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The Affidea Effect: A Global Dose Data Management System

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As the biggest independent provider of advanced diagnostic imaging services in Europe, Affidea owns and operates 170 medical centres and grows at a rate of (on average) one new centre every fortnight.

As the company evolves, our owners Waypoint Capital want to turn it into the biggest global brand for diagnostic imaging and cancer care. The cornerstone of doing this is to introduce practices that are standardised, unified and optimised, but that respect local cultures and remain patient centric. This becomes increasingly complex given the sheer number of geographies that Affidea operates in, as well as the vast amount of data that is accrued on a daily basis. Some of these data come from the Affidea dose excellence programme through which we currently centralise and analyse the information extracted from 65,000 computed tomography (CT) scans each month.

Setting Up The Dose Excellence Programme

Our dose excellence programme has been running for several years under the leadership of Katia Katsari and her team; it incrementally evolves - adapting and learning from each country as it is introduced.

The foundation of the programme was our initial cooperation with GE Healthcare in 2012 on the DoseWatch™ analytics platform. This allowed us to extract the radiation exposure data (as well as other data) from the CT scans performed at our centre in the University Hospital of Szeged, Hungary.

The GE DoseWatch™ system is an excellent tool, but like all tools, it must be used within a system by knowledgeable individuals for the full benefits to be realised – implementation, learning and subsequent action are critical. Having the dose data is great, but fundamentally insufficient without benchmarking it to the regional guidelines and being able to influence the subsequent imaging based not only on dose, but also image quality. The dose excellence programme set out to turn dose awareness and optimisation into a habit, rather than something that ‘just had to be done’.

After the first installation of DoseWatch™ in 2012, a further 15 licenses were purchased in 2013. Then in March 2014, a memorandum of understanding was signed between Affidea and GE for 30 more licenses. In May of 2014, the Affidea dose excellence programme was officially launched.

At first there was a lot of cultural resistance to change. However, this is not unusual in the medical profession, where having an evidence base is absolutely critical to underpin any new initiatives. It came down to communication. A multi-disciplinary steering committee was set up that was able to clearly outline the strategy, process and goals.

Within each country, and within each centre of that country, we have a named radiologist, radiographer and radiation physicist responsible for the dose excellence programme. They work together closely to push it forward in close collaboration with the regional GE DoseWatch™ teams.

Comparing Analytics Across Vendors

GE Healthcare were early implementers of tracking and analysing software in CT; they also had the foresight of making the platform vendor neutral, meaning that we are now able to compare dose data not only between different models of CT but also different manufacturers using different dose reduction algorithms. However, before this takes place we have to be certain that we are comparing 'like with like'. An initial part of our dose excellence programme was establishing standardised CT protocols – categorised by anatomic area and clinical indication across all vendors. We currently have 65 standardised protocols that include information not only on how the scan is acquired, but also the third percentile dose reference levels (DRL) that benchmark the radiation dose to the standards. This is another important point - there are no pan-European standards currently available so we have had to develop our own specific 'Affidea standard' that can encompass all the variables.

As well as standardised inputs and measuring, the processes also have to be uniform across each country. Thus, we created Affidea standard operating procedures and guidelines for the comprehensive implementation of the programme. These include quality control, mapping and how to implement changes. Calibration of CT systems is standardised across the whole network.

All doctors work to the best of their ability and are very keen to show you what they do. Radiologists (I am one) like to show nice images: 'Look at the great pictures we are getting and the great diagnostic capability they give us'. The problem is that without insight into the data, and some idea of the regional benchmark, you can always get nicer pictures by giving a higher dose. Meanwhile, many CT radiographers want to reduce the dose, but often this is done in an unstructured manner - the exposure is reduced, the images become grainier, the radiologist complains and then the exposure increases again. It is a kind of yo-yo. This is why image quality has to be a key output of the dose excellence programme. Without incorporating this aspect of the process, clinicians will not sign up to the process.

The dose-optimised images have to be non-inferior to the routinely acquired images and we have processes in place to measure image quality both subjectively (blinded image assessment) and objectively (using phantoms).

At Affidea, we have the scale of a country with the speed of an independent company. We don't have the lethargy of a national body or government or university, where any change implementation takes months, if not years. We also have the expertise of being a specialist high-end diagnostic imaging provider and this is what we do.

On a monthly basis, we upload all the data from all the servers onto our central system. We extract all the data and we export the metadata.

This is important - we don't export individual patient data, just the homogenised group data to avoid patient confidentiality and regularity issues. We have currently networked just over half our install base, and are already acquiring the data from 65,000 CT scans per month.

Patient Safety Is Fundamental

The fundamental thing is individual patient safety; this is the key driver across the whole network. However, given the scale of our operation we can go from the individual to looking at the imaging trends across and between whole countries. This also allows dissemination of best practice and collegiality. For instance, the dose excellence group in Hungary are collaborating with the dose excellence group in Greece to perform blinded assessments of each others' optimised images.

Then there is a comparison between technology and vendor so we can compare Siemens to Philips to GE. We can look at energy use, effect of dose reduction algorithms and even the effect that dose optimisation has on the working lifespan of the x-ray tube.

Despite the focus on standardisation and unification of pathways and processes, we do not forget that medicine remains an art, and that to have a truly patient-centred approach there must be nuances in delivery of care. One size does not fit all, but understanding and justifying variance allows outliers (by whatever measurement) to be scrutinised. It has been the experience of the dose excellence programme that clinicians respond where negative variance can be demonstrated, and solutions offered to improve practice. Having a high radiation dose scan does not cause censure where it can be justified on reasonable clinical grounds. Thus, the system becomes one that everyone feels happy to engage with.

Conclusion

As far as we know, the Affidea dose excellence is the largest dose optimisation programme of its kind. We have shown that with the correct processes, standards and engagement with staff it is possible to take an analytic tool and make it a powerful agent for change.

It is true that 'you can't manage what you can't measure', but once the correct analytic tool has been developed, measurement becomes relatively straightforward. More complex is the choice of data to focus on, and the management processes used to influence and implement change.

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