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ABSTRACT

INTRODUCTION: Current haemodialysis practice involves disposing the extracorporeal circuit (ECC) consisting of the dialyser and blood set after each treatment resulting in hazardous waste and disposal costs. It is estimated that dialysis accounts for 600,000 tons of hazardous waste per year worldwide. The calculated cost of disposal can be up to 10-40% of the cost of disposables adding to economic burden of therapy. Dialysis supply/disposables production, delivery and disposal contribute to burden on the environment. Conventional devices and NxStage System One, a home haemodialysis device, dispose of the single use ECC after each treatment. In contrast, the VIVIA Haemodialysis System uses a validated in-situ non-chemical treatment process to enable extended use of the ECC of up to 30 times in a single patient.

AIM: The aim of this study was to analyze the weight and costs of biohazardous ECC disposables with the VIVIA System vs a conventional in-center device (CD) and the NxStage System One (NSO), a home haemodialysis device.

METHODS: An analysis of the use of biohazardous disposables in single use CD and NSO and extended use VIVIA was performed when used for high dose haemodialysis (6 treatments per week) over a 30 day period (24 treatments per month). VIVIA extended use enables each ECC to be used for up to 30 treatments. The CD and NSO require change in the ECC after every treatment or 24 times per month. Calculations were based on the above usage. Consumables for each system were analyzed based on: ECC description, weight, replacement frequency, and biohazardous waste characteristics. A conservative cost of biohazardous waste disposal was based on 2010 RCN data from www.rcn.org.uk, which showed the median cost per ton was £501/ton (lowest £37 and highest £4900). In other regions in Europe, the average cost was £2000/ton (range £1000-5000/ton).



RESULTS: The calculated weight of disposable biohazardous ECC (per month per patient) was 14.94 kg for CD, 16.72 kg for NSO and 1.13 kg for VIVIA. The computed cost (per month/patient) based on RCN median cost of biohazardous waste disposal was £7.49 for CD, £8.38 for NSO and £0.57 for VIVIA. If the highest rate was used, the cost for biohazardous waste disposal (per month/patient) was £73.22 for CD, £81.93 for NSO and £5.54 for VIVIA.

CONCLUSIONS: The amount of biohazardous waste with VIVIA extended use is significantly less than CD and NSO. This translates to a reduced disposal cost favoring VIVIA vs CD and NSO. Therefore, VIVIA extended use provides more environmentally sustainable treatment and cheaper disposal cost.

RESULTS

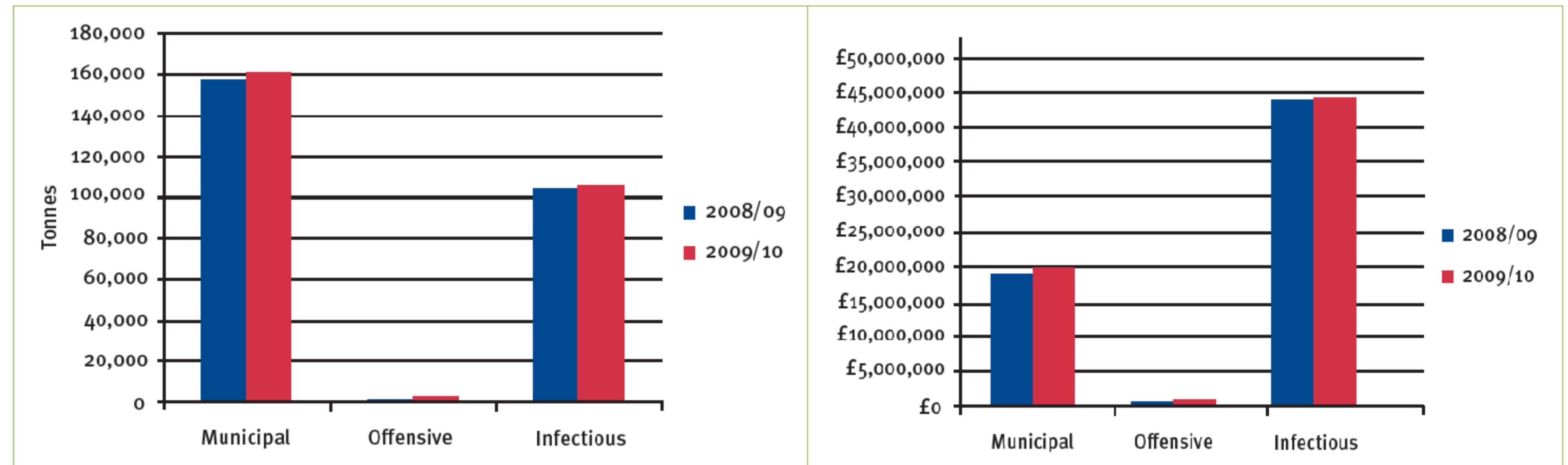


Figure 1. Weight and Total Cost of Disposal of Medical Wastes (NHS)¹

	2008-09			2009-10		
Cost per tonne	Municipal	Offensive	Infectious	Municipal	Offensive	Infectious
Highest	£1,978	£3,387	£7,171	£1,887	£4,746	£4,900
Lowest	£24	£51.92	£42	£31	£78	£37
Median	£125	£370	£490	£122	£469	£501

Table 1. Cost of Disposing Medical Wastes (NHS)¹

	Consumables	Disposal	Replacement Frequency	Consumable Weight (kg)
VIVIA	Vivia Dialyser	Biohazard	Up to 30 Treatments	0.228
	Blood Set	Biohazard	Up to 30 Treatments	0.359
	Dialysate Set	Biohazard	Every 6 Months	3.255
NxStage	Blood, Dialysate Tubing, High Flux Dialyser, Drain Line Extension	Biohazard	Single Use	0.697
Conventional Device	Blood and Dialysate Tubing	Biohazard	Single Use	0.395
	High Flux Dialyser (2.1 m ²)	Biohazard	Single Use	0.228

Table 2. Consumables Description

	VIVIA System	NxStage System One	Conventional Device
Weight (kg) per 24 treatments per patient*	1.13	16.72	14.94
Median Disposal Cost (£) per 24 treatments per patient*	0.57	8.38	7.49
Highest Rate Disposal Cost (£) per 24 treatments per patient	5.54	81.93	73.22

* Assumes 6 times per week treatments (4 week month)

Table 3 Calculated Weight and Cost of Disposal of Biohazardous ECC Wastes

SUMMARY: The amount of biohazardous waste and associated disposal costs with VIVIA extended use ECC is significantly less than with CD and NSO devices.

CONCLUSION: VIVIA extended use provides more environmentally sustainable treatment and cheaper disposal cost.

References

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