take other measures to manage X-ray exposure.

The live screen integrated with the FlexVision XL display

Live screen shows information during each procedure



Review screen shows information after the procedure



DoseAware Xtend automatically sends a dose report via email.

Procedural dose to gain insight into performance

After the procedure, the DoseAware Xtend review screen provides the cumulative amount of scattered X-ray dose received by each person for that procedure compared to the scatter dose in the room (reference dose). This helps staff better understand how their behavior during a specific procedure may have positively or negatively affected their X-ray exposure. For example, someone may have a green bar at one moment in the procedure and a red bar for the entire procedure.

Smart reporting supports continuous improvement

To make it easy for staff to track weekly or monthly X-ray dose exposure, DoseAware Xtend automatically sends a dose report via email. It provides an overview of the cumulative X-ray scatter dose. Since this information is presented by procedure, it can help users identify micro and macro trends in radiation exposure, by type of procedure, time of day, room, etc.

Procedural data about X-ray scatter dose received by the staff is provided in DICOM operator RDSR format to simplify data analysis for research and quality improvement programs.

Secondary lead protection to manage X-ray exposure

DoseAware – flexible solution

DoseAware is a flexible solution that can be used in any X-ray room for real-time feedback on scattered X-ray exposure. The PDM measures the X-ray dose received and is wirelessly connected to the Base Station, which can be mounted on an exam room monitor. The Base Station shows the amount of scattered X-ray dose received by each PDM as colored bars (green, yellow, or red). Recognizing the yellow or red status allows the staff member to consider taking immediate action to manage their X-ray exposure.

Base Station

DoseAware uses a portable LCD touchscreen to display real time dose data for all PDMs within range. It includes drill down screens for more information on a particular PDM. The Base Station stores PDM data as well. Multiple Base Stations can be network linked to a computer running DoseManager analysis software. X-ray dose history information can be automatically retrieved from any Base Station or from any PDM by using a Cradle with DoseView software or Dose Manager software.

Personal Dose Meter (PDM)

Worn by the staff, this smart badge measures scatter radiation and transmits this information to the Base Stations (DoseAware) where it is displayed or radio hub (DoseAware Xtend)

Base Station and Personal Dose Meter with Cradle

"DoseAware can help change practice patterns during procedures"

B.T. Katzen, MD

Interventional Radiologist

Medical Director, Baptist Cardiac & Vascular Institute, Miami

DoseView

This PC software package is included with DoseAware and DoseAware Xtend. It connects to a PDM via a cradle. DoseView enables you to view data on a PC, change names assigned to PDMs, or reset PDMs.

Dose Manager

Dose Manager is optional software that collects all data for reporting, exporting, and archiving. It can be connected to multiple Base Stations (DoseAware) or multiple radio hubs (DoseAware Xtend) via the hospital network.

Part of DoseWise

We have a long standing commitment and philosoph to manage X-ray dose and contrast through our DoseWise philosophy – a set of techniques, programs and practices that focus on providing excellent image quality, while protecting patients and clinical staff in X-ray environments. DoseWise is applied at every level of new product design and development and helps us continually move forward in dose management.

Empowering staff and delivering value

Together we can make the difference by making it easy for people who work in X-ray environments to monitor and track their own X-ray exposure throughout the day. Informed by the real-time feedback from the DoseAware family, healthcare professionals are empowered to take steps to better manage their own exposure levels. This can make a true difference to the health of medical professionals who work in the interventional environment.

DoseAware Family: selected specifications

Personal Dose Meter	
Weight	30 grams (1.06 ounces)
Operational unit	HP(10)
X-ray dose range	1 µSv – 10 Sv
X-ray dose resolution	1 µSv
X-ray dose uncertainty	5% or 1 µSv
X-ray dose rate range and linearity	+/- 10% 40 µSv/h – 150 mSv/h +/- 20% 150 mSv/h – 300 mSv/h
Energy dependency rays	N40-N120 (33 keV – 101 keV)
Average battery life	3 – 5 years, depending on daily use

DoseAware Xtend Hub (to be mounted on ceiling)	
Dimensions	13.5 x 18.5 x 3.5 cm (w x h x d) / 5.3 x 7.3 x 1.4 inch
Weight	170 grams (6 ounces)
Display	via FlexVision XL
Resolution	640 x 480 pixels
Storage	All X-ray dose-rate/sec and accumulated X-ray dose/hr that are received from PDMs in range. For example: the memory size accommodates 250 PDMs with 50 hours X-ray dose rate history each.
Communication	Wireless radio communication with PDMs (868,3 918,3 927,9 MHz)
Ethernet	10/100 Mbits/s port for the Dose Manager and connection to X-ray system.

DoseAware Xtend reporting	
Email reports	By week or by month, by PDM or by lab
Operator RDSR	Comprehensive Structured Report, up to 3 SCP can be configured as receivers.
Operator RDSR SOP class	UID 1.2.840.10008.5.1.4.1.1.88.33

DoseAware Base Station	
Dimensions	30 x 25 x 6 cm (w x h x d) / 11.8 x 9.8 x 2.4 inch
Weight	1.45 kilograms (51.15 ounces)
Display	10.4 inch touch screen
Resolution	640 x 480 pixels
Storage	All X-ray dose-rate/sec and accumulated X-ray dose/hr that are received from PDMs in range. For example: the memory size accommodates 250 PDMs with 50 hours X-ray dose rate history each.
Communication	Wireless radio communication with PDMs (868,3 918,3 927,9 MHz)
Ethernet	10/100 Mbits/s port for the Dose Manager connection

Dose Manager (PC requirements)	
Operation system	Windows XP, Vista or Windows 7
System memory	At least 2 GB
Hard disk	40 GB with at least 15 GB available space - USB 2.0 port

DoseView (PC requirements)	
Operation System	Windows XP, Vista or Windows 7
System memory	At least 1 GB - USB 2.0 port

Please visit www.philips.com/doseaware

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