Learnings from 2,274 Peripheral Intravenous Catheter Audits: ‘How many audits do you really need?’

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Purpose
Clinical auditing of peripheral intravenous catheters (PIVCs) is an important tool to improve insertion and post-insertion management. The purpose of this study was to determine the optimal number of PIVC clinical audits to sufficiently capture care quality.

Method
Data from five-years of clinical audits (2015-2019) was used to: 1. identify the precision of complication estimates; and 2. develop a decision-making tool to guide audit size. Complication prevalence and exact binomial 95% confidence intervals (CI) were calculated. We modelled a range of scenarios to understand how the precision of prevalence estimates changed according to actual complication prevalence and the audit size. Three prevalence estimates were chosen, 20% (representing the expected prevalence in our audits), 10% (a low prevalence estimate) and 50% (a high prevalence estimate). Seven sample size scenarios were investigated (20, 50, 100, 150, 200, 250, and 300 patients).

Results
Of 2,274 PIVCs assessed, 475 (21%) had a complication. The rate of complications varied between audit rounds from 7.8% (95% CI, 4.2 to 12.9%) to 39% (95% CI, 32.0 to 46.4%). Precision improved with larger audit sizes and at lower complication rates. For example, if a hospital has PIVC complication rates of 20%, auditing 150 patients provides a 95% CI for the true hospital wide complication prevalence of 13.9% to 27.3%, whereas increasing the audit size to 300 patients only slightly narrows the 95% CI to 15.6% to 25.0%. If complication prevalence is much higher at 50% then auditing 200 PIVCs provides a 95% CI of 42.9% to 57.1%, with negligible change observed in the 95% CI when auditing 300 devices of 44.2% to 55.8%.

Conclusion
Hospitals should audit at least 100 PIVCs. There is no meaningful benefit in conducting more than 250 assessments per audit round.