Using Enterprise Connectivity to Make Medical Devices IHE Compliant

While device manufacturers and EMR vendors want to be able to implement the protocols required to be IHE compliant for device connectivity, there are market challenges causing difficulty to do so. These include:

- A lack of established standards for medical device data; the use of HL7 is growing but there are still many versions of HL7 and the protocols for HL7 keep changing.
- There are hundreds of legacy devices that simply cannot support the new HL7 standards. Therefore, more often than not medical devices have and will continue to have their own proprietary protocols.
- Both device manufacturers and information system vendors cannot keep up with developing and maintaining a comprehensive list of device drivers or with updating the software on current medical devices.
- Device integration is simply not the core competency of device manufacturers and information system vendors.
How Capsule Fits Within the IHE Patient Care Devices (PCD) Domain

Capsule has been actively involved in the IHE Patient Care Devices (PCD) domain for the past several years and is committed to providing end users with a comprehensive interoperability platform that supports all patient-care devices used across the clinical environment.

Capsule has implemented the Device Enterprise Communication (DEC) and Alarm Communications Management (ACM) profiles in the Patient Care Devices (PCD) domain of IHE. This allows any site that uses supported versions of DataCaptor™ to use the IHE PCD profiles to achieve semantic interoperability with minimal configuration, when communicating with other systems implementing the same PCD profiles. This allows users to overcome one of the biggest drawbacks of using just HL7-semantic variability. If the legacy medical devices in a clinical environment does not support PCD profiles or even HL7, as most do not, the DataCaptor™ system on the network will be able translate the clinical data to the IHE PCD compliant profiles, allowing enterprise wide IHE compliance.

Our solution offers numerous benefits to device manufacturers and information system providers.

For device manufacturers, our solution delivers:
- A low risk, low resource alternative to in-house development
- A standards based IHE PCD (DEC and ACM) solution that is proven to work with most CIS vendors implementing these profiles, and generic HL7 based output for all others.

For HIS vendors, our solution offers:
- An IHE DEC and ACM profile compliant data source
- Standardized variable mapping
- Unified device interface without custom coding
- Support for all device vendors

In fact, Capsule already has established relationships and proven deployment with nearly every device manufacturer and information system provider in the industry. Therefore, with Capsule, over 600 devices are IHE compliant as well as 14 information system providers. Capsule also continuously works with these companies to solve and develop products and solutions that will meet the connectivity needs of the future in order to ensure that these solutions are integrated into their roadmap plans.

Why Capsule for Device Connectivity

Capsule understands that staff changes, technology is continually evolving, and hospitals don’t want to implement an entirely new system whenever these changes occur. We partner with the leading medical device manufacturers and information system vendors around the world to allow hospitals to connect any device to any hospital information system. And, our design is completely flexible and scalable allowing hospitals to add devices and information systems and even change devices and information systems, all without impacting connectivity.
Capsule is the leading provider of medical device connectivity with over 16 years of experience and expertise in the industry. Our solution is proven and installed at over 1,100 facilities worldwide. Our solution benefits hospitals through the deployment of safe medical device integration to information systems that work today, right away, and is flexible to grow as the hospital's needs grow.

**Capsule’s Enterprise Medical Device Connectivity Solution**

Capsule’s Enterprise Medical Device Connectivity solution was designed with nurses for nurses and features connectivity options that work in all care areas of the hospital - from critical care, to the OR, Med-Surg, and the ED. Designed under the same open architecture principles that fostered the design of Capsule’s proven DataCaptor™ software, Capsule’s Enterprise Connectivity Solution does not lock hospitals into one method of operation and deployment; in fact it works with existing technologies and integrates with caregiver workflows. With various methods of capturing patient information available, the Enterprise Device Connectivity Solution features a variety of options that allow a hospital to configure their solution based on their clinical and organizational needs.

**Continuous Data Collection for High Acuity**

In higher acuity environments, such as the ICU or OR, the Capsule Neuron is typically mounted directly on the wall near the patient. Each Capsule Neuron is assigned to one patient. The visual display at the bedside provides clinicians with constant assurance that all patient data is being collected from the connected devices and processed for the charting system. This means the nurse can focus on patient care without having to stop every 5-15 minutes to manually chart the vital signs. The Capsule Neuron simply allows clinicians to provide care with confidence – knowing that patient data is being captured automatically and sent to the EMR waiting for validation when they are ready to chart.

**Periodic Data Collection for Low Acuity**

In lower acuity environments, such as Med-Surg, Capsule’s Mobile Vitals Plus™ is deployed to handle multiple patients. The Capsule Neuron is mounted directly to a roll stand with the spot-check monitor and a bar-code scanner, seamlessly working with the existing workflow of the unit. Vital signs are automatically captured by Capsule’s Mobile Vitals Plus™ system connected to a spot-check monitor. The vital signs validation is completed at the point-of-care and clinicians can automatically send it to the information system allowing the patient’s record to be updated immediately without the clinician ever needing to log into a workstation.

**Collaborating for Medical Device Integration Success**

**Departments, Devices and Vendors Seamlessly Come Together for Success at Sentara**

We’re all in this together in today’s new era of healthcare reform. This perspective is particularly true when integrating medical device data into an Electronic Medical Record (EMR) system that successfully meets current mandates for greater information sharing. Devices, IT systems and users – human infrastructure – must all come together to maximize results.

Recognizing this, in 2006, Sentara Health Systems (headquarters) embarked on a multi-phase, multi-location Medical Device Integration (MDI) initiative that included a wide range of equipment across the enterprise, involved participation and met the needs of all departments touching the technology, and represented a true partnership with its MDI vendor Capsule.

Facilitating interoperability on many levels, the ambitious, ongoing project has already reaped improvements in patient safety, efficiency and the bottom line. Sentara hospitals are also enjoying the benefits of real-time data delivery to patient charts and beginning to realize Meaningful Use.

**MDI – A Definition**

For the uninitiated, MDI is an approach to delivering digital data directly from biomedical devices over the hospital network into the electronic medical record (EMR) system. Without it, data – especially vital signs—must be recorded on paper charts and duplicated through re-keying into the EMR. MDI eliminates repetitive efforts and through automation enhances data accuracy and communication efficiency. It improves clinical decision making with faster and easier access to current patient information and enables caregivers to spend more time at the bedside and less with machines.
Sentara Healthcare
MDI Overview

Comprising more than 100 sites across Virginia and North Carolina, Sentara is among the nation’s top integrated healthcare systems. It includes numerous acute care hospitals, stand-alone emergency facilities and community hospitals. The MDI scope initially involved physiological patient bedside monitors, fetal monitors and vents in varied nursing settings – ICU, Labor and Delivery, PACU, Pre-Op, Endoscopy, ED and more. Surgical department anesthesia device integration was also recently added. The hospital system selected Capsule as an independent connectivity solution because it was not a one-size-fits-all solution and supported the large and diverse number of medical devices used throughout the enterprise. This system complements the native integration modules from the hospital’s primary physiological monitor vendor, which are also widely implemented.

The Capsule solution provides network drivers for hundreds of devices across most major vendors, and the architecture can be configured to meet specific department workflow and system needs. Capsule’s unique interoperability with virtually any medical device allows clinicians to choose their preferred endpoint technology and to maintain existing workflow. Its near-universal device support minimizes costs of equipment replacement to achieve integration and allows large-scale MDI implementations to be accomplished more rapidly.

MDI eliminates repetitive efforts and through automation enhances data accuracy and communication efficiency

For Sentara’s Capsule integrations, information flows from devices into a Capsule interface, which functions as middleware to translate data as the EMR requires. Using VMware, Capsule’s DataCaptor™ software runs completely on virtualized servers in the main data center. After the information is translated, it is sent over the network to an enterprise integration engine, which delivers it to the EMR seamlessly and in the correct format, with safety checks in place. This engine brings all device information together enterprise wide, serving as a single point of EMR entry.

In addition to patient monitors, Sentara’s advanced MDI system already supports devices, from ventilators to anesthesia machines with new equipment being introduced regularly. It includes more than 2,000 biomedical devices for 1,400 beds, which feed information to their Epic EMR. Nursing workflow alone generates more than 675,000 messages daily for the EMR.

The Benefits of a Team Effort and Project Planning

From project launch, a dedicated full-time MDI team assumed overall responsibility for project management, including developing a master project blueprint and reproducible models for specific departmental integrations for enterprise-wide rollout.

The team works with organized committees of all stakeholders to gather the required data and coordinate efforts. Capsule supported the MDI team as necessary to ensure all needs were met. The Clinical Team, or super-users, includes those who use the devices hands on. Other teams include Biomedical, IT, and EMR Application and Technical. The latter ensures correct patient record field mapping.

Throughout, the MDI team worked with the various other groups to ensure every aspect of the project was well understood and planned, from clinical workflow and devices involvement to budgeting and system testing.

The Results

As a result, MDI technology and workflow interaction has become a two-way street. The implementation supports the way clinicians work and makes the most of the technology's capabilities to minimize implementation time tables, costs and maintenance. The project has proceeded seamlessly with an ever-growing list of devices and departments. And most important, all involved continue to have an extremely satisfying experience.

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To view our library of over 600 device drivers for DataCaptor™ scan here:

or go here:
http://hub.am/XPwhWg
(the URL is case sensitive)