

The impacts of automated SPECT/CT quantification on clinical workflow

SPECT/CT imaging is a ubiquitous tool that aides clinicians in making prompt diagnoses and developing personalized treatment strategies. With the addition of an automated tool that consistently produces reliable, quantitative measurements, providers explain how they are able to integrate quantification into their routine SPECT/CT protocols.

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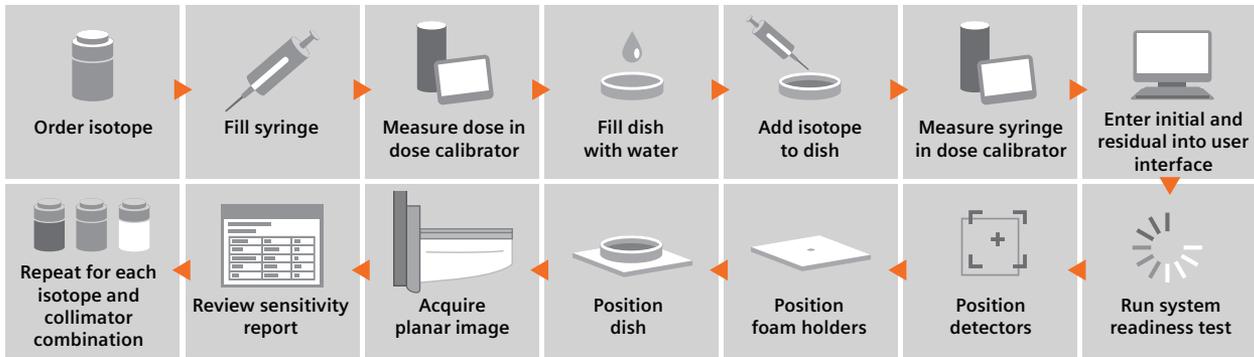
Silvano Gnesin, PhD, medical physicist at Centre Hospitalier Universitaire Vaudois (CHUV) in Lausanne, Switzerland, discusses ways in which the implementation of automated SPECT/CT quantification impacts his role as a physicist, and how these changes shape the future of therapy management and monitoring with SPECT/CT.



Q. Has an automated calibration process made it easier to adopt quantitative SPECT/CT at CHUV?

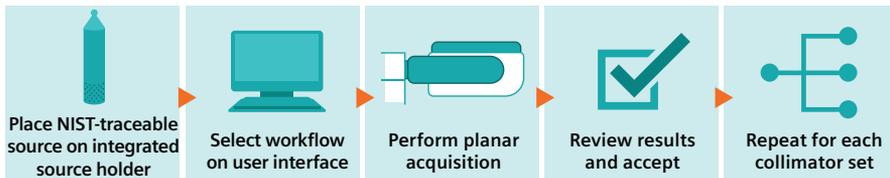
A. We're performing quantification on our Symbia Intevo™ SPECT/CT for SUV evaluation, which allows us to assess the response of disease over time and internal radiation dosimetry. Our automated xSPECT Quant™ tool provides the ability to directly obtain quantitative data from SPECT without performing manual calibrations on the scanner, which means we don't need to verify the calibration of the system each time we want to perform a quantitative analysis of our data. Previously it was manual because we had to handle open sources to prepare the phantom for testing, and we had to establish the calibration factors in order to move from proportional counts to quantitative information. Now, with this automated approach, we just have a monthly test with the reference calibration sources (Cobalt-57 and Selenium-75). We do the calibration every six months because we found the stability of the system is reliable over this range of time, which avoids frequent manipulation of open sources to prepare the phantoms. This is a plus for radiation protection, efficiency, and obtaining quantitative data that can be compared with data from other systems that use the same calibration method. We are able to compare quantitative data across systems because we use sources of calibration that are National Institute of Standards and Technology (NIST) referred, so we are able to have a common standard with others that use the same material.

Conventional quantification calibration



⊗ Manual and time intensive—
increasing potential for error

xSPECT Quant™ calibration



- ✓ Automated
- ✓ Fast
- ✓ Accurate
- ✓ Standardized

Q. How has the implementation of automated SPECT/CT quantification impacted physicists' workload at your facility?

A. For us, SPECT/CT quantification with xSPECT Quant was a point of improvement in our work here. We are pleased to have the quantitative data, directly from the system, for use in dose assessment of lesions, tumors, and normal tissue. It's a very good way to provide the best treatment plan for each patient. Because the steps are automated, our technologists can do most of the calibration work, and this helps our physicists significantly. Now, the physicist provides an overview of the protocol and the technologist can then install the calibration source and perform the sensitivity measurement, the results of which the physicist ensures are in line with the accuracy of the scanner. When we used to perform these calibrations manually, a physicist needed to work at least half a day for just one isotope: today, it's a matter of one hour. The time our physicists save in the quantification process—because it's standardized and easily performed by the technologists, under our supervision—can now be used to conduct interesting analyses of the data.

For dosimetry we continue the dosimetry protocol by analyzing data, delineating regions of interest, and deriving the number of disintegration that occur in these regions to then estimate the dose we deliver to the specific tissue. So we are able to correlate quantitative response to a delivered absorbed dose in tissues.

Q. How do you expect the value of SPECT/CT quantification to increase at CHUV as it is now used in a variety of clinical cases?

A. What I'm expecting is a full integration of a dosimetry workflow with this quantitative data. That means we can obtain the data from the scanner, easily delineate regional interests, and measure the number of disintegration in each organ or specific tissue. As a result, we have models to help us move from the number of disintegration to the dose that is delivered to the tissue, helping our clinicians significantly improve the treatment of different types of diseases. We have made SPECT/CT quantification available for most of our clinical cases at CHUV and, in my opinion, our physicians are more confident using the technology in their clinical routine because of its verified precision and accuracy. This allows us to move toward a vision where SPECT/CT quantification is a standard practice used for all of our patients. ●

The statements by Siemens Healthineers customers described herein are based on results that were achieved in the customer's unique setting. Since there is no "typical" hospital and many variables exist (e.g., hospital size, case mix, level of IT adoption) there can be no guarantee that other customers will achieve the same results.

Further Information

Discover Siemens Healthineers' solution to quantitative SPECT/CT
[siemens-healthineers.com/xspectquant](https://www.siemens-healthineers.com/xspectquant)

Explore CHUV's work with automated, quantitative SPECT/CT
[siemens-healthineers.com/quantfuture](https://www.siemens-healthineers.com/quantfuture)
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