Carts, Wall Mounts or Both?
Exploring the Best Criteria when Implementing EMR Equipment

INTRODUCTION

Healthcare IT News reports that hospitals are in an EMR (electronic medical record) buying "frenzy" due to the requirements of the Health Information Technology for Economic and Clinical Health (HITECH) act. But as hospitals and clinics implement new EMR systems, the most critical questions that often go unanswered until the very end are how this technology should be used by providers and which equipment or system arrangements provide the most optimal work processes. Is it best to mount point-of-care computers on the wall, or on carts, or to use a mix of both? The problem persists because equipment purchasing decisions are often made by information technology (IT) departments which may not have visibility to patient care, caregiver workflow or ergonomics. This can result in setting inefficient solutions in place.

BACKGROUND

The HITECH act was enacted as part of the American Recovery and Reinvestment Act of 2009 to promote and expand the adoption of health information technology. Over the last five years, the implementation of information technology in healthcare has grown rapidly, with an 82 percent increase in hospitals adopting at least a basic EMR system between 2010 and 2011, according to the Office of the National Coordinator of Health Information Technology. As of 2014, the U.S. Department of Health and Human Services reports that more than half of eligible physicians and providers and more than 80 percent of eligible hospitals have demonstrated meaningful use of EMR.

Increased EMR implementation directly correlates with increased computer usage, which has been a potential stumbling block for caregivers and their organizations. Computers located at the point-of-care have the potential to allow medical professionals to complete their electronic-based charting work at the patient bedside while maintaining the important triangle of care, which is the interaction formed between the caregiver, the data and the patient, thus positively impacting the patient experience.

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However, the computers are often not properly integrated into the point-of-care spaces. They can have a negative impact on communication and workflow, and require substantial time and energy to be incorporated smoothly.

EVIDENCE OF THE PROBLEM

The root of the problem may lie in the design of the healthcare workspace. In 2012, a survey of more than 200 healthcare providers was conducted by Hedge and James to evaluate current computer use in diagnostic clinics at a major healthcare system. They found fewer than 16 percent were involved in the design of their clinic workplaces or computer workstations. When asked how the current clinical workplace layout affected interactions with patients, more than 40 percent said the layout "somewhat" or "definitely" hindered interactions with patients.[1]

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As a result of the layout and types of solutions available to caregivers, they also experience alterations to their workflow and facility of communication with the patient. A follow-up survey to the 2012 report was conducted with the same group of providers in 2014 to assess the impact of a new EMR system on the work and health of providers. Almost half of the physicians said the new system reduced their face-to-face interactions with patients. A number of providers indicated that the way computers were installed in many clinic areas created a situation in which a choice had to be made between facing the patient and facing the computer, and this adversely affected the quality of their interaction with the patient.

The equipment used also has health implications for the caregiver. In the follow-up survey from 2014, nearly two-thirds of the these providers reported increased frequency of neck, shoulder and back discomfort and 50% reported an increased frequency of right wrist discomfort, likely attributed to increased mousing tasks since the new system was implemented.

In order to effectively implement EMR, it is useful to identify what caregivers truly need from point-of-care technology. Through interviews and focus groups with physicians in an emergency department, a recent study identified the following improvements that are needed for EMR systems:

O **Improved Patient Interaction**: Achieved through maintaining effective communication with patients, being able to maintain eye contact and enhanced patient education and patient satisfaction.

O **Improved Workflow**: Achieved through better access to information, reduced redundancy, mobility and faster workflow.

O **Structural Benefits**: Achieved through systems that are easy to use, provide better infection control and are more similar to the old paper systems.

The solution to these issues can be found by choosing the best equipment that creates a high-performance environment in which health, communication and safety are prioritized. When it comes to the selection criteria for carts and wall mounts, IT departments are typically focused on evaluation of all associated costs. There are many factors that go into their decisions from the cost of actual units of technology to the installation and maintenance costs. It is important for them to evaluate how many wall mounts are required compared to the number of necessary carts to cover the same territory, and realize that the installation and service costs are, in effect, for both systems. By understanding this, healthcare organizations can implement solutions that are both cost-effective and accommodating to the caregiver.

HOW DO WE SOLVE THIS PROBLEM?

To aid healthcare organizations in making the best decisions when selecting equipment for new EMR systems, it is important to start by having a good understanding of the information needs through observing workflows, collecting data and meeting with key stakeholders. This will help IT personnel better understand the types and quantities of devices needed for a facility or department. It is often helpful to use a team approach to solve this problem.

Teams should consist of representatives from all major areas including:
O Physicians and advanced care providers
O Nursing
O Pharmacy
O Physical and occupational therapy
O Materials management
O Environmental services
O Patient and visitor relations
O IT
O Patient billing

Once a team is assembled, the group can begin gathering information for the facility. Some of the more critical information needs, in addition to an explanation of the importance of this information, is provided in the following table.

AREAS OF CONSIDERATION WHEN SELECTING BETWEEN CARTS AND WALL MOUNTS

INFORMATION NEEDS	WHY IS IT IMPORTANT?
Current inventory	In order to assess the quality of existing inventories of equipment that can be used for EMR systems, a thorough survey of desktop computers, laptops, COWs, WOWs and wall-mounted devices should be conducted.
Number of devices/ computers needed	The number of devices/computers required per room during peak times and rounds should be noted. The percentage of mobile devices that may be out of service at any time for charging or maintenance should be also considered.
Workflow patterns	Workflow should be analyzed within patient care units and at the bedside. This includes clinician walking patterns, sit/stand patterns, documentation process, medication distribution, patient and visitor flow, typical procedures performed, flow of data and infection control and contact isolation procedures.
Space	The amount of floor space, wall space and storage space in patient rooms and hallways can drive the type of device/equipment selected for EMR. Sufficient staging space (not in hallways) must be available for charging mobile units.
Patient interaction	Layouts of rooms, as well as device and equipment type, can indicate how well the patient can view the monitor, whether the clinicians can make eye contact during use and whether charting can be done at the bedsides. These should be assessed prior to purchase and implementation of EMR systems.
User mobility preferences	It is essential to survey users about their preference for stationary vs. mobile computers to inform the equipment purchase. Consideration should be given to the walking distances to stationary computers vs. pushing forces and distances for mobile computers.
User device preferences	Surveying users about their preference for device type is also helpful in the decision-making process. This may vary by clinician and service type. Laptops, CPU/thin clients, tablets and mobile phones are all options that should be considered.
Adjustability/ ergonomics	Equipment used to support computers should be easy and intuitive to adjust with keyboard/mouse and monitor adjustments allowing for maximum comfort and reducing risk of discomfort for the widest range of caregivers. Sit/stand needs should be determined for all spaces.
Wiring/IT	The availability and locations of wiring, power and network connections in patient rooms and in hallways must be considered. The strength of wireless signals and availability of routers should be determined. Equipment battery life and equipment reliability should also be considered.
Accessories	Many EMR systems utilize bar code scanning technology. How this technology interfaces with the software and hardware, as well as storage and space for these accessories, must be assessed. The use of printers and other peripheral equipment should be considered.
Security	The security of mobile devices and wireless equipment in high-visibility areas should be assessed. Login and network security must be evaluated for EMR systems. Alternative methods include proximity card readers, passcode systems and biometric readers. HIPAA security should be evaluated for each work area and device.
Cleaning and maintenance	In-room computers and wall-mounted devices must be cleaned between patient discharges, while mobile devices must be cleaned between patient rooms. Moving mobile devices into and out of rooms where patients are on contact isolation may be problematic. Maintenance and IT access for equipment must be considered.
Cost/warranties	To determine total hardware costs, the cost per device, the number of devices, related equipment and accessories and installation costs should be determined. Device lifecyles, warranties and maintenance costs should be identified, including the lifecycle and replacement schedules for batteries.
Installation/assembly	By having the equipment installed by the manufacturer, it can reduce the amount of time a space is unavailable. Manufacturer training has been shown to drastically increase equipment acceptance. Installation and training should be budgeted for in the early stages of planning.

To further aid with product evaluation and final decision-making, two checklists are available at the Cornell University Ergonomics website.

Cornell Healthcare Computer Wall Station Ergonomic Checklist:
http://ergo.human.cornell.edu/Pub/AHquest/CUCompWallStationEval.pdf

Cornell Healthcare Computer Cart Ergonomic Checklist:
http://ergo.human.cornell.edu/Pub/AHquest/CUCompCartEval.pdf

SOLUTIONS

There are many effective cart and wall-mount solutions now available on the market. To begin thinking about possible solutions once the above information and data have been collected, objective, criteria-driven tools can be used to help with the evaluation process. This will result in an evidence-based selection and will help ensure success.

SUMMARY

The use of information technology in healthcare is on the rise. Consequently, healthcare providers who already use computers extensively will be using them even more in the future. Hospitals and physicians that currently use EMR can further optimize clinical workflow and prevent provider discomfort by improving the design of the supporting physical environments through the use of mobile carts and/or wall-mounted, adjustable workstations.

Hospitals and clinics that have not yet implemented EMR systems should carefully evaluate existing processes so they can select and implement effective equipment that promotes good ergonomic design of the clinical workplace while also optimizing workflow for better patient interactions and greater quality of care.

The primary goal of having a computer at the point-of-care is to enhance the experience between medical professionals and patients. Charting practices become seamless and a system of alerts and checks can be implemented in the digital EMR system. Often these goals are not met because the computer acts as a barrier between the healthcare provider and the patient, causing a break in communication that becomes detrimental to the quality of care and patient experience. Computers must be used in a way that allows open communication between medical professionals and patients, and additionally enhances that interaction.

To ensure optimal work processes and quality healthcare delivery, the purchase of EMR equipment and arrangement of that equipment must be part of an overall assessment process that looks at all aspects of the clinical environment, including users, workflow, patient flow and ergonomics. By selecting the appropriate solution of a cart or a wall mount, patient experience is enhanced, rather than inhibited.

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1. Alan Hedge & Tamara James, "Ergonomic Issues of Computer Use in a Major Healthcare System," Advances in Human Aspects of Healthcare, Jul 2012: 259 -268

CHECKLIST FOR CARTS VS. ADJUSTABLE WALL-MOUNTED WORKSTATIONS

This checklist will help guide healthcare facilities to select the most appropriate equipment, whether they are mobile carts, wall-mounted, adjustable workstations or a mix of both. The facility should rank each item in terms of importance on a scale of 0 to 10 (with 10 being the most important). The total for each section of the checklist can then be calculated to determine the best EMR equipment solution(s) for your facility. When the decision has been made regarding which type of equipment or mix of equipment is needed to support the computers, various vendors should be consulted and their products evaluated.

SECTION A	YES	IMPORTANCE WEIGHT (0 TO 10)	SCORE
Is pushing equipment a concern for staff (i.e. flooring or elevation changes) or are there impediments that would limit rolling computers from room to room?			
Do most medical procedures performed require bedside documentation?			
Is there room on walls for computer mounts?			
Is hallway clutter a concern?			
Will patients (or others) need to see information on the computer monitor?			
Are there a large number of patients on contact isolation?			
Can the walls support the weight of computer equipment?			
Is equipment theft a problem in the facility?			

SECTION B	YES	IMPORTANCE WEIGHT (0 TO 10)	SCORE
Are there regulations limiting equipment weights in patient rooms?			
Is there sufficient bandwidth for wireless carts?			
Are funds available for long-term equipment maintenance.			
Do staff frequently go outside the room for supplies/medications?			
Will peripherals be required for use with computers (bar code scanner, printer, etc.)?			
Are there sufficient outlets and space (separate from hallways) for charging computers?			
Do staff prefer the flexibility to document inside or outside the room?			
Are there processes in place to locate equipment (such as mobile units)?			

Total Score for Section A: _____
Total Score for Section B: _____

If the score for Section A is significantly higher than Section B, your facility would likely benefit from the use of wall-mounted workstations. If the score for Section B is significantly higher than for Section A, your facility would likely benefit from the use of carts. If Section A and B are fairly equal, you facility would likely benefit from a mix of both.