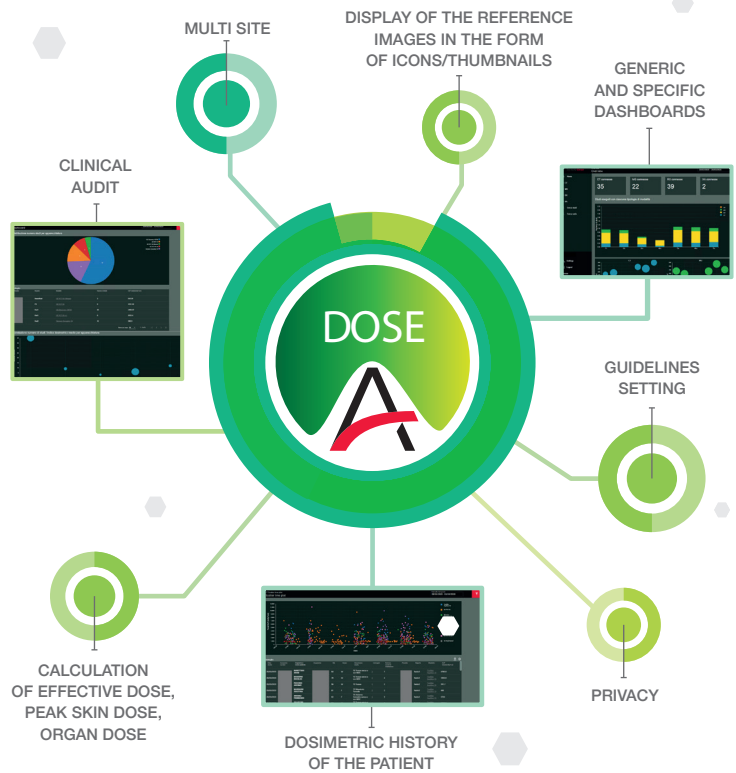


SYNAPSE DOSE USER'S VOICE

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Healthcare IT

Radiation Dose Monitoring System

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“The Hospital of Sassuolo and Fujifilm have collaborated profitably for years, mainly through Dr. Stefano Rivetti, a medical physicist at the Hospital of Sassuolo. In the past, the partnership between the Hospital of Sassuolo and Fujifilm has materialized in contracts for the research and development of Fujifilm technologies. This is the setting in which the work done with Synapse Dose (formerly Syncro Dose), which began in 2018, took shape. When we were requested to install the software, we were looking for IT tools that could ensure compliance with the EURATOM directive, with particular regard to the monitoring of patients’ exposure to medical ionizing radiation. DIRECTIVE 2013/59/EURATOM lays down basic safety standards for protection against the dangers arising from exposure to ionizing radiation, reiterating and broadening the concepts of justification of medical exposure, optimization of the procedures, clinical responsibility of the practitioner for each case of medical exposure and procedures for inserting the data concerning the patient’s exposure in the examination report. While waiting for the Directive to be transposed into Italian legislation, it is fundamentally important for health facilities like ours to start preparing to meet these requirements. In this setting, a fundamental tool is represented by Synapse Dose, a radiation dose monitoring software package (the literature refers to a “Radiation Dose Index Monitoring – RDIM – System”) which enables a large amount of dose data taken from examinations

conducted on various devices and at different departments or facilities to be collected automatically and analysed. Synapse Dose was designed as a tool capable of operating in full compliance with the EURATOM directive as regards the dose data management aspects with a view to establishing and verifying Diagnostic Reference Levels (DRLs). Before Synapse Dose was introduced, the analyses of patients’ medical exposure to ionizing radiation, aimed at determining the local DRLs, were conducted on small samples of patients, by identifying standard-sized patients with homogeneous examinations. The overall DRLs of the hospital were estimated on the basis of these small samples. Synapse Dose offers a unique advantage, by allowing the activity to be monitored as a whole and not just on small samples of selected patients, which enables hundreds of patient exposures to be managed and analysed and homogeneous samples to be taken easily and without overlooking the recording of outliers, thus obtaining a complete representation of the distribution of the exposures performed at the hospital. Finally, once the methods have been established in legislation, Synapse Dose has all the characteristics and potential to be able to carry out the procedure laid down in the directive to manage and insert the individual exposure data in the patient’s report.

1 CT cannot perform differential diagnosis between the interstitial pneumonia caused by Covid 19 and that caused by other viruses



The product described above was the pilot project developed with Synapse Dose, but we are still using the software for various purposes, both for routine tasks, such as the management and verification of the diagnostic reference levels, and for specific tasks, including:

- installation of the new FCT Speedia. Synapse Dose has enabled us to align and set up the new CAT instrument following the same criteria as the technology already installed and in use at the Hospital of Sassuolo. The various devices are designed with native acquisition protocols specific to the manufacturer and supplier. Furthermore, the procedures can be personalized by the users to produce acquisition protocols with particular characteristics that may depend on the specific radiological examination or specific requests made by the radiologist. Nevertheless, in a complex setting, making the performance of the procedures uniform is a positive, indispensable operation to optimize the hospital procedures carried out with different technologies, in that an excessive proliferation of protocols may induce the user in error or to choose acquisition protocols below the standards of clinical practice. The procedure standardization process is a path to be followed but is not a simple, automatic operation. Synapse Dose's ability to collect large volumes of data on the protocols and examinations conducted at the hospital on the various devices installed thus becomes an important tool in a process of standardizing the performance of diagnostic procedures.
- management of abnormal exposure. A fundamental aspect offered by Synapse Dose is to monitor and signal any cases of abnormal exposure, by setting specific threshold levels for each examination and device, and to

retrospectively determine or verify the cause of these levels of exposure: this enables processes for improving and correcting the procedures to be implemented.

- set up a dose team. Although, during the initial implementation and learning phase, Synapse Dose was managed mainly by medical physicists, who periodically send reports to the clinicians at the Radiology Unit, the ideal structure would be that of an authentic Dose Team that understands all aspects of radiology: the Medical Radiology technician, responsible for the practical aspects of carrying out the radiological procedures and involved, together with the practitioner and the medical physicist, also in the process of optimizing the dose; the Radiology Specialist, who has the clinical responsibility for the patient's exposure, as well as the responsibility for assessing the justification for exposure in advance, and finally us medical physicists in that we are responsible for making the assessments, including the physical measurements, that enable an accurate estimate of the dose administered to the patient to be made.

It can certainly be said that Synapse Dose was designed to respond to the needs laid down in the EURATOM directive but, at the same time, that its many functions offer precious tools for ensuring the right level of exposure and care for the individual patient and optimizing the operational workflow at the hospital, by providing analytical tools and supporting the operators in their work.”

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