

SELECTING A COMPUTED TOMOGRAPHY SCANNER

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Abstract: The paper briefly describes the features to consider while purchasing a CT scanner.

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I. INTRODUCTION

Medical physicists are often asked which computed tomography scanner to select from the scanners offered by several CT manufacturers. The answer is not straightforward and simple since there are many factors to be considered in the selection process. Generally, selection process can be broadly classified into various phases, such as the need assessment and specification phase, data collection phase and reviewing of manufacturer's data prior to selecting a particular imaging system. Once the image system is chosen, then the process continues with working out the details regarding construction and installation phase, acceptance testing phase, clinical applications phase and the beginning of routine use and the establishment of service contracts. The selection process greatly benefits with discussions among the radiologists, technologists, medical physicists, and administrators (1). The team approach method is optimum in selecting/identifying the best imaging system to match the need. The purpose of this article is to focus on the selection of a new CT scanner and key features to consider during the selection process.

Clearly identifying the goals and the needs for a CT scanner is important in the selection process. For example, need to select a *general-purpose CT scanner* or a *special-purpose CT scanner* or a *CT scanner mostly used for CT Simulation scans in Radiation Therapy* or a *CT scanner adjacent to an upcoming Proton Therapy Center*.

A *general-purpose CT scanner* is one that is used for routine imaging of all anatomical regions and accommodate all types of patients and act as a workhorse in the radiology or in the emergency department. Such CT scanners should require minimal down time and accommodate all types of patients and therefore such scanner does not necessarily have to be the latest and the greatest generation but rather a stable scanner that has already demonstrated consistency for routine clinical use.

On the other hand, if the CT scanner is required for *specific applications* such as *pediatric, neuro-radiological applications (perfusion), cardiac imaging, hybrid imaging such as PET-CT, SPECT-CT, etc.*, then the selection of special-purpose scanner should focus in identifying not only the scanners but also how much resources manufacturer can provide for specific applications.

The need for a CT scanner in the Radiation Therapy departments typically span over whether the CT scanner will be used primarily for CT simulation or the scanner need to have advanced CT applications such as dual energy CT capabilities desired by the new Proton Therapy Center.

One common theme applicable to all types of use is the capability of CT scanner to deliver good image quality with least amount of radiation dose (2). Often neglected aspect in selecting new CT scanner is the availability of service. Generally, CT scanners are quite stable and often requires minimal care, however, if it requires services, then it is critical to assess during selection, the availability of service. This is especially critical in LMIC (Low to Middle Income Countries) since the CT scanner downtime can be lengthy and disruptive to the clinical service.

If a center is planning to install a new CT scanner, it is also critical to assess the siting of the scanner and evaluate the availability of desired electrical power strength in the building. In addition, it is also important to assess the radiation shielding required for the CT scanner room and it should be in compliance with regard to the existing regulations in the particular region or country.

A detailed article discussing the key features essential in the selection of the CT scanner, along with available resources will be published in the next issue of the IOMP Journal Medical Physics International (MPI, Dec 2022).

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