

Does longer peripheral intravenous catheter length optimise antimicrobial delivery?

A randomised controlled trial

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Antimicrobial delivery is:

- One of the most common reasons for hospital admission in Australia¹
- Accounts for 959 of every 1,000 occupied bed days¹

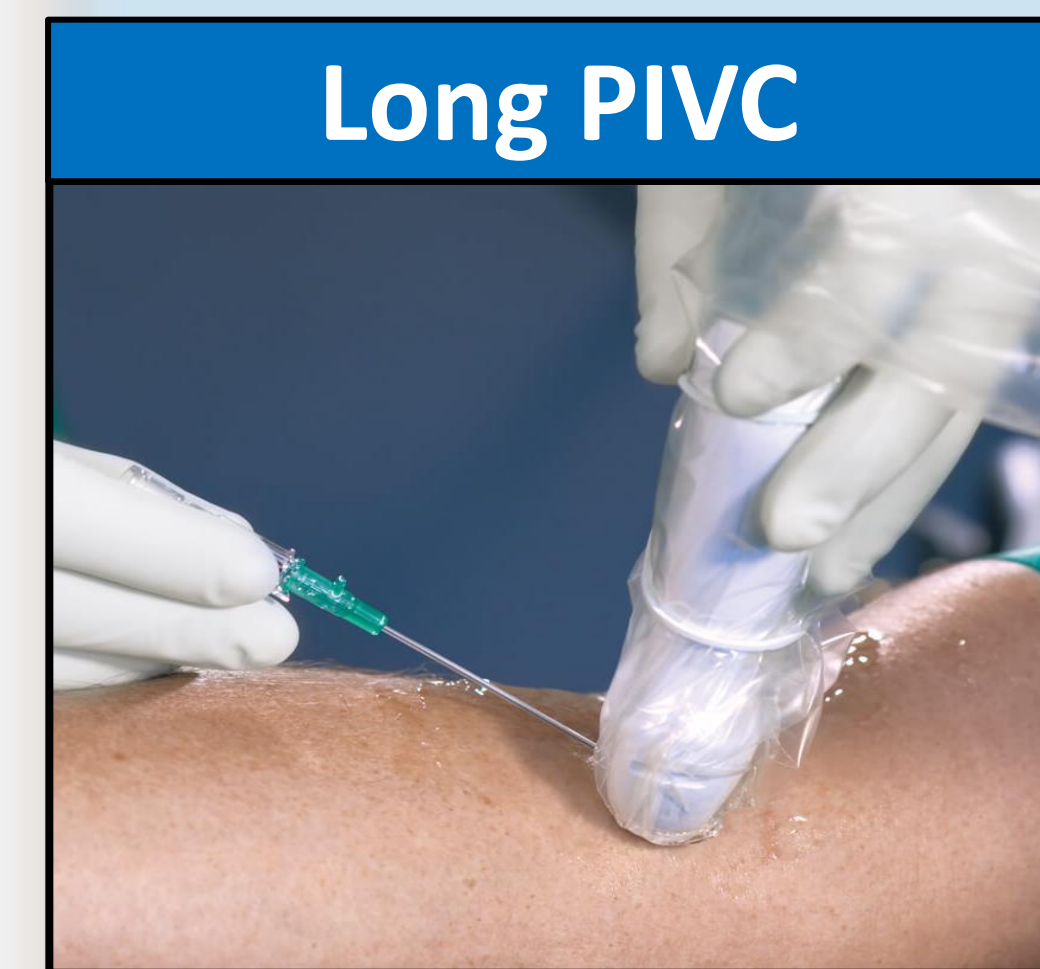
Suboptimal antimicrobial delivery leads to:

- antimicrobial resistance²
- re-emergence of infectious diseases³
- patient distress from repeated insertions
- increased length of stay and healthcare costs⁴

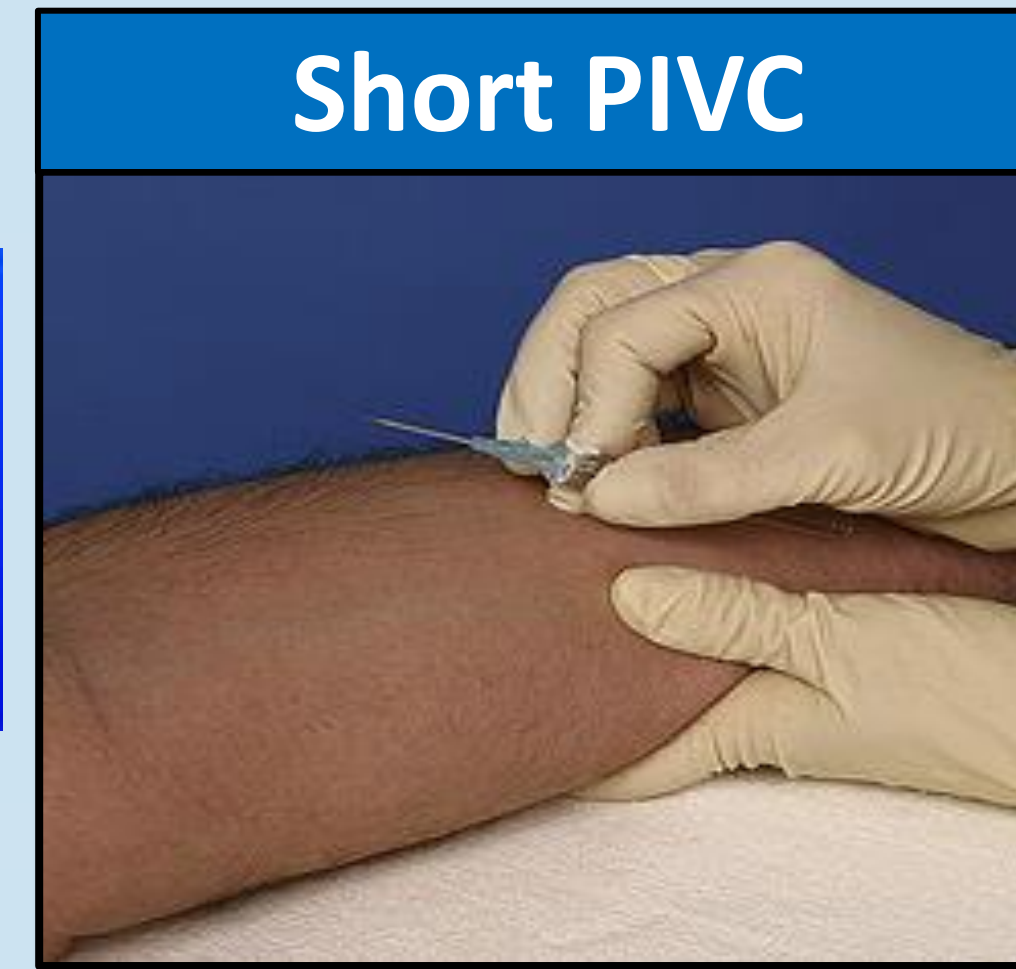
40% of antimicrobial doses delivered by short PIVCs²

But 1-in-3 short PIVCs fail⁵

Leading to up to 1-in-4 antimicrobial doses missed²



Long PIVC



Short PIVC

METHODS

- Single-centre, two-arm, parallel group RCT (embedded pilot phase, n=70) assessing long vs short PIVCs
- 194 adult medical/surgical patients requiring ≥ 3 days of antimicrobial therapy
- Large quaternary hospital in Brisbane, Australia
- Central, web-based service, with allocation concealment until study entry
- Daily data collection until 48 hours post-PIVC removal using REDCap

OUTCOMES

Primary outcome PIVC failure

Unplanned PIVC removal due to infection, phlebitis, infiltration/extravasation, blockage/occlusion, thrombosis, or dislodgement

Secondary outcomes

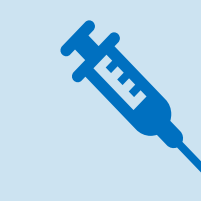
- Individual complications (as above)
- First insertion success
- PIVC dwell time

RESULTS



194 participants (97 per arm) included in early intention-to-treat analysis

Over two-thirds (70%) male; median age 64 years; most admitted for emergency surgery (65%); **poorer vein quality in long PIVC group (22% vs 11%)**



Most commonly delivered antibiotic was Piperacillin-Tazobactam, followed by Cefazolin, with half requiring IV antimicrobials for wound infections



94% of long PIVCs inserted with US guidance, compared with 49% short-PIVCs

Outcome	Long PIVC n=97	Short PIVC n=97	Long vs Short	P-value
All-cause PIVC failure (n, %) Incidence rate/1000 catheter days mean (95% CI)	21 (22.7%) 72.8 (47.5, 111.6)	22 (23.4%) 74.3 (49.4, 111.8)	RR 0.91 (0.54, 1.53) IRR 0.97 (0.54, 1.76)	0.83 0.94
Infiltration , n (%) Incidence rate/1000 catheter days mean (95% CI)	8 (8.3%) 27.7 (13.4, 55.5)	12 (12.4%) 38.8 (22, 68.3)	RR 0.66 (0.28, 1.56) HR 0.69 (0.28, 1.49)	0.35 0.42
Thrombosis , n (%) Incidence rate/1,000 catheter days mean (95%CI)	2 (2%) 6.7 (1.7, 26.8)	0 -	- -	- -
Dislodgement , n (%) Incidence rate/1,000 catheter days mean (95%CI)	3 (3%) 10 (3.2, 31.1)	0 -	- -	- -
First insertion success , n (%)	93 (95.9%)	81 (83.5%)	OR 4.59 (1.47, 14.26)	0.009
PIVC dwell time (hrs, mean, SD)	71.4 (4.9)	76.6 (5.3)	MD -5.2 (-19.3, 9.1)	0.30

Conclusions

- Length of PIVC alone did not reduce PIVC failure and complications
- This study confirms the benefit of ultrasound guided PIVC insertion
- More research is required, focusing on optimal device selection for antimicrobial delivery



THE TAKE-HOME MESSAGE

A patient-centred approach is essential when choosing the correct device for our patients to optimise outcomes