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King Abdulaziz Cardiac Centre

Full-Cycle Integration: Automatic Data Flow from Order to Discharge

Connecting the EMR, Scheduling, Imaging, Physician Reporting and More at King Abdulaziz Cardiac Centre

Highlights

Full-Cycle Integration of Data and Images. Connected systems transmit Orders, ADT, scheduling, results and physician report information to and from the electronic medical record (EMR), modalities, devices, the Apollo™ clinical data repository—automatically and seamlessly.

Interoperability Between Best-of-Breed Systems. KACC elected to use a vendor-neutral system to connect their assorted applications and devices. Vendor neutrality enables each clinical area's best-of-breed system to communicate with others.

Clinical Information More Accessible and More Accurate. Patient data is fully integrated and readily accessible for review at any time during the care cycle. Additionally, because data is no longer entered multiple times into multiple systems, greater accuracy is ensured.

More Time with Patients, Less Time Managing Data. Integration has enabled crucial data to auto-populate multiple fields in formerly unconnected systems across the Cardiac Centre. This accelerates the physician reporting process and liberates clinicians from manual data entry so they can devote more time to patient care.

“We have greatly reduced the time it takes to get the information our physicians need. For example, formerly a cath report would take three days and now it can be completed within 20 minutes after the end of the procedure. This is the significance of integration.”

—Raed AlHazme
Cardiac PACS Director
King Abdulaziz Cardiac Centre
National Guard Health Affairs

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The King Abdulaziz Cardiac Centre (KACC), located within the King Abdulaziz Medical City in Riyadh, Kingdom of Saudi Arabia, is part of a nationwide system of hospitals operated by National Guard Health Affairs. Hosting a highly trained, highly experienced medical and technical staff and offering a full range of Adult and Pediatric cardiac services, the center is committed to the appropriate application of technology as an avenue to improved patient care.

KACC reported a modest 800 surgeries, 2,300 catheterizations and 30,000 clinic visits in 2008. This volume is expected to increase rapidly soon with the opening of an expansion to the facility that will provide the center with a total of 144 dedicated cardiac beds.

The center's rapid growth has increased the need for an easily accessible flow of clinical data. Recently KACC achieved **full-cycle integration** of its cardiac data: From the moment a patient walks in the door of the center, all clinical information moves smoothly from each device, system and clinical area to the Apollo data repository, out to the EMR and back again when needed.

Best-of-Breed Approach

KACC had adopted a best-of-breed approach to data and image management, acquiring the best systems to serve each clinical area and department. "You cannot buy one solution that fits all the cardiac specialties. That's a fact and we don't think it's going to change any time soon—because no single company can design and develop a system that adequately fits all the complexities and variations of cardiac clinical activities. Companies can develop software for echo, ECG, Holter, surgery, etc., but the functionality is seldom up to expectations," says Cardiac PACS Director Raed AlHazme.

FULL-CYCLE INTEGRATION – HOW IT WORKS

1. QCPR, the EMR system, transmits Orders, scheduling and ADT messages to the Apollo clinical data repository via the Rhapsody integration engine.
2. All systems use the same Order number.
3. Apollo sends this information to Xcelera (imaging system) and HaemoSphere (hemodynamic system).
4. Xcelera acquires images and HaemoSphere acquires hemodynamic data during the procedure.
5. When the procedure is complete, Xcelera and HaemoSphere send results to Apollo.
6. Data and images in Apollo auto-populate fields in CardioDoc™ physician structured reporting.
7. Apollo sends cath results reports via Rhapsody back to the electronic medical record (QCPR).

The Benefit:

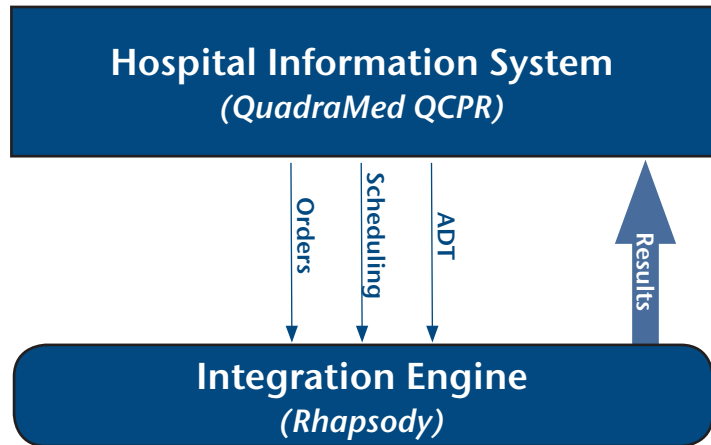
A dramatic reduction in the time it takes for physicians to get the information they need to deliver best-quality care.

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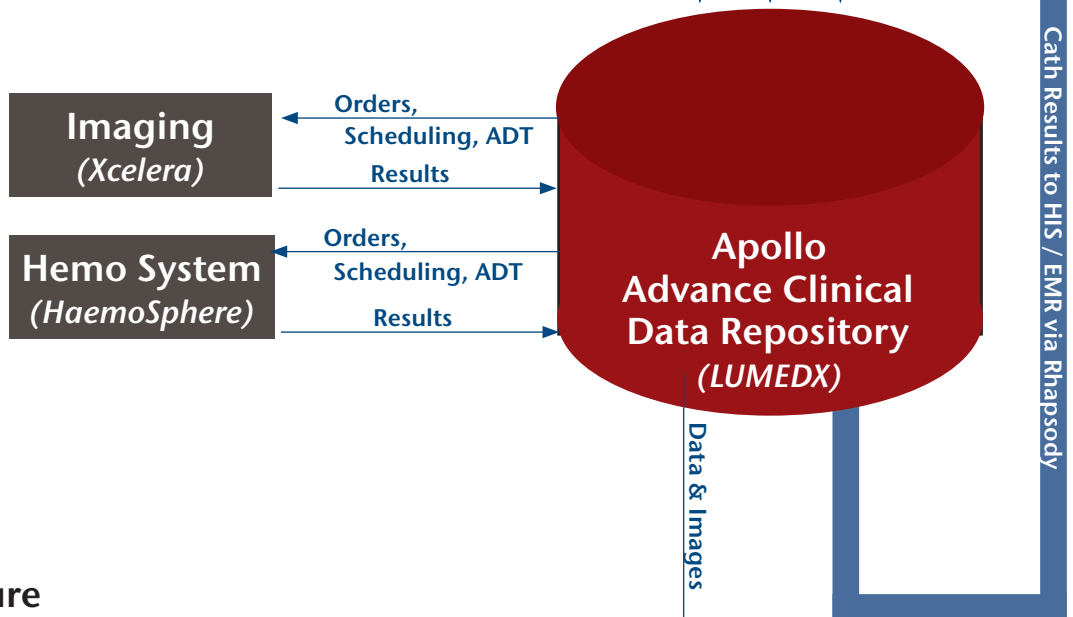
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FULL-CYCLE INTEGRATION – HOW IT WORKS

Pre-Procedure



Procedure



Post-Procedure



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Isolated Systems and Silos of Data

The best-of-breed approach served KACC well but also created its own set of challenges. According to Raed, “Our systems are the very best systems for their area, but they did not talk to each other. They were isolated.” Isolated systems led to the following problems:

- While best-of-breed systems resided in single clinical areas in the hospital, patients moved through multiple areas during the care cycle.
- Getting the data from these myriad systems to follow the course of a patient’s treatment involved tremendous manual effort.
- This in turned slowed the communication of critical information.
- Employing healthcare professionals to manage data took their time away from providing care for patients.
- Storing and managing information from myriad systems manually was costly.
- Data was entered multiple times from multiple sources, increasing the risk of inaccurate data, which could impact the quality of care.

KACC wanted to be able to transmit patient data automatically from one clinical area to another: from ECG to EP for example, and from EP to cath, with results going to surgery databases if necessary and to the EMR.

Cumbersome Physician Reporting Process

Isolated systems also slowed physician reporting. For example, generating a cath report was a time-consuming, multi-step process that entailed staff members gathering data from several sources.

1. Manual look-up of demographic information from the EMR or paper chart.
2. Manual data entry of demographics into X-ray hemodynamic standalone interface for the hemodynamic/procedure log systems.
3. Manual printing of angio images and procedure log, which were then placed in the chart along with a handwritten preliminary cath report.
4. Physician dictation of the final report.
5. Transcription.
6. Two to three days later: physician correction or signing of final report.

This process was inefficient, slow and subject to error, particularly if any important detail was inadvertently omitted or incorrectly transcribed. Reports were frequently returned for corrections.

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GLOBAL COORDINATION

The full-cycle integration project involved systems and vendors around the globe, including:

- Apollo Clinical Data Repository and interfaces – LUMEDX – Seattle, United States
- HaemoSphere Hemodynamic System – Philips – Amsterdam, The Netherlands
- QuadraMed Computerized Patient Record (QCPR) – QuadraMed – Virginia, United States
- Rhapsody Integration Engine – Orion Health – Southern California, United States
- Xcelera Imaging System – Philips – Amsterdam, The Netherlands
- MUSE – GE Healthcare – Chalfont St. Giles, UK*

*Integration with MUSE in progress.

The Chairman of the Cardiac Centre, Dr. Muayed AlZaibag, is an interventionist, and he not only understood the problem, he lived it—and was highly motivated to find a solution. The proposed expansion of the Cardiac Centre magnified the need to obtain a solution.

The Solution: Vendor-Neutral Integration

“We discussed this and decided that we needed a system that would integrate with all of our systems,” recalls Raed. The optimal solution would be thoughtfully constructed interfaces that could support a revised user-friendly, IT-driven workflow. Additionally, notes Raed, “We determined this system should be vendor neutral and allow customization by trained in-house staff.”

Global Coordination: Cardiac Centre, LUMEDX and Other Vendors

After investigating a few vendors’ offerings, KACC ultimately chose LUMEDX to help them achieve full integration of cardiology data and images. LUMEDX specializes in vendor-neutral management and integration of data and images.

LUMEDX, based in Seattle, and the Cardiac Centre staff in Riyadh worked with multiple systems, vendors and time zones, coordinating a team that spanned the globe, including: Philips

in Amsterdam, The Netherlands; QuadraMed in Virginia, USA; and Orion Health in Southern California, USA; and GE, headquartered in the UK.

The project was extensive. Each system had its own unique requirements, yet careful planning and communication enabled integration of data and images throughout the entire patient care cycle.

A Streamlined Workflow

Six months after going live with full-cycle integration, staff and clinicians at KACC have seen dramatic changes in their workflows. Today when a technician walks up to an imaging machine in the cath lab, for



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example, he doesn't have to type in the patient's name or any other information. That data has already reached the machine automatically. If a clinician wants to check on the status of a patient, she can look in the EMR and see either that the Order is in progress or that the procedure has been completed and the results are available in the EMR.

Additionally, after the procedure is over a physician only needs to log into CardioDoc, pull up the patient, enter his findings, include images and finalize the report. All other required information has already automatically populated the report fields. And because the systems now use the same Order number, once the report is finalized a message is transmitted back to the EMR to signal the Order is complete.

Immediate Access to Data Facilitates Best Quality Care

Connecting systems to automate the flow of information has liberated staff from manual data entry; moreover, because data is no longer entered multiple times into multiple systems, data integrity is improved.

"We have greatly reduced the time it takes to get the information our physicians need. For example, formerly a cath report would take three days and now it can be completed within 20 minutes after the end of the procedure," notes Raed. In fact, day patients are currently discharged with reports in hand. In addition, now when existing patients are admitted into the Emergency Room cardiologists only need to update the history. All the details of prior clinic visits, history and physical, Echo, ECG, catheterization and other information is immediately available in electronic form, saving crucial minutes.

At KACC, immediate access to data and accelerated physician reporting have far-reaching consequences. "The quality of the care we deliver has improved because everything is done right away," Raed explains. "This is the significance of integration. Now we're getting calls from hospitals within the country and around the world, wanting to know how we have done this."

LUMEDX SOLUTIONS AT KING ABDULAZIZ CARDIAC CENTRE

- Apollo Advance™ Clinical Data Repository
- CardioDoc™ Physician Structured Reporting
- CardioDoc Toolkit
- Apollo Toolkit
- CardioSchedule™ Patient Scheduling
- Clinical Manager Performance Management
- Suite of LUMEDX interfaces

