

AbstractID: 6008 Title: Non-ideal Behavior of DR Systems

Ideally, we would like for clinical digital radiography (DR) systems to produce faithful reproductions of radiographic projections, acquired at optimum gain, and rendered appropriately for diagnostic interpretation. We also expect uniform performance from identical DR systems. We would like DR systems to maintain their optimum performance indefinitely, or at least to alert us when their performance falls below reasonable limits. We expect DR systems to be user-friendly, to accommodate operator Quality Control (QC) activities, and to enable the operator to correct errors without the need for a repeated exposure. In reality, all DR systems fall short of these ideal expectations. Awareness of causes and corrective actions for non-ideal behavior is important for Medical Physicists in order to assist clinical practice with DR.

The talk will consider the effects of discrete detector elements, gain compensation maps, and "ghost" images on acquisition of the radiographic projection. Variation in gain and SNR with exposure will be discussed. Sources of interferences with image segmentation will be described including hardware, shielding, and the challenge of large and small patients. The influence of operator technical errors will be explored. The value of automated quality control self-tests in assessing and maintaining optimum performance will be examined. The ability of the operator to intervene in the event of a sub-standard image will be considered. Positive and negative aspects of operator modification will be mentioned. Discrepancies between display functions at the acquisition station and at the physician's diagnostic display will be discussed.

Learning Objectives:

1. Appreciate the technological limitations on ideal behavior by DR systems.
2. Understand the clinical manifestations of non-ideal DR behavior.
3. Identify actions that can reveal or correct non-ideal DR behavior.