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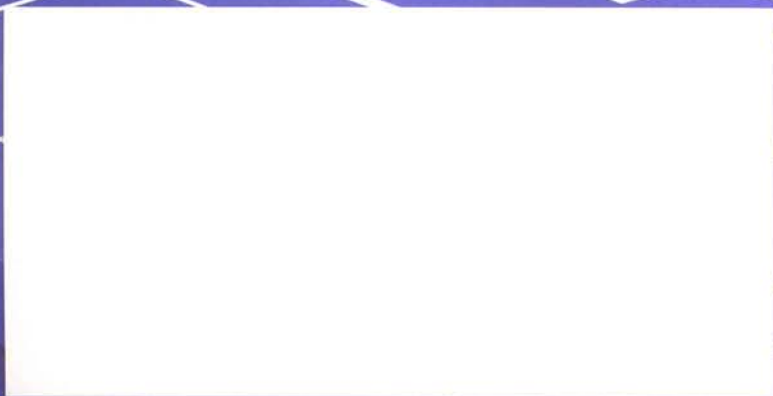
Planning Makes Perfect

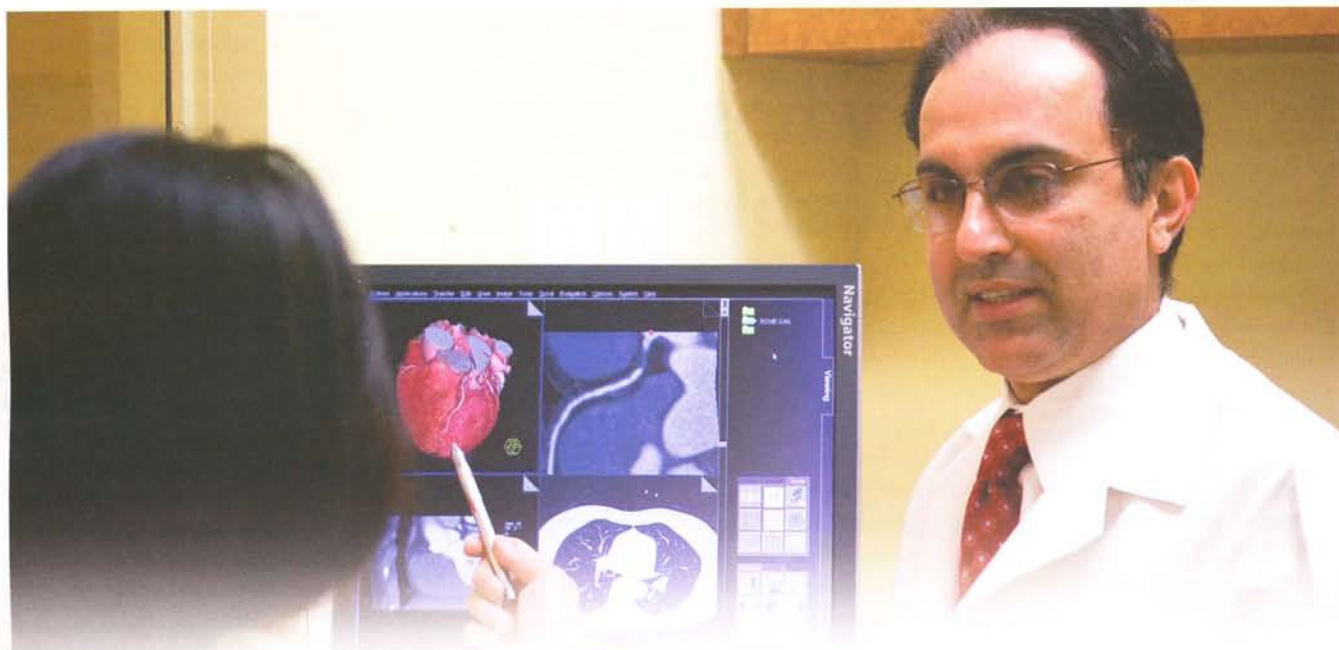


Keys to the Kingdom

**How EHRs
Boost Compliance**

**Can Big Brother
Save Healthcare?**





The Bigger Picture

New PACS options allow a California imaging center to scale down cost while scaling up capacity.

By Camir Ohadi, M.D.

As a growing state-of-the-art medical imaging facility, Millennium Imaging Medical Centers were built on providing the best modality for the right image at the right time to healthcare providers in Southern California. Yet, as we have grown, so has our need for greater image archiving capacity. Our first location in Montclair, which averaged only five to 10 imaging studies per day, eventually increased its study load to more than 30 per day—growth that was accentuated by the opening of our second location in Rancho Cucamonga.

Founded in 2000, Millennium Imaging provides advanced multi-modality imaging services for Southern California customers from facilities in Montclair and Rancho Cucamonga. These facilities operate four digital imaging modalities including open-MRI, computed tomography (CT), ultrasound and bone densitometry—all of which our referring physicians depend on to provide high-quality images and critical diagnostic information to directly benefit their patients.

For a number of years, our practice operated solely on a CD-based digital image archival and retrieval platform. The digital image archive, which consisted of more than 900 CDs, required significant manual intervention for proper maintenance and updating. Unfortunately, this solution lacked the scalability we needed to keep pace

with our rapid growth. In addition, the replication of all medical images and studies for remote storage, as required by the Health Insurance Portability and Accountability Act (HIPAA), became a labor-intensive process resulting in significant additional costs.

In an effort to find a better way, our technologists routinely compared our archival capabilities and CD-ROMs against the log records. As we continued to grow our practice, it became increasingly challenging to find the time and onsite space for CD storage and archiving. Even more urgent, our ability to offer referring physicians fast and easy access to digital image data from our archive for comparison studies or follow-up visits was routinely compromised. We realized we needed a cost-effective, automated, rule-based solution to handle remote replication and provide a reliable method for disaster recovery and protection.

The PACS Appliance Solution

While a conventional PACS can meet some of our digital image management needs, this solution comes at prices ranging in the hundreds of thousands of dollars—far too costly for us and many other smaller medical organizations such as imaging centers, clinics and small hospitals. Additionally, most PACS require users to master the operation and maintenance of a general-purpose server,

including adding peripheral subsystems and services to ensure optimal operation of the PACS—a responsibility that would unduly burden our technologists who already manage various equipment and applications.

Ultimately, we concluded that a traditional PACS would have added significant acquisition costs, as well as management and administrative overhead to our practice—not to mention incremental workload potential for staff at both locations. In considering an alternative solution, we took a departure from a conventional PACS approach, which we believed was originally designed to accommodate IT-centric hospitals. Instead, we explored digital image-management system solutions specifically tailored to the budget, maintenance, and growth challenges we were facing at the time.

A new class of recently introduced PACS appliances take a different approach by offering a simplified appliance operating system coupled with Digital Imaging and Communications in Medicine (DICOM)-standard operability for digital imaging modalities and industry-standard CPU and RAID storage. Using Serial ATA disks and expansion units, a PACS appliance can be configured to provide one to more than 100 terabytes of storage and archive capacity.

Moreover, we found that many of the key features of the costlier PACS can be found in a PACS appliance.

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However, because of its single-purpose appliance design for DICOM services rather than a general-purpose computer system, a PACS appliance is significantly easier to install and administer than a conventional PACS.

Thanks to its streamlined architecture, the PACS appliance delivers simplified image access, operation and management, and protection of digital images in a HIPAA-compliant storage and archival environment. So, to meet our diverse needs, we chose to deploy the Candelis ImageGrid 1000 PACS appliance at each location, instead of a single-location, conventional PACS.

Quick Installation, Quick Use

Having chosen what we deduced to be the proper solution for growth and usability, we installed a 4.8-terabyte ImageGrid PACS appliance. The installation took a mere four hours with no interruptions to our daily operations, which represented a significant advantage over a conventional PACS. Within minutes of the installation, the four digital-imaging modalities at each location were able to send images directly to their respective local PACS appliance, which were available for immediate viewing by our radiologists.

Since our new PACS appliance was also designed to be compatible with DICOM-standard viewing software, our existing Merge eMed e-Film Workstations were easily integrated with the PACS appliance. A Virtual Private

Network (VPN) connection between the two locations provides us with a secure protocol for bi-directional replication of each imaging study.

In addition to faster and more efficient image study access and retrieval, we are also able to deliver reports more quickly to our referring physicians. Image transfers between our two facility sites is also considerably less cumbersome. This is especially relevant for most data-intensive studies that can now be programmed for overnight delivery to conserve valuable network bandwidth during our busiest business hours.

Productivity and Future Growth

In addition to eliminating a labor-intensive CD-based system, we have also virtually eliminated errors resulting from the manual handling of CD-based images. Based on current usage patterns, our new PACS appliances should provide at least four years of disk-based archiving.

We are also taking advantage of our PACS's embedded capabilities and features, such as image routing to referring physicians. Having always-on access to images enables our staff to address questions and requests almost immediately, resulting in vastly improved communication with our referring physicians who can now deliver more timely patient treatment and care.

Investing in a PACS appliance has enabled us to avoid the costs of more complex and costly PACS servers and hardware, which has helped reduce our average image-archiving cost to an impressive 50 cents per study. The PACS appliance's proactive self-monitoring capability has allowed our practice to not only reduce our IT administrative costs, but also improve the uptime by operating at 100 percent capacity with little, if any, administrative interaction. Our two systems also provide us with a real-time disaster recovery capability through daily bi-directional replication, which protects patient data and complies with HIPAA data-retention requirements.

Based on the results of our PACS appliance installation, we no longer consider digital image storage and archiving to be an obstacle for future growth. In fact, we are now in the process of adopting an advanced 64-slice, multi-detector CT. Despite the digital image-management challenges of a 64-slice, multi-detector CT system with imaging studies as large as 5 gigabytes, the ImageGrid PACS appliance will be able to provide a comparable level of productivity and protection as we move forward.



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