Sapphire Software Update from 11.53 to 13.22.1

Hospira has released upgrades to the Sapphire pump. HomeMed will plan to implement the new software versions in two phases.

- **Phase 1** will include installing the software upgrade on pumps available at HomeMed and taking advantage of new pump configuration options to improve the patient experience and decrease pump issues (with minimal need for patient education).
- **Phase 2** will include development and initiation of the use of the “smart pump” features of the Sapphire pump including use of the Drug Library Editor.

**Phase 1- (begin Rolling conversions beginning 12/12/16)**

We will begin a rolling conversion of the new software version as pump swaps and dispensings occur after our conversion date. We will have a period of time where we have two software versions in the field. Reminder: the software version is visible during pump start up.

**General Enhancements in versions 13.2+**

- **Backpressure monitoring** in all modes
  - The pump will now be monitoring for consistent backpressure from anti-siphon valves, catheters, and other patient variables
  - The backpressure compensation should **improve infusion inaccuracies** and **nuisance occlusion alarms** currently being seen in software version 11.53 (e.g. volume remaining in the bag of TPN patients using an anti-siphon valve)

- **Improved trapped air bubble sensor algorithm** to reduce **nuisance air in line** alarms and correct for **iron sucrose** infrared sensor interference.
  - **Excess Ambient Light**-A new air in line message was added. If the pump air sensor detects bright lights, it will ask the patient to decrease the light level.
  - **Potential air in line**-There is a new air in line test which will prompt the patient to help the pump test for **iron sucrose** or **trapped air bubbles**.¹

**Screen Changes in versions 13.2+**

- **Password**
  - Even though pump is set to **high level** authorization code, user needs to re-enter high level password to create new or edit Preset Program.

¹ Demonstrated in HomeMed Sapphire Software 13.2+ Upgrade Video
Sapphire Software Update from 11.53 to 13.22.1

- **Function Name and Sequence changes**
  - **Function keys name changes**
    - [Pause] changed to [Request Pause]
    - [Continue] changed to [Request Continue]
  - **Infusion Paused**
    - Screen flashes “PAUSE” in red
    - When resuming infusion, press [Request Continue], next screen says “Still Paused” press [OK] to continue
  - **Alarms** must be muted before resolving by pressing [MUTE] then press [OK].¹
  - **TPN mode**¹
    - Taper Down key is now available during non-taper rate.
    - When Taper Down key is pressed, option available for Immediate Taper Down or Pause Infusion

- **Intermittent mode**
  - **Dose rate field (mL/h)** is now called Dose time (h: min). Pump automatically calculates rate in mL/h once dose time is entered.
Sapphire Software Update from 11.53 to 13.22.1

PCA Only Configuration Changes in 13.2+

- Bolus history has been renamed to delivery history
- Delivery history (previously bolus history) is available during patient lockout (without unlocking)

<table>
<thead>
<tr>
<th>Configuration Setting</th>
<th>Current State</th>
<th>Future State</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bolus Handle auditory signal(^1)</td>
<td>Always on</td>
<td>When bolusing</td>
<td>Changing bolus sounds to only beep when a bolus is available. If the patient pushes the button and a bolus isn’t available, the pump will not beep.</td>
</tr>
<tr>
<td>Bolus Reminder(^1)</td>
<td>Off</td>
<td>On</td>
<td>Reminds patients with on-screen graphics to plug the bolus cord into the pump and checks the bolus cord functionality.</td>
</tr>
</tbody>
</table>

General Configuration Setting Changes in versions 13.2+

<table>
<thead>
<tr>
<th>Configuration Setting</th>
<th>Current State</th>
<th>Future State</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keys volume</td>
<td>High volume</td>
<td>Low volume</td>
<td>Decreasing keystroke audible volume to decrease patient/caregiver alarm fatigue. Change recommended base upon patient feedback.</td>
</tr>
<tr>
<td>Repeat Last Infusion(^*)</td>
<td>On</td>
<td>Off</td>
<td>Will remove the prominent repeat last infusion button as an option on the start screen. Patients should use PreSet programs</td>
</tr>
<tr>
<td>Backlight</td>
<td>Partial</td>
<td>Off</td>
<td>Screen will darken after 30 seconds of inactivity. Green run light will flash on side of screen if infusing. Screen is unresponsive to touch until on/off button is pressed briefly to wake up (takes ~3 seconds to wake up). Change recommended based upon patient feedback on common inadvertent touch alarms when using carrying case.</td>
</tr>
<tr>
<td>Allow Bolus (in Continuous Mode)(^*)</td>
<td>Auto On</td>
<td>Off</td>
<td>Turning off boluses in continuous mode.</td>
</tr>
</tbody>
</table>

\(^*\) This enhancement is based upon HomeMed feedback to Hospira.
Phase 2- February 2017
A drug library editor (DLE) is available for the sapphire pump. The DLE allows pre-set programs to be entered into the pump with drug specific safety limits. The DLE can also be used to automatically configure the pump, instead of our current (equipment area) manual process. Developing a DLE will take several months. We anticipate that a DLE and related staff/patient education would not be ready for roll out until February-March 2017.

Phase 2 Planning
- Reviewer group convened (September 2016) to discuss configuration settings and DLE utilization. Members: Hitesh Patel, Tom Simonelli, Dana Iocoangeli, Mary Stevens, Vivian Fisher, Candy Damico, and Jamie Tharp
- Software version 13.2+ DLE software was obtained from Hospira in Early October
- Develop and implement the use of a drug library to utilize drug-specific safety parameters
- Considering implement of multiple Clinical Care Areas (CCA) within the drug library to set individualized pump configurations for multiple patient populations (e.g., Adult vs. Pediatric, MACRObore vs. MICRObore tubing, or Volume vs. Weight based dosing)
- Consider changing the default priming volume to 20 mL
- Develop staff, VNA, and patient education resources (multi-modal)
  - Update Patient quickstart guide with new content
- Investigate using repeat last infusion option for PCA and Intermittent (as a CCA)