

The right dose of expertise: How Agfa HealthCare is helping stakeholders balance “imaging gently” with quality imaging

In the days of film-on-a-lightbox, dose seemed easier to control. If you overexposed film, the image would turn black. If you underexposed, the image would be too light. These technical realities exercised subtle control over the range of dose that would produce a useable image. With the advent of digital imaging, those subtle nuances changed.

INTERVIEWEES Bruce Apgar, Application Lead for Imaging Services and Applications, North America · Rawa Al-Saigh, Dose Registration Global Solution Manager



DIGITAL DOSE CREEP

Technologists soon learned that slight overexposure in digital imaging could create a better looking image. So there was a natural tendency for doses to slowly edge higher in the name of image quality. Add to this the steady increase of new types of modalities coming on line and the patient’s potential for increased radiation exposure began to creep higher and higher.

These trends have given rise to intensified interest in dose management from both medical professionals and regulatory bodies. The industry has formed advocacy groups such as Image Gently, an alliance dedicated to raising awareness of opportunities to lower radiation dose in pediatric imaging. Government bodies are also becoming involved. In the United States for example, the State of California has passed legislation making it mandatory for imaging centers to record radiation exposure from CT exams.

As a leader in medical imaging, Agfa HealthCare has taken a key role in understanding and contributing to best practices for dose management. Teams have also developed new technologies and solutions that help reduce radiation dose on the front lines of imaging (while delivering high quality images) and provide intelligence to manage dose appropriately on the back end.

A SERIES OF DOSE MANAGEMENT FIRSTS

“Agfa HealthCare is all about achieving optimal image quality,” explains Bruce Apgar, Application Lead for Imaging Services and Applications, North America.

“It’s a logical extension to apply that expertise to dose management, since image quality is a function of dose. If our technology can produce a higher quality image because it is more efficient, then there should be an opportunity for dose reduction, depending on the needs of the department.”

Although dose reduction is universally important in all patient populations, it becomes even more important when applied to an area like pediatrics. For example, when you consider that a premature infant may receive 30 to 40 exposures over the course of their treatment, it’s clear that finding ways to reduce radiation exposure makes sense for preserving long term health.

One way Agfa HealthCare is helping to reduce exposure is by introducing high efficiency needle phosphors – Cesium Iodide (CsI) for Direct Radiography (DR)* and Cesium Bromide (CsBr) for Computed Radiography (CR). Due to their higher X-ray absorption and conversion efficiency, needle phosphors have the potential to produce higher quality images at a significantly reduced dose.

“It is like installing technology that gives you twice the gas mileage from your car,” explains Apgar. “In fact, recent studies have shown that CsBr needle phosphors in particular can reduce radiation exposure by up to 50%. It’s a huge step towards effective dose management.”

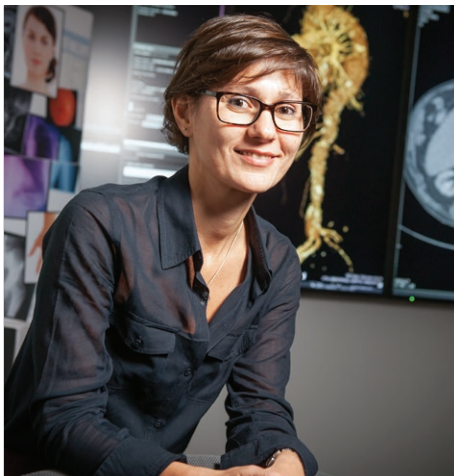
This needle phosphor technology is complemented by Agfa HealthCare’s MUSICA², a leading tool for optimizing

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* Potential dose reduction is indicated only for select DR units

** REM is a works in progress



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RAWAL AL-SAIGH, Dose Registration Global Solution Manager

image quality. When you further add in the productivity and centralized dose monitoring capabilities of the NX Multi-Modality workstation, you have a powerful set of tools for dose management.

Another significant move towards stabilizing radiation dose was the introduction of the exposure index standard by the International Electrotechnical Commission (IEC) and the American Association of Physicists in Medicine. Agfa HealthCare was the first company to fully implement the exposure index standard in its modalities. Using this standard method for tracking exposure reduces the possibility for exposure errors, because technologists only need to remember one method for monitoring exposure changes, regardless of which manufacturer’s technology is being used to capture the image. The exposure index has since become an industry accepted standard by manufacturers around the globe.

INTRODUCING VISUAL SAFEGUARDS

Agfa HealthCare complements the standardized exposure index with a color-coded exposure bar in the NX workstation. Apgar explains the significance: “The exposure bar appears green, yellow or red to indicate whether the radiation exposure is acceptable, slightly out of range or dramatically out

of range. This technology, which we pioneered, provides a simple visual way for the technologists to verify that they have a good exposure before capturing the image.”

Exposures can be tracked and monitored for trends, such as an overall drift up or down or even comparisons among technologists. “Quality control and monitoring tools help to verify that you don’t have inappropriate dose in your procedures,” says Apgar. “You need safeguards in place and Agfa HealthCare is providing the technology to help keep the dose appropriate.”

LOOKING AT THE BIGGER PICTURE

Automating the collection of exposure data is an important next step in dose management. Agfa HealthCare’s IMPAX REM** (Radiation Exposure Monitoring) is a soon-to-be-released solution that tracks, stores and performs analysis on radiation dose data from multiple modalities.

“Up until recently, dose wasn’t something that was always automatically recorded,” explains Rawal Al-Saigh, Dose Registration Global Solution Manager at Agfa HealthCare. “Innovations in technology and the introduction of standards are making this information more accessible than ever before so that we can perform patient dose tracking with ease. IMPAX REM is PACS and modality vendor neutral. It collects disparate data and then stores it in a standardized format so that it can be easily shared and used for further analysis and reporting.”

The IMPAX REM product includes a data modelling tool that looks at the dose information in the system. It then applies statistical algorithms to determine if there are abnormalities that need to be highlighted in the dose levels at the patient, study, and machine or institute level. Built-in capabilities also allow easy comparison with dose management guidelines (when available). And simple integration with other radiology department systems means that dose history can be accessed from anywhere.

“We want to help staff to be able to react quickly, meet best practices and comply with mandatory regulations,” says Al-Saigh. “The whole idea behind dose management is, if we can perform imaging studies with less radiation, then we should. IMPAX REM is an effort towards empowering imaging centers to establish that fine balance between imaging techniques and dose levels.”

HELPING TO MAP OUT THE FUTURE OF DOSE MANAGEMENT

Agfa HealthCare stays closely involved with industry groups and alliances to understand the current realities and future of dose management while being a key part of the conversation. Working closely with the American College of Radiology, Agfa HealthCare teams work to develop technology solutions that meet and exceed the needs of the industry. They provide funding to the Medical Industry and Technology Association and sit on its Computed Radiography and Digital Radiography group. They participate in American Association of Physicists in Medicine meetings, providing technical guidance and support. The IMPAX REM software is born from a close collaboration between the National Research Council of Canada, McMaster University and Hamilton Health Sciences Corporation.

“I ultimately believe that dose management is going to become more comprehensive and automated,” says Apgar. “There is a good chance that dose tracking will be mandated by legislation in the future. National Dose Registries will likely be the norm in the not too distant future. I can honestly say that Agfa HealthCare is very well equipped for whatever the future brings.”

“Various teams within Agfa HealthCare are working closely together on a cohesive dose management strategy,” concludes Al-Saigh. “We don’t want to simply design solutions that satisfy the legislation or guidelines for today; we aim to anticipate future needs as well. Our philosophy is to advance efforts in the dose management arena because, ultimately, that could protect people’s long term health.” •

DID YOU KNOW...

- » According to the International Atomic Energy Agency (IAEA) the use of CT has increased significantly over the last two decades.
- » A premature infant could receive upwards of 30 or 40 radiation exposures over the course of their treatment.
- » Agfa HealthCare was the first company to fully implement the IEC exposure index into their modalities.
- » Agfa HealthCare’s MUSICA² software lets you see bony detail, soft tissue and details in-between in a single image so you’re less likely to overexpose.
- » Automating the collection of radiation exposure data is an important next step in dose management.