Reviewer's report

Title: Enhancing an adult-based computerized provider order entry system to meet the unique needs of children: description of an advanced dosing model

Version: 2 Date: 11 August 2010

Reviewer: Heleen van der Sijs

Reviewer's report:

This paper describes the development of dosing guidance for pediatric patients in a computerized provider order entry with existing dosing guidance for adults. The authors describe the development process, the choices made and safeguards included. The paper also presents the number of voluntarily reported adverse drug events before and after deployment of the pediatric advanced dosing model.

General comments

The report is well-written and the topic of medication safety in pediatrics is highly relevant as children are at risk for medication errors.

Major compulsory revisions

1. The Tables puzzle the reader due to the order the items are presented.
   1a. Table 1 presents the pediatric wards in chronological order of CPOE release date, which is not relevant for the subject. A distinction between ICUs and medium care units and/or on age (first NICU, then PICU and cardiac ICU) is more logical.
   1b. Table 2 shows the criteria for the model logic which is presented in Table 3 in different order.
   1c. Furthermore, Table 3 shows recommended doses in descending as well as ascending age and weight classes.
   1d. Figure 1 shows the logic of the dosing model, but mentions the criteria of Table 2 in a different order.

Tables should be made consistent and present information in logical order.

2. The authors mention the daunting task of entering all dose recommendations and developed functionality and alerts for manual dose entry with the risk of over-alerting. Furthermore, providers were concerned when no dosing region was present and had to be educated to think critically about the dosing recommendation. Also they mention the risk of incorrect selection of recommended doses.

However, the discussion does not refer to other options for pediatric dosing guidance, such as alerting for over- and underdosing. This type of decision support would challenge providers to think themselves and make them less dependent. Furthermore, suppression and redirection logic would probably be
superfluous and rounding methods could be simplified. Pediatric alerting logic can be based on the same criteria as mentioned in Table 2 to result in specific dosing alerts to prevent alert fatigue. This should be added to the discussion.

3. Background: It is not clear what is meant by ‘their immature renal and hepatic systems inconsistently clear drugs’. During many years of childhood hepatic function exceeds adult hepatic function; it should not be described as immature. Pediatric clearance of drugs is not inconsistent but deviating from clearance in adults.


5. Dosing regions based on dosing weight, chronological age, gestational age and indication are useful.

5a. It would be interesting for the reader to know which expiry dates are configured by the development team.

5b. The distinction between impaired and normal renal function misses the details required for correct dose recommendations (based on percentage renal function or calculated with help of the Schwartz formula). This should be mentioned.

5c. The emphasis on location makes the pediatric ADM very context specific and not transferrable to other hospitals. Would it be possible to accommodate the criterion ‘location’ into care intensity (ICU/medium care), age, and indication? It is not clear whether location should be an independent criterion.

Minor essential revisions
1. It is not clear whether the well-known British National Formulary was not included as a pediatric dosing reference.

Discretionary revisions
1. The paragraph on definition of pediatric patients is rather long for the description of normal logic.
2. A screenshot of the CPOE with dose recommendation would be helpful.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, but I do not feel adequately qualified to assess the statistics.