Clinical Displays: Definitions and Specifications
June 5, 2018

Imaging Physics
CancerCare Manitoba

Purpose

This document outlines the current categories of clinical displays in Manitoba and lists minimum performance specifications for each category. These specifications should be used as guidance when purchasing new displays.

Definitions

Primary displays

Primary displays are used by radiologists for interpretation and diagnosis. Examples of primary displays include Barco Coronis Fusion 3MP and 6MP displays used for general radiography and Barco Coronis Uniti 12MP displays used for mammography. Performance standards for primary displays are taken from the *ACR-AAPM-SIIM Technical Standard for Electronic Practice of Medical Imaging (2017)* or successor documents, along with the *ACR-AAPM-SIIM Practice Parameter for Determinants of Image Quality in Digital Mammography (2017)* or successor documents for mammographic primary displays.

Secondary displays

Secondary displays, in general, are used to review images other than for interpretation. Secondary displays include modality displays, clinical specialist displays, electronic health record displays, and, as a special case, on-call displays. Modality displays are used by medical radiation technologists to verify image quality during image acquisition. Clinical specialist displays are used by non-radiologist physicians to make health care decisions before images are interpreted by a radiologist. Electronic health record displays are used by physicians to display images after interpretation by a radiologist.
On-call displays are used by radiologists to review and interpret images when on call, and thus differ from other secondary displays. *NOTE: The intended use of an on-call display is for viewing small-matrix images, i.e., CT, NM, MR and ultrasound images. They are not suitable for general radiography or mammography.*

Other displays

Any other displays used for clinical service not including review of clinical images, including laptop displays and other displays used for speech-recognition software or other non-imaging review tasks. No specifications are given for these displays.

Recommended Specifications

DISPLAY TYPE		PRIMARY (GENERAL RADIOGRAPHY)	PRIMARY (MAMMOGRAPHY)	SECONDARY
Size (diagonal)		21” (54 cm), 24” or larger recommended if appropriate		
Matrix size		≥ 3 MP	≥ 5 MP	≥ 2 MP
Pixel pitch		≤ 0.21 mm	≤ 0.21 mm	≤ 0.3 mm
Maximum luminance	**Minimum**	≥ 350 cd/m^2	≥ 420 cd/m^2	≥ 300 cd/m^2
	Recommended	≥ 350 cd/m^2	≥ 450 cd/m^2	≥ 350 cd/m^2
Luminance non-uniformity		≤ 10%		
Calibration		DICOM GSDF		
White point		CIE Daylight Standard D65		
Stand adjustability		Height- and tilt-adjustable		
Display interface		DVI-D, HDMI or DisplayPort (VGA or DVI-A *strongly discouraged*)		
Pixel grey level response time		Appropriate for video frame rate		

Display Configuration

The display height and tilt should be adjusted so the display is perpendicular to the line-of-sight. The ambient light level of the room should be at a low level. When used with a laptop, the laptop display should be used for the speech-recognition software or other non-imaging review tasks.

Calibration and Quality Control

Any displays used for image interpretation should be calibrated and have a quality control program such as the one described in the *Equipment Quality Control for Primary Displays* guidance document available on the Imaging Physics group’s website.

Where to go for help?

You can contact Imaging Physics at Imaging.Physics@cancercare.mb.ca or by calling 204-787-4145.