AbstractID: 13197 Title: How Stable Are The Qualities Of Medical-Grade LCD Monitors? Is The TG18 QC Test Pattern Sensitive Enough to Detect Any Quality Degradation?

Background: Medical-grade LCD monitors have been used in PACS for nearly a decade and they have been touted as much more stable than their CRT predecessor thus might have lead some PACS users to become complacent in their monitor QC efforts. In this study, we wanted to determine the effect of extensive, long-term clinical use upon these monitors in a large-scale picture archiving and communications system (PACS). Additionally, we evaluated the sensitivity of sharp edged low-contrast objects (as often contained in the AAPM TG18 test patterns) in the detection of contrast resolution degradation in monitors.

Materials and Methods: A group of medical-grade monitors were selected for this study based on their durations of operational use. The contrast-detail (C-D) characteristics of these monitors were measured with both a disc-like object with sharp edges and a nodular object with fuzzy boundaries against uniform backgrounds at various luminance levels. The monitors were sorted into three groups according to their length of use, which ranged from 20 hours to ~35,000 hours, and their C-D curves were compared.

Results: There was a trend of gradual degradation in the monitors' contrast sensitivity although the changes were not statistically significant at all object sizes and luminance levels. Contrast thresholds measured with nodular objects were higher (thus more difficult to detect) than those measured with disc-like objects and should probably be used in the quality assessment of monitors.

Conclusion: Extensive clinical use over time may cause gradual but not statistically significant changes in image quality of monitors. Sensitive measures may be needed to detect subtle deterioration in monitors used for primary diagnostic purposes.