

**Title page:**

**Title: A randomised controlled trial of routine versus clinically indicated replacement of peripheral intravenous catheters: implications for clinicians**

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The full reference for *The Lancet* article is: Rickard CM, Webster J, Wallis MC, Marsh N, McGrail R, French V, Foster L, Gallagher P, Gowardman JR, Zhang L, McClymont A, Whitby M. Routine versus clinically indicated replacement of peripheral intravenous catheters: a randomised controlled equivalence trial. *The Lancet* 2012; **380**:1066-74

### **Background of the study:**

Currently the US Centers for Disease Control and Prevention (CDC) state that the peripheral intravenous catheters do not need to be replaced more frequently than every 72 to 96 hours to reduce the risk of infection and phlebitis in adults (O'Grady et al., 2011). Of the 200 million peripheral intravenous catheters estimated to be inserted each year in the USA alone, if even 15% are needed for more than three days, then a change to clinically indicated replacement would prevent up to six million unnecessary intravenous catheter insertions, and would save about two million hours of staff time and up to US\$60 million in health costs each year for that country alone.

### **Why this study was conducted (aims):**

The study aimed to understand the effect of extension of peripheral intravenous catheter dwell-time beyond three days with replacement of catheters only for clinical reasons. It postulated that patients who had peripheral intravenous catheters replaced when clinically indicated would have equivalent rates of phlebitis and no difference in other complications compared with patients with catheters removed every third day.

### **Study methods:**

A multicentre, non-blinded, randomised controlled equivalence trial was undertaken in three university-affiliated hospitals in Queensland, Australia (Royal Brisbane and Women's Hospital, Herston; Princess Alexandra Hospital, Woolloongabba; and Gold Coast Hospital, Southport) between May 2008 and September 2009. It recruited adults ( $\geq 18$  years) with a peripheral intravenous catheter of expected use longer than four days and participants were randomly assigned to receive either clinically indicated intravenous catheter replacement, or third daily routine replacement.

### **Study results:**

From the 3283 patients randomised (5907 catheters) phlebitis occurred in 7% patients of both the clinically indicated and routine replacement groups. No patient had a venous (local) infection and groups were equivalent for all-cause bloodstream infections and catheter colonisation. Only one patient had a catheter-related bloodstream infection and this patient was in the routine replacement group. Rates of infiltration, occlusion, accidental removal, total infusion failure, and in-hospital mortality were all equivalent between groups.

### **Implications for clinicians:**

The study demonstrated that peripheral intravenous catheters can be removed as clinically indicated. The results of the study are consistent with previous smaller randomised controlled trials (Rickard et al., 2010, Van Donk et al., 2009, Webster et al., 2008, Webster et al., 2007) and a systematic review that showed no benefit of routine replacement for phlebitis or catheter-related blood stream infections (Webster et al., 2010).

The CDC guidelines currently recommend clinically indicated treatment in children (O'Grady et al., 2011). Intravenous catheters are already frequently left in place beyond the currently recommended 72 to 96 hours typically as the result of a complex clinical judgment, rather than a policy violation (Schultz and Gallant, 2005, Palese et al., 2011). The CDC itself tempers its 72 to 96 hour replacement

recommendations with “if sites for venous access are limited and no evidence of phlebitis or infection is present, intravenous catheters can be left in place for longer” (O’Grady et al., 2011) Thus, a change to policies of clinically indicated removal of intravenous catheters might not be very far from the current real-world approach that occurs despite policies and recommendations.

Contemporary evidence now suggests that clinically indicated replacement of peripheral intravenous catheters is safe. Updated intravenous catheter policies (including CDC guidelines for adult patients) should advocate clinically indicated removal - focussing on monitoring and immediately removing intravenous catheters for complications or as soon as treatment is complete. Routine intravascular catheter resite involves pain for patients, staff procedural time, equipment costs and environmental waste.

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