Government of **Western Australia**
South Metropolitan Health Service
Fiona Stanley Fremantle Hospitals Group

Safety from bag to vein: infusion management in a tertiary oncology centre

Jeanie Misko[1], Breigh Ridley[1] and Amy Finch[2]
[1]Pharmacy Department, Fiona Stanley Hospital, Murdoch, Western Australia, [2]BD Medical Technology, Australia

Background

- Errors involving chemotherapy administration and vascular access management (VAM) may cause serious patient harm.[1]
- To minimise errors related to administration of incorrect doses and/or rates of medication, fluids and blood products, dose error reduction software (DERS) safety limits are utilised in all clinical areas at Fiona Stanley Hospital (FSH).
- In 2017 the average DERS compliance within the haematology/oncology profile was 8.5% lower than other adult areas.
- Peripheral intravenous catheters (PIVCs) are the most frequently used invasive device in acute care settings.[2] Vascular access management of PIVCs are comprehensively supported with local, state and national guidelines.

Aims

- To undertake a clinical review of the haematology/oncology DERS profile
- To review clinician satisfaction with the haematology/oncology DERS profile
- To improve DERS compliance within the haematology/oncology DERS profile
- To compare FSH VAM compliance with organisational guidelines and Australian/New Zealand benchmarks[3]

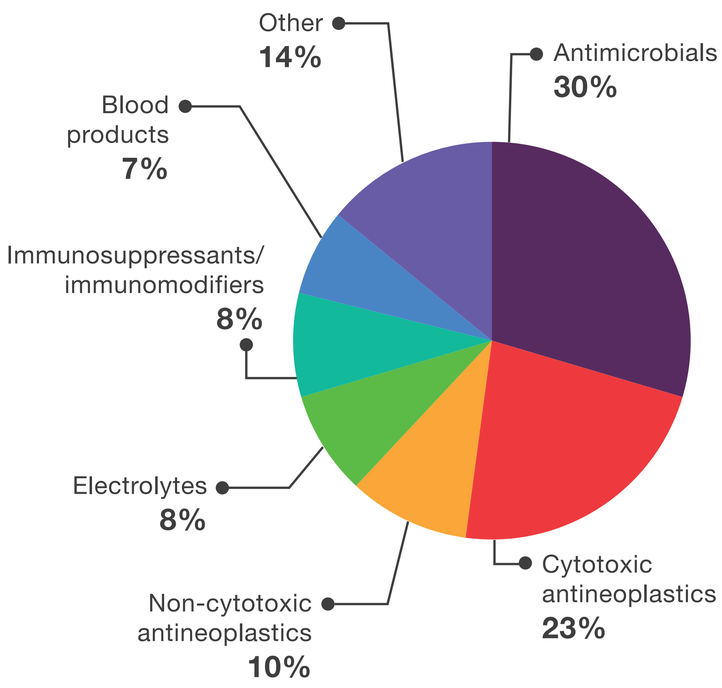
Methods

- A multidisciplinary working group of pharmacists, nurses and doctors with vendor representation was established to review medication, fluids and blood products in the haematology/oncology DERS profile and coordinate an electronic survey assessing clinicians' satisfaction with the current profile.
- SurveyMonkey™ was used to collect responses and tabulate data.
- DERS compliance was measured using vendor supplied Continuous Quality Improvement software.
- A prospective observational audit was conducted on all patients admitted to the FSH Cancer Centre and both the Haematology and Oncology wards to review VAM and assess compliance of running infusions with organisational guidelines. The audit was conducted across two weekdays over a two week period in February and March 2018 by pharmacy and vendor experts in DERS and VAM.

Results

- The multidisciplinary working group met five times between February and April 2018.
- In April 2018 the working group made 92 changes to 71 drugs, predominantly to realign with updated practice recommendations and reduce nuisance alerts (Table 1). The most common medication groups updated are listed in Figure 1.

Figure 1: Changes to DERS by medication group



- During the observational audit (Figure 2) the group reviewed 150 patients with an average age 60 ± 16.3 years, 94 (62.7%) patients were male. Table 2 describes the details of the running infusions.
- 7 drug infusions (21.2%) did not comply with labelling standards due to the following reasons:
  - » omission of concentration (5, 71.4%)
  - » omission of fluid volume (4 (57.1%)
  - » omission of date of birth (2, 28.6%)
  - » omission of UMRN (2, 28.6%)
  - » use of brand name (2, 28.6%)
  - » omission of quantity of active ingredient (1, 14.3%)
- Fifty seven lines were connected most of which (56, 98.2%) were not labelled on the patient side.
- Vascular access devices were observed across the 4 clinical areas over 3 separate occasions (Figure 3).
- Best practice evidence to reduce IV failure suggests to place the PIVC in the forearm, and avoid wrist and antecubital fossa if possible.[3]
- Australian and New Zealand data from The One Million Global (OMG) Catheters Study group in 2014-2015 showed that the national Australian average for placement in the forearm was 23%, demonstrating this centre was above average.[3]
- Across the audit period average compliance with DERS increased from 77.9% to 85.6%, p=0.157.
- Fifty eight staff responded across both clinician satisfaction surveys with the very satisfied rating increasing from 13.3% to 57.1%, p<0.005.

Table 1: Major changes made to the Haematology/Oncology DERS profile

Change	Reason	%	Example
Separation of hard minimum and initial duration	Reduce nuisance alerts	48.9	Aztreonam
Addition of new therapy	Therapy addition increases specificity to drug entry	8.7	Cyclophosphamide mg/kg (for HSCT)
Decrease hard minimum duration	New evidence on duration of infusion	6.5	Melphalan
Align duration across all concentrations	Match chemotherapy charts	5.4	Eculizumab
Addition of new drug	New protocol/drug	4.3	Calcium folinate (as per FLOT regimen)
Increase hard maximum dose	Higher doses used in practice/allow for rounding	4.3	Ciclosporin
Remove soft maximum rate	Reduce nuisance alerts	4.3	Albumin 4%

Figure 2: Observational audit detail

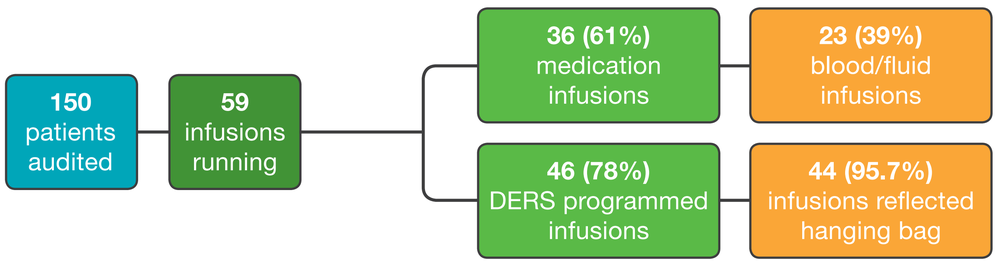
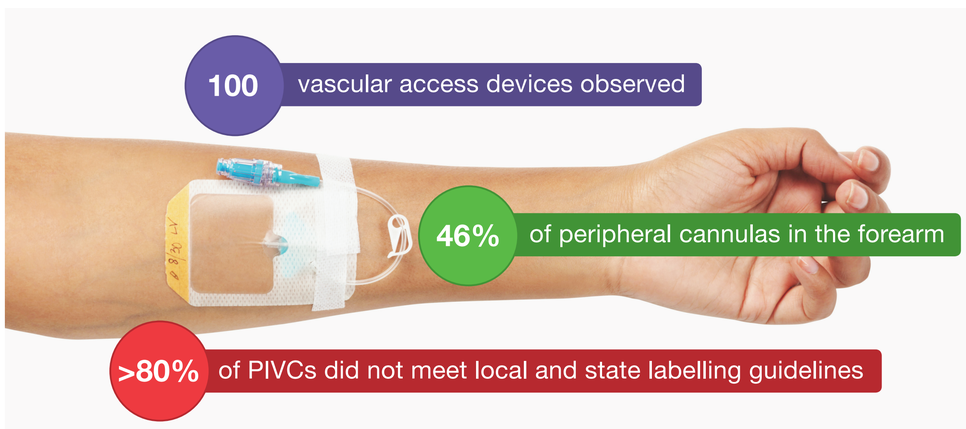


Table 2: Assessment of running infusions

	7C N (%)	7D N (%)	Cancer Centre N (%)	Total (%)
Total infusion pumps in use	6 (10.5)	13 (22.8)	38 (66.7)	57
Correct Profile	6 (100.0)	12 (92.3)	38 (100.0)	56 (98.2)
Correct UMRN	0 (0)	0 (0)	24 (63.2)	24 (42.1)
Medication infusions running	3	10*	23	36
DERS	2 (66.6)	10 (100.0)	20 (86.9)	32 (88.9)
Basic infusion	1 (33.3)	0 (0)	2 (8.7)	3 (8.3)
Unable to assess	0 (0)	0 (0)	1 (2.2)	1 (2.8)
Fluid or blood product infusions running	3	4	16	23
DERS	3 (100)	4 (100)	6 (37.5)	13 (56.5)
Basic infusion	0 (0)	0 (0)	10 (62.5)	10 (43.5)
Unable to assess	0 (0)	0 (0)	0 (0)	0 (0)
Correct infusion labelling	0 (0)	4 (57.1)	22 (95.6)	26 (78.8)

*including three flushes

Figure 3: Results from the VAM audit



Conclusion

A review group to improve the haematology/oncology DERS profile was successful in improving compliance. Infusions running outside of DERS have been addressed by amendment of the DERS profile and feedback to clinical areas. There was good compliance for vascular access insertion sites; however improvement in site and line labelling is required.

References

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3. Alexandrou E, Ray-Barruel G, Carr P, Frost S, Inwood S, Higgins N et al. Use of short peripheral intravenous catheters: characteristics, management, and outcomes worldwide. J Hosp Med 2018;13.doi:10.12788/jhm.3039.

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