Government of **Western Australia**
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Fiona Stanley Hospital

Clinical Review of Paediatric and Neonatal Smart Infusion Pump Profiles in a Quaternary Hospital

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Background

Smart infusion pumps with dose error reduction software (DERS) were introduced to Fiona Stanley Hospital (FSH), a quaternary adult hospital with secondary paediatric and neonatal services upon opening in October 2014.

FSH has seven medication profiles in the DERS library:

- Adult General
- Adult Critical Care
- Haematology/Oncology
- Obstetrics/Maternity
- Neonates
- Paediatric Critical Care
- Paediatric General

Compliance with DERS for each profile is monitored monthly. The average compliance in 2016 for all adult profiles was 86.1% compared with 69.9% for neonates and 65.5% across both paediatric profiles.

Aims

The aims of the project were:

- To create a working group of paediatric and neonatal staff to undertake a clinical review and update of the Paediatric Critical Care, Paediatric General and Neonatal DERS profiles and
- To measure the impact of this review on staff compliance and satisfaction with DERS.

Methods

- The FSH smart infusion pump pharmacy team along with the vendor (BD), the distributor (Western Biomedical), the Nurse Unit Managers, Clinical Educators and the Senior Pharmacist within paediatric and neonatal areas met to discuss the project aims and requirements. The group nominated appropriate staff to participate in the working group and ensured nursing and pharmacy rosters were adjusted to permit attendance at planned meetings. Medical heads of service (HOS) were invited to participate.
- An electronic survey assessing clinicians' satisfaction and thoughts on the current profiles and the DERS in general was distributed via email to nursing and medical clinicians for three weeks pre and post review. SurveyMonkey® was used to collect responses and tabulate data.
- Post review, the revised dataset was deployed to the smart infusion pumps using wireless technology.
- DERS compliance (calculated as the percentage of infusions run with DERS) was measured using vendor supplied Continuous Quality Improvement Software and statistical significance calculated using Pearson's Chi-Squared test.

Results

- **Working Group**
  - » A multidisciplinary working group of 14 staff was launched on 1st February 2017 and met seven times throughout the month.
  - » Engagement within the working group was varied and often delayed and/or hindered by unforeseen changes to nursing rosters.
  - » The working group reviewed and recommended 235 changes to 82 medications or fluids. The most common changes were made to dose, infusion duration, and concentration limits as per Table 1. All recommendations were accepted by the relevant Medical HOS and endorsed by the FSH Drugs and Therapeutics Committee.
  - » Most changes were made to realign with updated practice recommendations from either Princess Margaret Hospital for Children (paediatrics) or King Edward Memorial Hospital (neonates).
  - » No changes were made to the paediatric PCAs, pending a separate review of the Paediatric PCA chart.
- **Compliance**
  - » Compliance measured from August 2016 to August 2017 demonstrated an increased use of DERS across all medication profiles as shown in Figure 1.
  - » Statistically significant improvements in DERS compliance were found in all neonates and paediatric profiles as displayed in Table 2.
- **Staff Satisfaction**
  - » Ninety eight staff responded across both surveys (63 pre and 35 post review).
  - » Most (65.63%) clinicians felt the changes had a positive impact on patient and clinician safety.
  - » Improvements were seen in clinician satisfaction (39.68% pre review vs 59.4% post review) and clinical needs being met by DERS for drugs (73.77% vs 93.94%) and fluids (58.73% vs 90%).
- **Other outcomes**
  - » Increased awareness of the process of managing DERS has been demonstrated by more frequent and timely communication from these areas to pharmacy.
  - » Suggested improvements include:
    - ► improved notification when external guidelines used within FSH are updated
    - ► review of the paediatric PCA library and the paediatric PCA chart which is underway
    - ► evolution into an annual hospital wide quality initiative

Table 1: Dose Error Reduction Software (DERS) changes

Type of Change	Paediatric General	Paediatric Critical Care	Neonates	Total (%)
Name change	5	6	2	13 (5.5%)
Dose change	39	12	25	76 (32.3%)
Concentration change	18	3	24	45 (19.1%)
Infusion duration change	31	0	23	54 (23.0%)
Therapy change	10	1	4	15 (6.4%)
Weight banding change	6	0	0	6 (2.6%)
Clinical advisory change	7	1	2	10 (4.3%)
Delivery method change	1	8	1	10 (4.3%)
Addition of new drug	5	0	0	5 (2.1%)
Removal of drug	0	0	1	1 (0.4%)
Total	**122**	**31**	**82**	**235**

Figure 1: Dose Error Reduction Software (DERS) Compliance by profile pre and post review

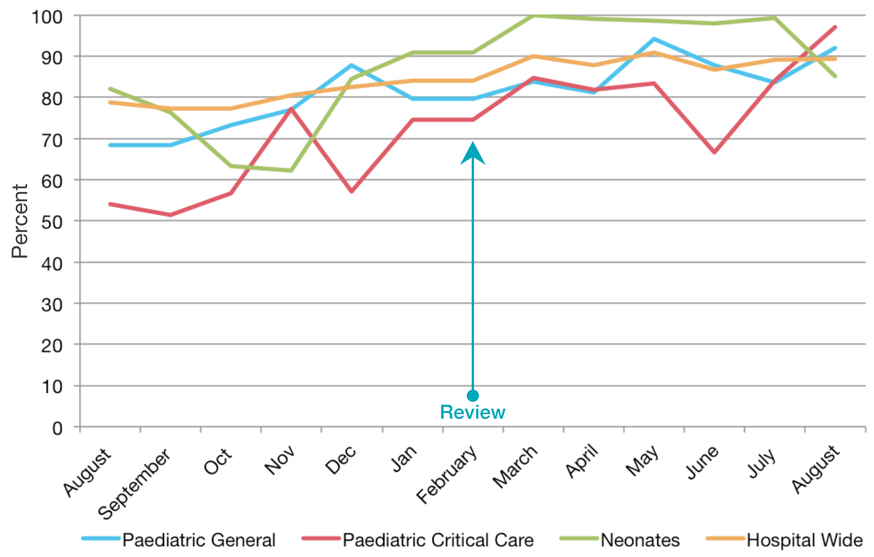

Table 2: Average Dose Error Reduction Software (DERS) compliance pre and post review

Profile	DERS compliance % Aug 2016 – Jan 2017	DERS compliance % Mar 2017 – Aug 2017	P-value
Paediatric General	75.7	87.1	0.038
Paediatric Critical Care	61.9	82.9	<0.01
Neonates	76.5	96.7	<0.01
Hospital Wide	80.1	89.0	0.082

Conclusion

A review group to improve paediatric and neonatal DERS profiles was successful in improving compliance, increasing satisfaction and meeting end user needs through a clinically appropriate DERS library at FSH. Wide engagement of clinicians and availability of appropriate staff to participate in DERS reviews is crucial for any future work.

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