



Johnson Lightfoote, MD, Director of Radiology, is impressed with the quality of integrated imaging, data retrieval, and report creation with syngo Suite.



# Enterprise-wide Workflow Drives Productivity

When a busy community medical center in California put out a call for help in streamlining its operations – both administratively and clinically – Siemens listened, responded, and participated in defining the right solutions. The initiative turned out to be a win-win situation for both the hospital and its patients.

By Abby Christopher

In 2003, Pomona Valley Hospital Medical Center (PVHMC) was frustrated with locating films, inconsistent reporting quality, and an increasing backlog of radiologists' reports. These issues interfered with the level of service provided to the patient and referring physician. The hospital issued a request for proposal, seeking help to address these challenges. Key goals included improving workflow efficiency and productivity; changing to a filmless, paperless environment; preventing misplacement of films; and faster, more responsive patient care. "We were driven by the need to

improve our radiology operations enterprise-wide," says Kent Hoyos, PVHMC's CIO (Chief Information Officer). Therefore, joint Siemens and PVHMC teams analyzed the causes and effects of these problems. Based on their results, the hospital decided to integrate its disparate imaging systems, the hospital information system (HIS), and the radiology information system (RIS). A role-based workflow was defined throughout the enterprise to govern all radiology processes, from patient registration, exam planning, image acquisition, postprocessing, interpretation and report dictation, to report and image distribution to referring physicians. An important tool in creating it was Siemens' *syngo*® Suite. This suite of solutions provides trendsetting end-to-end imaging workflows for clinical imaging that are role-based, context-sensitive, and knowledge-driven – making infor-

report, advising him to go to physical therapy.

### Enterprise-wide and Beyond

*syngo* Suite supports a tightly integrated, RIS-driven picture archiving and communication system (PACS) that enables enterprise-wide communication as well as remote access. PVHMC's RIS/PACS enables authorized hospital staff at different locations to simultaneously access the same reports, images, and patient information as a common point of reference for phone consults and other tasks. Such access boosts efficiency and improves the quality and timeliness of patient care. "I've been impressed with how well imaging and reports are integrated with this RIS/PACS system – even from remote sites," says Johnson Lightfoote, MD, PVHMC's Director of Radiology. Robert Ring, MD, one of PVHMC's general

throughout the enterprise or over the Internet through an easy-to-use, single point of access, Soarian® Clinicals. Neurosurgeons, orthopedic surgeons, and other specialists who require more sophisticated functions have access to the floating licenses of the *syngo* Studio Advanced viewing software.

### Single-vendor Strategy

With Siemens' help, PVHMC has deployed several of the *syngo* Suite modules to establish its enterprise-wide workflow. Combined *syngo* Suite solutions, including *syngo* Imaging for PACS, *syngo* Workflow with *syngo* Voice for RIS and dictation, as well as *syngo* Dynamics (a dedicated PACS and reporting solution used in cardiology and vascular ultrasound) have made PVHMC's enterprise-wide workflow possible.

PVHMC chose Siemens as a single-vendor solutions provider, rather than opting for a multi-vendor strategy, according to Herb Medford, manager of the hospital's PACS. "I feel sorry for hospitals that work with multiple vendors in their imaging departments. If you have more than one, they finger-point, and this slows down the resolution of system problems," says Medford. "As a community hospital, we needed someone we could partner with to manage the enterprise-wide approach. Otherwise, we would not be able to build or to afford the necessary IT support internally," says Hoyos. "We've been a Siemens customer for 30 years, on the IT side as well as in imaging," he adds.

### The Transcription Bottleneck

CIO Hoyos established a committee to clearly identify where the bottlenecks were and how workflow could be improved across the continuum of care. "We have an enterprise team approach," explains Hoyos. The Chief Medical Information Officer (CMIO), radiologists, referring physicians, PACS manager, and RIS manager, among others, including Siemens experts, participated in the committee. Part of the group's mandate was to gather information on established hospital workflow processes. "We wanted to find out what steps we could eliminate and which steps needed improvement,"

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mation available to the right user in the right workflow context. *syngo* Suite is comprised of key building blocks that enabled PVHMC to build an enterprise-wide workflow and an entirely filmless, paperless environment. As a result of this strategy shift, PVHMC realized dramatic improvements not only in productivity, but also in collaboration among clinical colleagues. Referring physicians and patients experience improved service with minimized waiting times and faster report turnaround time. "With Siemens' recommendations and IT solutions, we've improved workflow for our radiologists quite significantly," says Hoyos. He recently experienced this firsthand when he had an X-ray for a shoulder problem and in less than an hour received a voicemail from his referring physician, who had quickly received the radiologist's

radiologists, works remotely from a small coastal village in Maine several months each year. From June to October, Ring reads images and generates reports remotely between 5:00 a.m. and 10:00 a.m. east coast time. He uses a secure virtual private network (VPN) and a low-cost FiOS (Fiber Optic Services) connection with a bandwidth of ten Mbit/s down and two Mbit/s up to access the PVHMC RIS and PACS. This success motivated the hospital to set up eight of the hospital's radiologists to work remotely. It even provides a RIS/PACS suitcase, containing a portable workstation to be used by radiologists for diagnostic reading while traveling. Since one can hardly expect all radiology data users in the enterprise to become experts in using RIS and PACS, PVHMC made the reports and images available



Chose Siemens' solutions to help transition to an enterprise-wide workflow at PVHMC: Gerald Goldman, MD, Robert Jacoby, and Kent Hoyos, CIO (from top to bottom).



explains Hoyos. The committee identified film distribution, transcription, and report production as key bottlenecks. Prior to the adoption of *syngo* Suite, PVHMC, like many other hospitals, relied on conventional transcription and a loosely structured reporting process.

To help make the reporting process more efficient, the hospital is now employing *syngo* Voice, the speech recognition application for online creation of reports with self-editing. Radiologists dictate their reports and the system generates an electronic draft through the RIS, *syngo* Workflow. Radiologists then review and edit the reports for accuracy. This provides a consistent structure and format. However, some flexibility is also built into the system to accommodate specific data content of different imaging modalities.

According to PVHMC's RIS Manager, Julie Terveer, inpatient report turnaround time was between 24 to 36 hours and outpatient was 48 to 72 hours before switching to *syngo* Suite. Now, in 98 percent of the cases, turnaround time is two hours or better for both inpatient and outpatient reports.

During an unplanned patient tracer survey this year, Joint Commission inspectors were impressed with the quick turnaround. They traced an emergency room patient who needed a computed tomography scan. The scan and report was dictated and signed off in less than ten minutes, Terveer explains. She was also impressed at the rapid adoption of *syngo* Voice: Within only five weeks of intro-

ducing the voice recognition system, about 50 percent of all of the hospital's radiologists were using it. Today, the adoption rate is up to 80 percent, meaning just one or two physicians still rely on conventional dictation and transcription. "We thought it would be at least four months or more before we got to 50 percent," says Terveer.

### Collaboration and Productivity in the ICU

In PVHMC's intensive care units (ICUs), a tightly knit group of clinicians collaborates on the care of each patient. Until the adoption of Siemens' *syngo* Suite and Soarian Clinicals, morning rounds could take as long as three hours or more, according to Gerald Goldman, MD, PVHMC's CMIO and a veteran gastroenterologist. Now, with improvements in workflow and access to patient data, rounds take roughly two hours.

"We used to do walking bedside rounds to assess patients," says Heather Davis, MD, PVHMC intensivist. "Now, the charge nurse presents the patient assessment to the team to identify problems early in the process. This makes it possible to develop a plan prior to rounds." And, Goldman adds, "More data are available, which allows us to compare images and track patient progress."

The patient ICU team includes an intensivist, charge nurse, case manager, respiratory therapist, pharmacist, and dietician. Soarian Clinicals, with integrated patient results and reports, is used to compare and integrate all clinical information. A biometric mouse provided by Siemens helps speed access to all team members. Within the next six months, PVHMC will begin an accelerated Soarian installation as the cornerstone integrating all aspects of the hospital information system, according to Hoyos.

**"More information, in a timely manner, at the point of care, allows us to quickly make informed decisions."**

Gerald Goldman, MD, CMIO, Pomona Valley Hospital Medical Center, California, USA

## Deepening Ties to Referring Physicians

PVHMC has forged a number of strategic relationships with referring physicians in the Pomona area, starting many years ago with a practice that was literally just across the street from the hospital. While being neighbors made the ferrying of paper documents and films relatively easy, PVHMC's change to a filmless and paperless workflow has impressed Greg Dahlquist, MD, a primary care physician, whose practice has since expanded to multiple locations. "We're getting phenomenally fast results [from PVHMC]," says Dahlquist. "Previously, we'd have to go to the radiologist to find a film and request a paper report. Now, we access images and reports from our offices." Dahlquist's Premiere Medical Group and other PVHMC strategic partners can view full reports and images remotely while speaking with radiologists and other clinicians on the phone. "I've also seen a dramatic improvement in report quality," says Dahlquist. "syngo Workflow and syngo Imaging have helped PVHMC strengthen its ties to referring physicians. It's helping us with our outreach strategy," says Robert Jacoby, PVHMC's Administrative Director of Radiology.

## Keys to Ongoing Success

PVHMC has recently decided to outsource its disaster recovery backup system to Siemens and Siemens' new strategic partner, Harris Corporation. The Siemens/Harris disaster recovery system will back up PVHMC's server data at multiple locations via data centers throughout the USA, says Justin Aquino, PVHMC's Senior Systems Analyst, Information Services. In collaboration with Siemens, PVHMC

continues to refine the syngo Suite of solutions and to add and evaluate new solutions and updated modules. The hospital plans to implement Siemens' Soarian EDM/HIM (Enterprise Document Management/Health Information Management). Soarian EDM provides efficient, Web-based access to clinical, financial, and administrative documents. HIM provides Web-based access to online medical records. Siemens helped PVHMC's transition to an enterprise workflow and routinely responds to feedback from key stakeholders at the hospital. As PVHMC continues to expand and update syngo Suite and install Soarian Clinicals and other solutions, the hospital relies on Siemens for the journey towards workflow efficiency, productivity, and responsiveness to patient needs.

Stakeholders from different departments regularly meet with CIO Hoyos, and he and CMIO Goldman update each other on the progress of the integration and adoption of new solutions and share that input with Siemens. Regularly meeting and getting feedback is one of the keys to success, according to Hoyos. "The more you use the system, the more you learn about new possibilities you want to implement as you go along," adds Davis. For PVHMC, adopting syngo Suite, Soarian Clinicals, and other Siemens solutions has clearly rallied and brought together departments that once operated independently. Since the hospital began the transition to an enterprise-wide workflow, the cooperation between IT and radiology has improved. PACS Manager Medford says, "We're all in it together."

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## Summary

### Challenge:

- Backlog of radiologists' reports
- Turnaround times for each patient report up to 72 hours
- Difficulty in finding and locating films
- Misplaced reports
- Overall workflow inefficiencies and lack of productivity
- Annual costs for physical film and film processing US\$530,000
- 19 film librarians

### Solution:

- Massive enterprise-wide workflow re-engineering initiative, enabled by RIS-driven PACS with syngo Workflow and syngo Imaging
- Speech recognition alternative to conventional transcription with syngo Voice
- Enterprise-wide workflow with worklist-defined reports
- Easy access to reports and images throughout the enterprise
- Easy access to patient information via Soarian Clinicals

### Result:

- Savings of US\$510,000 annually on film costs
- Turnaround times for each patient report reduced to two hours
- ICU rounds reduced from three hours to two
- Virtually no report backlog
- 80 percent of radiologists using syngo Voice to produce their reports
- Consistent, thorough reports
- Improved collaboration among colleagues, e.g., for consults, daily rounds
- Improved patient care and responsiveness
- Established teleradiology that allows PVHMC radiologists to work remotely

## Pomona Valley Hospital Medical Center

Pomona Valley Hospital Medical Center (PVHMC), a 453-bed, not-for-profit community hospital, is located in Pomona, California, USA. With 190,000 radiological procedures, 24,000 patient admissions, 111,000 patient days, and 69,000 emergency room visits annually, PVHMC supports several centers of excellence for specialties that include oncology, cardiac care, and sports and family medicine.

## Further Information

[www.siemens.com/syngo](http://www.siemens.com/syngo)