



# DoseWatch

Does your quality improvement strategy include **dose management**?



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## **A comprehensive dose management program requires a well-designed low dose strategy, devices, and technologies.**

This involves close collaboration among your entire team, from the technologists operating the equipment, to the radiologists reading the scan, to the medical physicists evaluating protocols.

DoseWatch™, the solution with integrated radiation and contrast dose management across all your radiation emitting medical devices, supports your institution in driving better-informed, patient-centered, and effective care. It simplifies your efforts to optimize patient dose by automatically detecting outliers, providing insight into their root causes, and documenting their review.



## Automatic multimodality and multivendor dose tracking

DoseWatch captures, tracks, and reports radiation and contrast dose directly from the medical device or picture archiving and communication system (PACS). DoseWatch supports equipment from multiple modalities and device manufacturers, including:

- CT systems
- Contrast injection systems<sup>1</sup>
- Interventional Radiology (IR) systems
- Cardio-Vascular (CV) systems
- Mammography systems
- Radiography systems
- Surgical/mobile C-arms
- Nuclear Medicine and Molecular Imaging systems<sup>2</sup>

### **Flexible data acquisition for enterprise-wide coverage**

DoseWatch can collect dose-related information from multiple sources, including DICOM® Radiation Dose Structured Reports (RDSR), image headers, DICOM Modality Performed Procedure Steps (MPPS), OCR on dose report images, and more. This flexible configuration allows users broad visibility to dose data across their imaging systems fleet, even for older imaging equipment that is not RDSR-compatible.

# DoseWatch 3.2

## Compliance updates

### Helping improve compliance needs across all markets<sup>7</sup>

More in-depth benchmarking against national or local diagnostic reference levels (DRLs)

- DRL audit tool for all modalities
- DRL threshold visibility in analysis pages for CT and Interventional

Improve dose review information for Nuclear Medicine

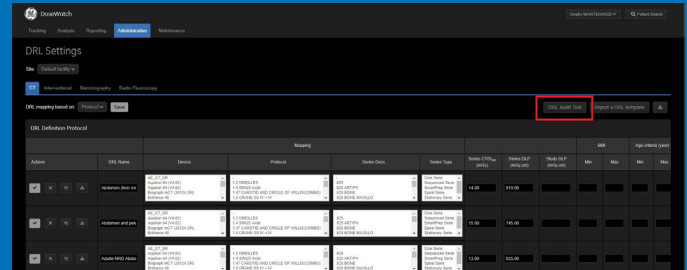
- New Nuclear Medicine DRL page
- NM worklist improvements

## Enhanced integration methods

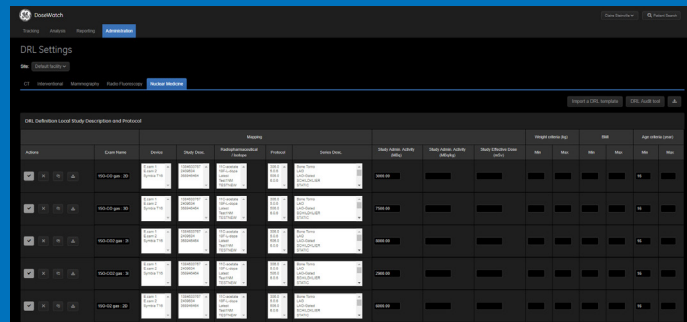
### Improved automation for installations for customers who prefer PACS exclusive integration<sup>7</sup>

Smart Ingestion

- PACS integration tool — Simplifies the integration of PACS-based dose data by automatically characterizing the PACS system (what data is available, what queries are supported, what information is missing). This reduces customer IT time and ensures the most optimal integration for PACS.



DRL Audit Tool



Nuclear Medicine DRL tool

# Optimized scalability and fine tuning

## Increasing efficacy and accuracy<sup>7</sup>

Addition of correction factors and post-exam peak skin dose alerts

- Revise dose for more accurate assessment for CT, Interventional, and RF

## Practice optimization

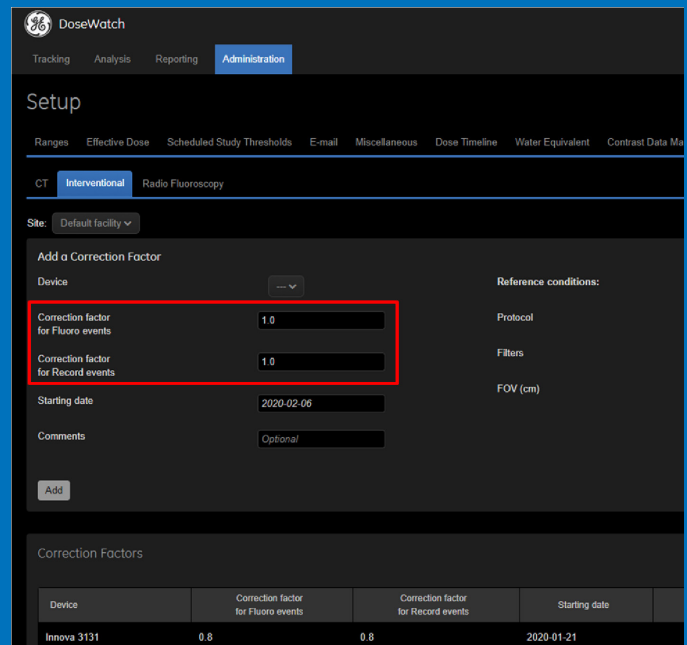
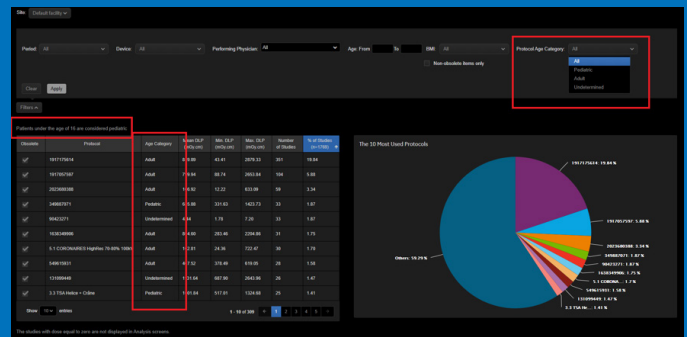
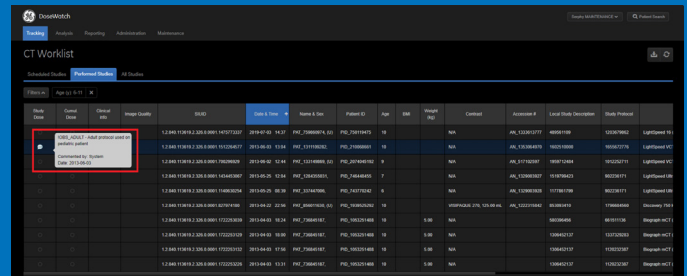
- Review practice, alerts, unfavorable image quality in worklists for all modalities

# Workflow improvement assist

## Automated detection of imaging workflow issues post-exam<sup>7</sup>

### Smart Observation

- Detection of adult protocols used on pediatric patients



Smart observation annotation and correction factors



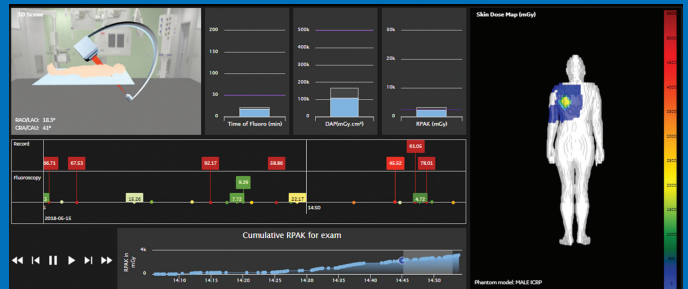
# Organ dose and skin dose map

## Organ dose dosimetry technology licensed from Duke University<sup>6</sup>

Within DoseWatch, GE Healthcare releases a new optional organ dose estimation module for CT, based on licensed dosimetry technology developed at Duke University. Using the Duke University XCAT phantom library referenced in over 100 peer-reviewed articles, the module employs a unique convolution-based approach to organ dose, including the display of confidence intervals.

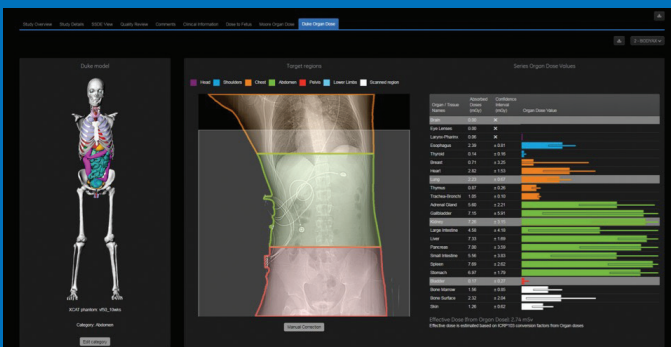
**This module** brings significant improvements in patient modeling with the use of more than 160 XCAT phantoms, accounts for tube current modulation, and provides an estimation of dose to tissues outside the field of view.

Fetal dose estimate is also improved in comparison to the method provided by default in DoseWatch by taking into consideration the week of pregnancy and the use of 50 XCAT phantoms for the pregnant patient.



## 4D skin dose map<sup>6</sup>

DoseWatch provides an interactive tool to support the post-procedure review conducted by the interventional imaging physician or medical physicist as they perform their comprehensive post-exam assessment of skin injury risk.





## Driving awareness

DoseWatch helps increase awareness about radiation dose across imaging departments by making the dose-related information and notifications available at a glance at the point of care.

### **Automatic dose notifications**

DoseWatch includes a notification management system to alert users when an exam or a patient exceeds predefined thresholds. This system includes:

- Modality-specific, configurable thresholds that can be set based on statistical parameters (median, average) or Diagnostic Reference Levels (DRLs)
- Alert notifications by email and on the worklist page

## Patient dose history

DoseWatch provides quick access to patient dose history including:

- The list of all examinations from any modality with easy access to the exams' details
- A cumulative dose by modality
- A cumulative dose of iodine
- A timeline view of all irradiation events

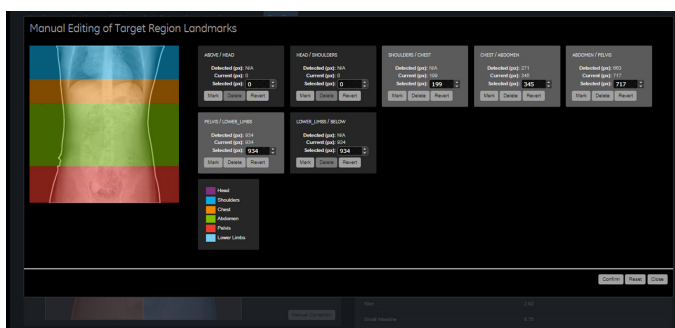
# Modality-specific features

## Organ dose for CT examinations<sup>5,6</sup>

DoseWatch helps medical physicists estimate the organ dose applied during CT examinations for all types of patients. Moore method (default feature, for pediatric patients only) and Duke University method (optional module, for pediatrics, adult, and pregnant patients) are available.

## Autodetection of anatomic regions<sup>5</sup>

DoseWatch automatically detects scanned regions from scout views, to calculate the dose applied to specific organs.

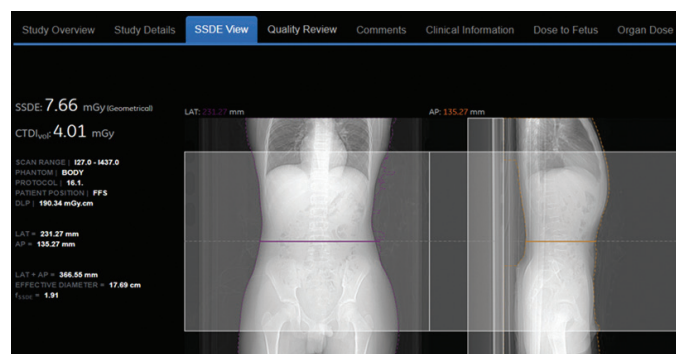


## Fetal dose for CT procedures<sup>5</sup>

DoseWatch helps medical physicists reporting on CT examination of pregnant patients by providing a post-exam estimate of the radiation dose delivered to the fetus.

## CT size-specific dose estimate (SSDE)

The SSDE is a more patient-specific indicator of dose developed by the American Association of Physicists in Medicine (AAPM). DoseWatch automatically calculates this value using peer-reviewed methods (AAPM Task Group 204 and Task Group 220 reports).



## Peak skin dose<sup>5</sup>

DoseWatch automatically estimates the post-exam peak skin dose for interventional procedures performed on RDSR-compliant imaging equipment.

## Effective dose<sup>5</sup>

DoseWatch provides effective dose estimation for all modalities, based on ICRP publications with age stratification.



## Optimizing performance

DoseWatch includes embedded analysis capabilities that help users identify opportunities for performance improvements and track change implementation.

### Trends and exam analysis

DoseWatch includes a variety of embedded analysis capabilities, such as dose benchmarking, identification of high cumulative dose patients, and comparisons across devices, sites, technologists, and physicians. Data can always be exported to Excel for custom analysis.

### Standardization of exam description

To facilitate data analysis and improve alert efficiency, administrators can map the names of imaging procedures to standard terms — a useful feature if protocol names aren't harmonized across your imaging fleet. For CT, the RSNA RadLex® Playbook is used. In addition, a customizable interface with the department information system can be implemented to keep study descriptions up-to-date for a better mapping with lexicon entries.

### Image quality voting button

DoseWatch provides a simple tool to collect feedback on image quality, which can be integrated into the RIS or PACS.

## Diagnostic Reference Levels (DRLs)

To promote compliance with national dose reference levels, DoseWatch gives users the opportunity to:

- Customize DRLs per country per device(s) by automatically importing a selected template<sup>3</sup>
- Set local DRLs following recommendations of ICRP Publication 135
- Set alerts based on national and/or local DRLs
- Create a national DRLs export (Microsoft® Excel®) ready to be sent to authorities
- Share DRLs settings with other sites

# Sharing results

## Reports

DoseWatch provides several types of reports:

- **CT, CV/IR dose-performance reports:** Detailed and fully customizable dose management reports addressing patient population, and much more
- **Triggered-alert report:** Provides percentage of alerts as a function of exam volume, percentage of alerts reviewed, identification of radiation-dose indices which triggered the alerts, and any comments provided in the alert review
- **Multisite report for CT and CV/IR:** Summarizes KPIs across facilities, including number of studies, number of alerts, CV/IR dose metric which triggered the alert, etc.

## ACR DIR compatibility

DoseWatch is an ACR (American College of Radiology) DIR (Dose Index Registry) Certified Software Partner.

# Contrast Data Management<sup>1</sup>

DoseWatch, with its optional Contrast Data Management (CDM) module, provides a single database to support the joint optimization of both radiation and iodine doses.

DoseWatch CDM can automatically capture the CT contrast injection details across CT systems, either with Class 4-integrated injectors or directly from some injection systems. Manual entry is available for other devices.

CDM enables the evaluation of the actual volumes and flow rates of contrast agent that each patient receives. You can track and assess variability in your efforts to standardize and optimize contrast administration.

## Contrast analysis

Analyze and compare contrast media utilization based on patient BMI/age/weight, concentration, imaging protocol, device, and more.

# Unified patient dose record

DoseWatch can unify all examinations in a single patient dose record when links between different patient identifiers are provided to DoseWatch; for example, through an IHE PIX-compliant interface. In multiple sites or department configurations with different patient identifiers, the unified patient dose record:

- Displays cumulative history and dose from linked patient records
- Manages cumulative dose alerts for all linked patient records
- Enables patient search using any of the patient's identifiers known in DoseWatch



## Integration with enterprise IT

### **Compliance with IHE technical framework**

DoseWatch complies with the IHE Radiation Exposure Monitoring (REM) dose-consumer and dose-reporter profiles. Over the past 5 years, DoseWatch software regularly participated in IHE Connectathons to validate IT transactions with other systems involved in dose management. Check the DoseWatch IHE Integration Statement for more details.

### **Integration with enterprise user directory**

DoseWatch supports LDAP 4 integration with open LDAP or Microsoft Active Directory to enable centralized user authentication based on the user's enterprise credentials.

### **User access rights**

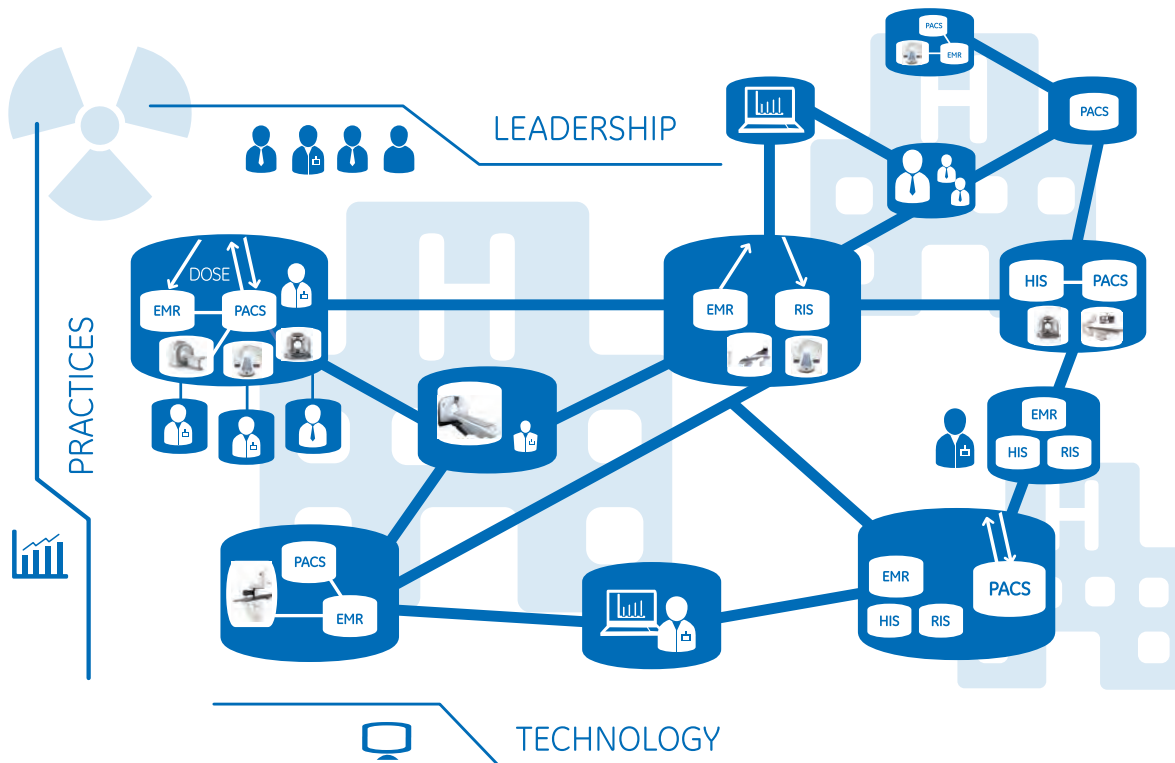
DoseWatch provides the ability to set what a user can do and see within the application. Imaging departments and services can also be configured — linking the devices to the users.

## Dose Excellence Program

GE Healthcare offers a customized Dose Excellence Program with clinical specialists to provide on-site DoseWatch training and optimization services. The GE Clinical Specialist will work directly with the user(s) to:

- Review historical dose data
- Outline and review all protocols currently set up
- Identify opportunities to standardize and adjust protocols
- Identify opportunities to better use dose-saving features
- Review ALARA principles

Upon completion of implementation and DoseWatch training, the GE Clinical Specialist will provide follow-up work with the customer to review the collected data to help establish a baseline and determine next steps. This session will also be used to ensure proficiency in use of the web interface and the reporting and analytical tools.



## Inbound and outbound interfaces

DoseWatch supports interfaces with a variety of information systems within your site.

- The DoseWatch inbound interface relies on HL7® to receive patient information updates, patient merges, and imaging procedure updates from RIS or any other HL7-compliant system.
- Outbound interfaces allow DoseWatch to send dose information to other IT systems, such as RIS, reporting solutions, or EMR; DoseWatch supports various protocols including DICOM MPPS or Radiation Dose SR, and HL7 messaging.
- DoseWatch also integrates with PowerScribe® 360 | Reporting from Nuance® Communications to automatically insert an exam dose summary in reports generated by this reporting solution.

## Implementation services

GE Healthcare has an Information Technology Professional Services (ITPS) team to support the entire DoseWatch implementation: project planning, system installation, modality device integration, information system integration (RIS, reporting/dictation systems, EMR), and training.

## Server requirements

DoseWatch is based on a modular software architecture allowing scalable implementations from a single server to distributed, multi-server configurations when connected imaging systems are spread across multiple, distant sites. The DoseWatch technical architecture is determined by a GE Healthcare project manager together with your IT department.

### Requirements for single server configuration:

Item	Minimum Specification
<b>Server</b>	Physical or virtual server
<b>CPU</b>	Single CPU 2 Cores, etc.
<b>Memory</b>	10 GB memory
<b>Hard disk storage</b>	200-300 GB storage for OS and application
<b>Disk space circulation</b>	Database storage to be determined based on exam volumes
<b>Operating system</b>	Windows® Server 2008/2012/2016 64 bits
<b>Network</b>	Gigabit ethernet

## Commercial offerings

DoseWatch is available either as a purchasable software solution or as a service subscription.

Organ dose technology licensed from Duke University is available as a purchasable option.





## References

- 1 This feature collects contrast data automatically for class-4 injectors integrated with CT scanners or directly from some injection systems. It is available for manual entry for other modalities connected to DoseWatch with the Contrast Data Management module.
- 2 Tracking for single-injection procedures only and single DICOM studies.
- 3 This feature depends on your country.
- 4 LDAP: Lightweight Directory Access Protocol.
- 5 This feature is available in DoseWatch 2.3 and higher versions.
- 6 This feature is available in DoseWatch 3.1 and higher versions.
- 7 This feature is available in DoseWatch 3.2 and higher versions.

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From medical imaging, software & IT, patient monitoring and diagnostics to drug discovery, biopharmaceutical manufacturing technologies and performance improvement solutions, GE Healthcare helps medical professionals deliver great healthcare to their patients.

## Imagination at work

DoseWatch is a Class I CE marked device in compliance with the applicable requirements of the Medical Device Regulation (EU) 2017/745. DoseWatch is a Medical Device Data System (MDDS) in the United States. The design site is certified according to ISO 13485:2016 - Medical Devices Quality Management Systems.

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