Using an Inexpensive Integrated Multimedia Hospital Patient Database Workstation Combining Text / Imaging with Telecommunications and Internet - Cardiology's Experience

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Background. Efficient care of patients in and out of the hospital requires an accurate, timely, and mobile patient record. The patient record must be available whenever the patient is present and must include all recent tests, for proper treatment to be provided. An electronic record provides the best solution as it contains data and images not available in the paper record, is accurate, and cannot be lost or misplaced.

The Department of Veterans Affairs has developed a multimedia workstation which combines the patient text and image records with an Internet connection providing for the exchange of information between hospitals, the review of current guidelines for diagnosis and recommendations for treatment. This workstation can be connected to proprietary servers to provide archival clinical records instantaneously to the treating physician. More than 450 of these workstations are in use at the Washington DC VA Medical Center. The workstation can be used alone, or it can be demonstrated in a client - server configuration.

System. The hospital workstation was developed using standard PC components. In its latest design, the workstation uses a Digital Equipment Corporation (DEC) 133 MHz Pentium computer with 40 MB of memory, 1.2 GB hard drive, Ethernet adapter, Matrox Video card (4 MB VRAM), 6X CD-ROM, and 21 inch SVGA monitor. The workstation is running Windows NT 4.0, the VA software and MS Office 95. When purchased in 1996, this package was under $3300. An Ethernet connection accesses the VistA (formerly the Decentralized Hospital Computer Program, DHCP), the Patient Imaging network, a commercial ECG server, and a commercial X-ray PAC. An Intranet (behind the VA firewall) connection, allows secure review and transfer of pertinent patient data, and through an Internet connection, current guidelines and reference research information can be accessed. Additional features include an e-mail browser, and access to the Medical Service website.

The textual patient record is accessed using the VistA server (3 DEC Alphas) while images are provided by the imaging network jukebox (1 terabyte). The jukebox stores over 168,000 images taken by 17 clinical services, including Cardiology, Radiology, Nuclear Medicine, Pathology, Surgery, Pulmonary and Gastro-intestinal. Images can be adjusted for size, contrast, brightness, zoom, reverse image, and panning. The image server retains any accessed image for a year to ensure rapid access. ECG images are directly accessed from a commercial server (Marquette) containing tracings from 1982. Patient records outside the Washington DC VAMC may be viewed through an Intranet connection. Using an Internet browser, the latest Agency for Health Care Policy and Research (AHCPR) Guidelines and Medical Outcomes are available as are other reference and research materials using custom bookmarks. The Medical Service website contains CD-ROMs for Medline (searchable to 1990); Physicians GenRX, a drug information / interaction program with color pictures of each drug; SAM, the complete text of Scientific American Medicine; Clinical Dermatology Illustrated; and Images in Rheumatology.

Cardiology Experience. An intuitive Windows interface presents the clinical provider with an accurate patient record which reflects the most recent tests as soon as they are entered into the system. The Cardiology database includes records of over 4,715 catherizations; 5,917 Holters; 48,335 ECGs; 14,649 Echocardiograms; 6,470 ETTs; and 1,144 EPs. Images include echoes, coronary arteriograms, ventriculograms, MUGA, thallium studies, X-rays, ECG tracings, as well as pathology, GI and pulmonary endoscopy, gross operative and dermatological images. This record is available in Cardiology Clinic, the Emergency Room and at the caregiver's desk. The workstation has been enthusiastically received.

Conclusions. The electronic patient record is available at over 450 locations throughout the hospital and can be used for automatic caseload, quality assurance reports and analysis using built in formats or standard statistical packages. Images can be electronically transmitted, printed or made into slides for presentation. The workstation promotes individual efficiency by providing the entire patient record, both text and diagnostic images, with online references to the treating physician in a easy to use package.

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