HUBzero and CatalyzeCare:
A community driven platform for data sharing and collaboration in medical informatics research

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ABSTRACT

The HUBzero platform is an infrastructure enabling online scientific communities to collaborate and share information and computational resources as they explore scientific phenomena. In medical care improvement, HUBzero has been adopted by the Regenstrief Center for Healthcare Engineering (RCHE) at Purdue University to form the HUB CatalyzeCare. RCHE has formed the community REMEDI Central on their CatalyzeCare hub that has been adopted by more than 140 hospitals and records data from over 30,000 infusion pumps. Hospitals voluntarily contribute the alert streams emanating from smart intravenous pumps and their drug limit libraries to the REMEDI Central community. Infusion pumps emit an alert whenever a healthcare professional programs the pump to administer a dose to a patient outside of the bounds established by the hospital in their drug limit library. The drug limit library contains for each drug in each treatment unit (e.g. pediatrics, intensive care) a set of low and high limits for administration by bolus and continuous infusion. A practitioner's response to an alert can be to reprogram the pump, to delay the infusion as they seek additional information from the ordering physician, or to override. From the patient's perspective, response to an individual alert can mean the difference between successful treatment, an adverse event, or even death. In the aggregate, alerts and their associated responses can represent the quality of hospital training, areas of improvement in procedures, or deficiencies in the hospital's drug limit library. Across hospitals, the alerts and drug limit library entries provide a means of benchmarking and improvement.

As part of the agreement for joining REMEDI Central, hospitals are able to benchmark themselves against the other hospitals in the community. No hospital is anonymous. By agreement, the hospitals have determined that the value of the shared data is high enough that they willingly identify themselves. Collectively, their goal is to improve overall patient safety by creating a set of best practices regarding infusion pump alert mitigation and response. The REMEDI Central community members meet three times annually, and openly share with each other their best practices and process improvements. The REMEDI Central community is unique in that it has three key stakeholder types and provides distinct value to each. Hospital practitioners get immediate tactical feedback from REMEDI Central as it guides them on a daily basis with regard to infusion alerts. Hospital administrators gain a strategic view from being able to benchmark their practices against their peer facilities. Researchers gain access to a stream of data that would otherwise be unavailable for the purpose of developing research-based interventions in healthcare. Since practitioners are provided immediate value from their data, they are incentivized to provide their data on a regular basis. This immediate incentive is key for researchers to be able to access an up-to-date and growing database of information. More information can be found at www.hubzero.org and www.catalyzecare.org.

REFERENCES

[1]   Catlin, A. C., Malloy, W. X., Arthur, K. J., Gaston, C., Young, J., Fernando, S., & Fernando, R. (2015). Comparative analytics of infusion pump data across multiple hospital systems. *American Journal of Health-System Pharmacy*,*72*(4), 317-324.