

The epic3 recommendation that clinically-indicated replacement of peripheral venous catheters is safe and cost saving: *How much would the NHS save?*

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The 2014 epic3(1) National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections recommend that peripheral venous catheters are no longer routinely replaced every 72-96 hours but instead replaced only for clinically indicated reasons including end of treatment, or if complications such as inflammation, infiltration, blockage or suspected catheter-related bloodstream infection occur. Based on the large randomised controlled trial by Rickard *et al* (2012),(2) the epic3 recommends that clinically-indicated replacement of peripheral venous catheters is safe and cost saving.(1) However, the amount of cost saving to the National Health Service in England from implementing this recommendation is unknown. We have recently published a cost-effectiveness analysis of the clinically indicated catheter replacement strategy from the perspective of Queensland Health, Australia, based on the clinical trial by Rickard and colleagues (2012).(2, 3) Following the same methods, we have performed a cost-effectiveness analysis from the perspective of the NHS England.

For this analysis, we have valued health care resources in terms of the equipment price and staff wages from the perspective of the NHS (2013 prices). We have calculated the incremental net benefit, which is the difference in effectiveness, multiplied by the amount the decision maker is willing to pay per unit of increased effectiveness, less the difference in cost.(4) A positive incremental net benefit indicates that the new strategy is cost-effective; in other words, the benefit of the strategy exceeds its cost. We have set the willingness-to-pay threshold at £0.0 per phlebitis case avoided since the treatment of this reaction typically consists only of removal and replacement of the affected intravenous catheter, which was

already accounted for in the cost calculations. Finally, we have evaluated the probability of the clinically-indicated strategy being cost effective for a range of willingness-to-pay values per phlebitis case avoided.

There was no statistically significant difference in the rate of phlebitis and other complications including bloodstream infections between the two strategies.⁽²⁾ The clinically-indicated replacement strategy was associated with a significant reduction in health care resources in terms of equipment and staff time. Replacing the catheters when clinically indicated resulted in 21% reduction (95% CI: 0.14 to 0.29) in the average number of catheters inserted and four-minute reduction in staff time per patient (95% CI: 2.57 to 5.49).^(2, 3) This gives a number needed to treat of five; that is, under a clinically indicated removal policy, one in every five patients will avoid an unnecessary procedure. The routine replacement group incurred equipment cost of £12.26 (SD 7.75) and staff cost of £7.00 (SD 4.87). For the clinically-indicated replacement group, the average cost for the equipment and staff was £10.86 (SD 6.98) and £6.15 (SD 4.39), respectively. The clinically-indicated replacement group was associated with a significant cost reduction of £2.25 (95%CI: 1.43 to 3.07) per patient. The incremental net benefit for the clinically-indicated catheter replacement strategy was £2.25 (95%CI: 1.41 to 3.05) in cost saving (Table 1). The probability of this strategy being cost-effective remained >95% as long as the willingness-to-pay per phlebitis case avoided was below £100.

<<TABLE 1 GOES HERE>>

To implement clinically indicated replacement of peripheral catheters, hospitals that currently undertake routine catheter replacement practice will need to update their policy. At the same time it will be important to reinforce current protocols to regularly assess patients and promptly remove catheters for phlebitis, other complications, and as soon as therapy is

complete. However, the expected cost of implementation is less likely to exceed the benefits from adopting the proposed strategy. We estimate that if only one third of the 11.5 million hospital admissions to NHS England hospitals every year required peripheral venous catheterisation for more than three days, the expected population for the proposed strategy implementation over five years would be around 20 million patients.⁽⁵⁾ Accordingly, we calculate that if the clinically-indicated strategy was fully implemented in all NHS hospitals in England, then the cost savings to the system would be around £40 million over five years, after discounting based on annual inflation rate of 3.5%.

References

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Table 1: Cost-effectiveness analysis of routine versus clinically-indicated catheter replacement

	Routine replacement	Clinically indicated	Difference		
	Mean (SD)	Mean (SD)	Mean	95% CI	p value
Equipment					
Catheters inserted	1.90 (1.17)	1.70 (1.05)	-0.21	-0.29,-0.14	<0.0001
Catheters removed	0.90 (1.17)	0.70 (1.05)	-0.21	-0.28,-0.13	<0.0001
Equipment cost	£12.26 (7.75)	£10.86 (6.98)	£-1.40	-1.95,-0.92	<0.0001
Staff					
Insertion time (min)	27.58 (17.01)	24.50 (15.00)	-3.08	-4.19,-1.97	<0.0001
Removal time (min)	4.07(5.30)	3.13 (4.70)	-0.94	-1.30,-0.60	<0.0001
Staff cost	£7.00 (4.87)	£6.15 (4.39)	£-0.85	-1.20,-0.55	<0.0001
Total cost	£19.26 (12.62)	£17.01 (11.34)	£-2.25	-3.07,-1.43	<0.0001
Effectiveness					
Phlebitis per patient, n (%)	114 (6.75%)	114 (7.16%)	0.41%	-1.33,2.15	0.64
Incremental net benefit^a	£2.25			1.41,3.05^b	<0.0001

^a At willingness-to-pay threshold= £0.0

^bBootstrap confidence interval