Experience With Migrating an Expert System From Batch to Real-Time
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This poster describes our experiences with migrating DoseChecker™, an asynchronous monitor for screening drug dosages, from batch to real-time processing. Specifically, the implementation, results of a 30-day trial and discussion of these results are presented.

DoseChecker™ has been previously described as an expert system that screens drug orders for drug dosing errors based on patient-specific information for patients at Barnes-Jewish Hospital. In 1997, we began developing a real-time version of DoseChecker™.

There were two major tasks associated with the development of a real-time monitor. The first task involved acquiring the data needed by the expert system in real-time. As described previously, we architected a method of data retrieval utilizing the enterprise repository information and some supplemental HL7 data to populate a data mart in real-time.

The second task was the development of a continuous monitor which would decide when and what data to screen. We devised a process whereby all drug orders are queued to be screened as soon as they are stored into the data mart. When new non-drug, pertinent information is stored into the data mart (e.g. age, weight, height, labs) all future and active drug orders for that patient are queued to be screened. Once an order was queued, it is screened once all relevant data was available or a specified time period pasted. The time periods were related to priorities that the pharmacists assigned to the various drug rules.

Results and Discussion
Real-time DoseChecker™ was recently evaluated during a thirty-day trial. The trial system was operational Monday through Friday between the hours of 7:00 AM and 4:00 PM. DoseChecker™ alerts were sent via alpha pagers to 1 of 10 clinical pharmacists with different coverage areas. During the trial, 151 alerts were generated, an average of 5 alerts a day.

The goals of the expert system trial were to reduce the time between drug order start time and time of an alert, and to improve the pharmacists agree rate associated with alerts. Our ability to improve the speed with which alerts reached our clinical pharmacists was dramatic. In batch-mode processing, the median time between the start of an order and an alert is 10 hours. Real-time DoseChecker™ delivered alerts to the clinical pharmacists in a median time of 11 minutes.

To assess the differences in agree rates between batch and real-time DoseChecker™ we compared data gathered during the trial to data collected by batch DoseChecker™ the previous month for the same times and pharmacist coverage areas. The agree rate increased from 35% to 50%. Not surprisingly, the most significant improvements for disagreement among the pharmacists occurred in the "Data too old" category where the disagree rate was reduced from 14% to 10%.

Acknowledgements
Funded in part by National Library of Medicine Decision Support Deployment in Diverse Clinical Settings (N01-LM-6-350).

References