

National Essential Medicines List price comparison Adult Hospital Level Component: Blood and blood forming organs

Date: 21 January 2016

Medication: Fresh frozen plasma (FFP) vs lyophilized plasma (FDP)

Indications: Haemophilia A and B, Von Willebrand's disease, Thrombotic thrombocytopenic purpura-haemolytic uraemic syndrome; Disseminated intravascular coagulation

Background: At the Adult Hospital Committee meeting of 21 January 2016, it was recommended that FDP be provided as an alternative to FFP.

Evidence: There is limited evidence of efficacy suggesting that FDP is comparable to FFP in terms of clotting factors¹, and for the management of clotting deficiencies^{2 3}.

LoE: II RCT

Additional factors:

The following factors have pragmatic implications:

1. *Storage requirements:* FFP requires to be stored at temperatures below -30 degrees Celcius, whilst FDP can be stored at room temperature^{4 5}.
2. *Shelf life:* FDP has a 2 year shelf life; whilst FFP is stored as a frozen product, and once thawed (for therapeutic use) needs to be stored at 0 to 4 degrees Celcius but must be used within 24 hours.
3. *Availability:* FDP is immediately available; whilst FFP needs to be thawed prior to use.
4. *Solvent detergent treated process:* FDP is pathogen inactivated as it has undergone a solvent detergent inactivation procedure⁶.
5. *Crossmatch:* FDP does not require a crossmatch, as it is not a pooled product.

Price comparison:

Although, a health economic study done in the United States has shown that FDP is more cost-effective than FFP for plasma transfusions⁷, a cost minimisation analysis for the South African context was performed. This analysis only used direct costs of medicines, crossmatch laboratory test and storage and retrieval costs for FFP.

Assumptions:

- Dosages calculated for a 70 kg adult.
- Inflation was factored in the medicine prices, based on the 4.8% Single Exit Price increase for 2016⁸.
- Full crossmatch test required for FFP infusion, sourced from the 2015 NHLS price list⁹.

¹ Lerner RG, Nelson J, Sorcia E, Grima K, Kancherla RR, Zarou-Naimo CM, Pehta JC. Evaluation of solvent/detergent-treated plasma in patients with a prolonged prothrombin time. *Vox Sang.* 2000;79(3):161-7. <http://www.ncbi.nlm.nih.gov/pubmed/11111235>

² Bindi ML, Miccoli M, Marietta M, Meacci L, Esposito M, Bisà M, Mozzo R, Mazzoni A, Baggiani A, Scatena F, Filippini F, Biancofiore G. Solvent detergent vs. fresh frozen plasma in cirrhotic patients undergoing liver transplant surgery: a prospective randomized control study. *Vox Sang.* 2013 Aug;105(2):137-43. <http://www.ncbi.nlm.nih.gov/pubmed/23448618>

³ Williamson LM, Llewelyn CA, Fisher NC, Allain JP, Bellamy MC, Baglin TP, Freeman J, Klinck JR, Ala FA, Smith N, Neuberger J, Wreghitt TG. A randomized trial of solvent/detergent-treated and standard fresh-frozen plasma in the coagulopathy of liver disease and liver transplantation. *Transfusion.* 1999 Nov-Dec;39(11-12):1227-34. <http://www.ncbi.nlm.nih.gov/pubmed/10604250>

⁴ National Bioproducts Institute. Bioplasma FDP®(lyophilized powder for IV infusion) South African MCC registered package insert, 30 May 2012.

⁵ South African National Blood Service: Clinical Guidelines for the use of blood products in South Africa, 5th edition (2014).

⁶ Liunbruno GM, Franchini M. Solvent/detergent plasma: pharmaceutical characteristics and clinical experience. *J Thromb Thrombolysis.* 2015 Jan;39(1):118-28.

⁷ Huisman EL, de Silva SU, de Peuter MA. Economic evaluation of pooled solvent/detergent treated plasma versus single donor fresh-frozen plasma in patients receiving plasma transfusions in the United States. *Transfus Apher Sci.* 2014 Aug;51(1):17-24.

⁸ Government Notice No. 24 in Government Gazette No. 39594, 13 January 2016. (SEP price increase of 4.8%).

http://www.gov.za/sites/www.gov.za/files/39594_gon24.pdf

- FFP requires storing below -30 degrees Celcius; and once thawed stored at -4 degrees Celcius and used within 24 hours. Therefore, storage and retrieval costs were included. These were extrapolated from a US cross-sectional survey ¹⁰.
- Prices extrapolated from US cross-sectional study was converted to South African Rands using the average Oanda exchange rate for 2016, only (performed on the 21 January 2016)¹¹.

Indications

The indications for FFP in the Adult Hospital level STGs and EML are:

- 2.10.1 Haemophilia A and B, Von Willebrands Disease
- 2.12 Thrombotic thrombocytopenic purpura-haemolytic uraemic syndrome (TTP-HUS)
- 2.13.1 Disseminated intravascular coagulation (DIC)

Base Prices:

Medication

Product	Volume (mL)	Current price	Inflated price	Price per mL
FFP	280	R 1,286.01	R 1,347.74	R 4.81
FDP	200	R 1,042.11	R 1,092.13	R 5.46

Other prices:

Item	Price	
	US \$	ZAR
Full crossmatch	n/a	R 55.59
Storage/retrieval	\$68.00	R 1,087.32

Price comparison:

2.10.1 Haemophilia A and B, Von Willebrands Disease		
Medicine	FFP	FDP
Dose	15 mL/kg (1050 mL)	15 mL/kg (1050 mL)
Price	R 6196.93	R 5773.69
Price difference: - R 463.24		
2.12 Thrombotic thrombocytopenic purpura-haemolytic uraemic syndrome (TTP-HUS)		
Medicine	FFP	FDP
Dose	30 mL/kg (2100 mL)	30 mL/kg (2100 mL)
Price	R 11 250.95	R 11 467.38
Price difference: R 216.43		
Medicine	FFP	FDP
Dose	15-20 mL/kg (1050-1400 mL)	15-20 mL/kg (1050-1400 mL)
Price	R 6196.93 to R 7881.60	R 5773.69 to R7644.92
Price difference: - R 463.24 to -R 236.68		

Conclusion:

FDP is cheaper than FFP. However, at higher doses, FDP is cost neutral when compared to FFP. However, the additional pragmatic aspects (as listed above) of using the different plasma products needs to be factored into the decision making process.

⁹ NHLS State price list, 2015.

¹⁰ Toner RW, Pizzi L, Leas B, Ballas SK, Quigley A, Goldfarb NI. Costs to hospitals of acquiring and processing blood in the US: a survey of hospital-based blood banks and transfusion services. Appl Health Econ Health Policy. 2011;9(1):29-37.

¹¹ Oanda average exchange rate for 2016. <http://www.oanda.com/currency/average>