In today's healthcare environment, data is predicted to be the strategic resource that will drive the real-time health system — creating insights to improve patient outcomes, create operational efficiencies, and support new care models. Currently, however, it is estimated that less than 1 percent of medical device data (MDD) is being used for digital health — mainly for clinical documentation, i.e. sending parameters to an electronic health record (EHR) (Capsule calculation, 2019).

Recently, many health systems have embarked on patient care and administrative innovations — initiatives that can enable predictive bedside interventions, close the gaps on patient safety and reduce workflow inefficiencies. These initiatives require that data — specifically medical device data — be available in greater types, quantities, and frequencies, but current IT infrastructures are ill-equipped to deliver this data to the right systems.

**MEDICAL DEVICE DATA: A CRITICAL ASSET, TODAY & TOMORROW**

**LESS THAN 1%**

**PERCENTAGE OF MEDICAL DEVICE DATA CURRENTLY BEING USED FOR DIGITAL HEALTH**
The Capsule medical device information platform (MDIP) is designed to support a hospital’s need to leverage device data in unlimited ways. With deployments in over 2600 leading healthcare facilities across 40+ countries, Capsule’s solution is proven to work in any care setting. Improving clinical workflow and data reliability for clinicians, Capsule also provides flexibility, scalability and security for biomedical and IT staff.

**CAPSULE ANTICIPATES & MANAGES THE COMPLEXITIES OF DEVICE INTEGRATION**

The Capsule medical device information platform (MDIP) is designed to support a hospital’s need to leverage device data in unlimited ways. With deployments in over 2600 leading healthcare facilities across 40+ countries, Capsule’s solution is proven to work in any care setting. Improving clinical workflow and data reliability for clinicians, Capsule also provides flexibility, scalability and security for biomedical and IT staff.

**CAPSULE PROVIDES:**

- The industry’s most extensive library of device drivers for a broad range of device types, manufacturers, and versions
- Connectivity options to fit any care environment
- Plug-and-play connectivity, self-service management model

**CAPSULE MANAGES DISPARATE DATA & PREPARES IT FOR USE**

The data generated by the array of medical devices in a typical hospital offers a wealth of information including patient data, therapy details, alarms and device settings. Unfortunately, there is little standardization as to how medical device data is output and labeled, so important context — location, associated patient, correct time, and other corollary elements — is often missing.

Destination systems, too, require different types of data from different devices. For example, the EHR requires patient vitals every minute for clinical documentation. Alarm management systems, however, need alarm and contextual information as soon as it is communicated by the device.
CAPSULE ALLOWS HEALTH SYSTEMS TO DELIVER COMPLEX MEDICAL DEVICE DATA TO SYSTEMS THROUGH POWERFUL DATA MANAGEMENT CAPABILITIES:

**DATA SELECTION**
Send all parameters or filter and send a subset of parameters as required by the receiving system(s).

**DATA SAMPLING RATE**
Send data at the appropriate pace. Deliver clinical alarms in near real-time as they are produced, while sending patient vitals every minute for clinical documentation.

**DATA TRANSFORMATION**
Send data in specific formats such as exact parameter labels, units, or codes. For example, 1-2-3 can become low-mid-high.

**DATA CONTEXTUALIZATION**
Add and send contextual data such as location, patient ID, user ID, time stamp, etc. to make data more meaningful. Most medical devices have no contextual awareness and cannot provide this data directly.

### UNIQUE MEDICAL DEVICE DATA REQUIREMENTS BY CLINICAL INITIATIVE

<table>
<thead>
<tr>
<th>TYPE</th>
<th>PARAMETERS</th>
<th>FREQUENCY OF DATA</th>
<th>CONTEXTUAL DATA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EMR / DEPARTMENTAL DOCUMENTATION</strong></td>
<td>Vitals</td>
<td>Subset</td>
<td>Periodic, Episodic (based on measurement frequency, ex: q2h)</td>
</tr>
<tr>
<td><strong>ALARM MANAGEMENT</strong></td>
<td>Alarms</td>
<td>Subset</td>
<td>Streaming</td>
</tr>
<tr>
<td><strong>EARLY WARNING SCORING (EWS)</strong></td>
<td>Vitals</td>
<td>Subset</td>
<td>Periodic or Streaming</td>
</tr>
<tr>
<td><strong>ALARM SURVEILLANCE</strong></td>
<td>Vitals</td>
<td>Subset</td>
<td>Streaming</td>
</tr>
<tr>
<td></td>
<td>Alarms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waveforms</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PATIENT SURVEILLANCE</strong></td>
<td>Vitals</td>
<td>Subset</td>
<td>Streaming</td>
</tr>
<tr>
<td></td>
<td>Alarms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waveforms</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CLINICAL RESEARCH</strong></td>
<td>Vitals</td>
<td>All</td>
<td>Streaming</td>
</tr>
<tr>
<td></td>
<td>Alarms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Waveforms</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CARE EFFICIENCY & DOCUMENTATION ACCURACY
In high acuity environments where patients are connected to multiple medical devices, Capsule’s Vitals Stream provides scalable, plug-and-play bedside connectivity. In lower acuity environments, Capsule’s Vitals Plus and Chart Xpress capture patient vitals, bedside observations, and send validated information directly to the EMR. With options to meet both the clinical and technical requirements of various care areas, Capsule reduces transcription errors, improves the bedside workflow and makes information immediately available to the entire care team.

MORE MEANINGFUL CLINICAL ALERTS THROUGH DATA CORRELATION
Because Capsule can correlate and send device data for display in alarm management systems, clinicians no longer have to correlate the alarm and patient status manually. This capability facilitates earlier data-driven interventions and reduced alarm fatigue.

IMPROVED OPERATIONAL PERFORMANCE
Less clinical disruption, system-wide IT efficiencies, and clear insight into medical device asset management — Capsule IQ utilizes the data flowing through the Capsule MDIP to provide dashboards and configurable notifications to proactively manage your medical device connectivity infrastructure.
DATA-DRIVEN ALARM REDUCTION 
& EARLY IDENTIFICATION OF 
AT-RISK PATIENTS

Capsule’s Early Warning Scoring System and 
Bernoulli’s clinical surveillance applications give 
providers a safer, more efficient way to monitor 
patients and identify developing patient conditions. 
In a clinical study of patients diagnosed or 
suspected to have Obstructive or Central Sleep 
Apnea, Bernoulli real-time analytics generated 
99% fewer alerts than the bedside devices, 
yet successfully identified every patient that 
experienced actual respiratory depression early 
enough to avoid a major escalation in care, such 
as the need to intubate or transfer to the ICU 
(Supe, 236-251).

BERNOULLI’S RESPIRATORY DEPRESSION SAFETY SURVEILLANCE (RDSS)

99% LESS ALARMS

UTILIZING STANDARD 
DEVICE ALARM 
THRESHOLDS

Total issued device alarms 
(capnographs and pulse oximeters, 
excluding technical alarms)

NO MISSED ACTUAL 
PATIENT EVENTS

APPLYING 
CONVENTIONAL ALARM 
DELAY TECHNIQUES

Total issued alerts using 
30-second sustained alarm criteria

NO NEED TO INTUBATE 
OR TRANSFER TO ICU

TOTAL ISSUED ALERTS 
USING BERNOULLI’S 
RDSS ANALYTICS

NOTE: alerted for all actual 
respiratory depression episodes

22,812

13,272

209

42% REDUCTION

99% REDUCTION

Biomedical Instrumentation & Technology, 
May/June 2017

https://www.aami-bit.org/doi/10.2345/0899-8205-51.3.236

FOR MORE INFORMATION, CONTACT US

NORTH AMERICA
+1 800-260-9537
support@capsuletech.com

INTERNATIONAL OFFICES
+33 1 84 17 12 50
international@capsuletech.com

Learn more at CapsuleTech.com

CapsuleTech.com

© 2019 Capsule Technologies, Inc. All rights reserved.