Effect of Screen Monitor Number on Radiologist Productivity in the Interpretation of Portable Chest Radiographs Using A Picture Archiving and Communication System

Bruce Reiner, Eliot Siegel, Frank Hooper, Habte Ghebrekidan, Jean Warner, Brian Briscoe, Zenon Protopapas, and Steven Pomerantz

PICTURE archiving and communication systems (PACS) offer unique improvements in operational efficiency when compared with film-based imaging by providing economical storage, rapid image retrieval, increased image accessibility, elimination of lost images, and reduction in film retakes. Radiologist productivity is dependent upon workstations facilitating fast and accurate interpretations. This study evaluates the effect of workstation monitor number on radiologist efficiency and accuracy in the interpretation of portable chest radiographs.

Time-motion studies were performed evaluating radiologist interpretation of portable chest radiographs using one-, two-, and four-monitor displays (2048×1536 pixels). Three board certified radiologists with extensive PACS experience prospectively evaluated 100 portable chest radiographs that were randomly assigned to one, two, or four monitors. In addition to evaluating the time required for image interpretation, accuracy was assessed comparing individual radiologist interpretation with those of an expert review panel. In all cases, comparison studies and reports were available at the time of image review.

As the number of monitors increased, overall time requirements in image display and interpreta-

tion progressively decreased. This accentuation in time savings was of greatest magnitude when the number of comparison studies increased and was independent of the radiologist. The overall accuracy of interpretation was not affected significantly by differences in monitor number, with consistent reporting accuracy for all radiologists. Radiologists subjectively reported fatigue to be inversely proportional to monitor number.

Use of a four-monitor workstation produces significant time savings when compared with one- and two-monitor workstations in the interpretation of portable chest radiographs. Although overall interpretation accuracy is not affected significantly by monitor number, there is a reported reduction in radiologist fatigue as the monitor number increases, which leads to further enhancements in radiologist productivity.

From the Departments of Radiology and Medicine, University of Maryland Medical Center; and the Department of Radiology, Baltimore Veterans Affairs Medical Center, Baltimore, MD.

Address reprint requests to Eliot Siegel, MD, Department of Radiology, Baltimore VA Medical Center, 10 North St, Baltimore, MD 21201.

This is a US government work. There are no restrictions on its use.

0897-1889/97/1003-1056\$0.00/0