Identifying the Impact of Outdated Drug Limit Library Usage by Smart Infusion Pump Logs

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Introduction

Objective: Quantify the impact of adopting out-of-date drug limit library (DLL) through investigating smart infusion pump logs, and examine infusions which potentially jeopardized patient safety with outdated DLL usage.

Motivation: Our prior analyses showed that DLL in pumps may not be updated efficiently. The inconsistency between DLL in pumps and the most up-to-date DLL may put patient safety at risk.

Method

We analyzed DLLs, all other alerts reports and all infusion detail reports from two hospitals to quantify the impact of DLL inconsistencies as follows:

1. Defined and identify the difference between versions of DLL
2. Labeled alerts and infusion events using an outdated DLL
3. Defined alerts/events adopting outdated DLL as:
   - No Match
   - Same Limits
   - Diff Limits No Effect
   - False Alert
   - Missed Alert
4. Summarized the types of alerts/events adopting an outdated DLL and identified the cases which potentially jeopardized infusion safety.

Result I (Usage of Outdated DLLs)

We extracted infusion started events from All Infusion Detail Reports and infusion alerts from All Other Alerts Reports, ranging from Jun 2014 to Sep 2015. Also, infusion alerts are collected from alert reports with the same time span. Each alert/event was classified using a “current” or “outdated” DLL based on its time stamp vs. the activated dates of the relevant DLLs.

Result II (Inconsistencies between Outdated and Current DLLs by Alerts/Infusion Started Events)

Compared to Pre-DLL, DLLs at hospital B

Figure 1: The structure of DLL

Figure 2: Examples of differences between DLLs

Figure 3: Alerts generated by various DLLs

Figure 4: The counts of alerts generated by outdated DLLs by version

Figure 5: Flow chart of defining alerts/events by outdated DLLs

Figure 6: Result summary of alerts by outdated DLLs at hospital B

Figure 7: Result summary of infusion started events by outdated DLLs at hospital B

Result summary of alerts by outdated DLLs at hospital B

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Reference