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Research Article

Audit-Driven Policy Reform for Enhanced Clinical Outcomes: A Multi-Domain Audit and Re-Audit Quality Improvement Project on Anticoagulation in Atrial Fibrillation, Postpartum Haemorrhage, Paediatric Sepsis, Psychiatric Medication Safety, and Pressure Ulcer Prevention

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Abstract

Background: Clinical audit followed by targeted policy reform and re-audit is an established quality improvement strategy. A coordinated multi-domain audit across five high-impact clinical areas was implemented to assess baseline performance, drive policy changes and measure post-implementation improvements. Methods: A prospective audit then re-audit (6 months after interventions) was conducted across five domains: (1) anticoagulation appropriateness in atrial fibrillation (AF), (2) active management of the third stage and timely uterotonic administration for postpartum haemorrhage (PPH), (3) early recognition and guideline concordant management of paediatric sepsis, (4) psychiatric medication safety checks on admission and discharge, and (5) pressure ulcer risk assessment & prevention bundle adherence. Simulated sample sizes and outcomes were used for demonstration: total baseline records audited n = 1,000 (200 per domain), re-audit n = 1,000. Interventions included new local protocols, decision-support checklists, staff training, and electronic prompts. Primary outcomes were domain-specific process compliance rates. Results (simulated): mean baseline compliance across domains was 58.4% (SD 9.8); post-

intervention compliance rose to 87.1% (SD 6.5), mean absolute improvement 28.7 percentage points (95% CI 24.9–32.6; $p < 0.001$). Domain-level improvements (baseline → re-audit): anticoagulation in AF 54% → 90% (Δ 36 pp), PPH bundle 49% → 85% (Δ 36 pp), paediatric sepsis pathway 61% → 92% (Δ 31 pp), psychiatric medication safety 63% → 86% (Δ 23 pp), pressure ulcer prevention 68% → 85% (Δ 17 pp). Reductions in specified adverse events were observed in the simulated dataset (e.g., PPH transfusion rate 4.2% → 2.0%, simulated $p = 0.03$; sepsis ICU transfer 8.5% → 4.1%, $p = 0.02$). Conclusions: The model demonstrates that coordinated audit-driven policy reform, multidisciplinary implementation and structured re-audit can yield large, measurable process improvements across diverse clinical domains. The manuscript provides a template for real-world implementation, reporting and evaluation.

(Keywords: audit, re-audit, quality improvement, anticoagulation, postpartum haemorrhage, sepsis, medication safety, pressure ulcers.)

Introduction

Clinical audit and structured re-audit are central instruments of quality improvement (QI) that translate evidence and guideline recommendations into measurable clinical practice change. Audit cycles identify gaps between current practice and accepted standards, inform targeted policy or pathway reform, and, when followed by re-audit, provide objective evidence of impact. When applied in a coordinated, multi-domain manner, audit cycles can catalyse system-level improvements that cross professional silos, improve patient safety and inform governance. The present model project synthesises established audit methodology to cover five domains with high patient-safety priority: anticoagulation appropriateness in atrial fibrillation (AF), active management and timeliness in postpartum haemorrhage (PPH), early recognition and treatment of paediatric sepsis, psychiatric medication-safety checks, and pressure ulcer prevention. These domains were selected because each contributes substantially to preventable morbidity and benefit from clear process metrics amenable to audit and re-audit.1-4

Anticoagulation in AF is a canonical area for audit because guideline-recommended risk stratification (CHA2DS2-VASc) and appropriate anticoagulant prescribing prevent stroke but are under-implemented without system supports. Decision-support tools, pharmacist involvement and

structured audits have demonstrated improvements in appropriate prescribing and safety monitoring. Similarly, PPH remains a leading cause of maternal morbidity; audits that ensure timely risk assessment, active third-stage management and rapid uterotonic delivery can reduce severe haemorrhage. Paediatric sepsis outcomes improve when early recognition and sepsis bundles are reliably delivered; QI programmes and sepsis pathways with audit have shown mortality and ICU-transfer reductions. Psychiatric medication safety—particularly verification of indications, interactions and monitoring during admission and at discharge—reduces adverse drug events and is amenable to checklist-based interventions. Pressure ulcer prevention is a classic target for audit: systematic risk assessment and adherence to prevention bundles (risk screening, repositioning, skin care, support surfaces) correlate with lower prevalence.5-8

The rationale for a combined multi-domain audit approach is pragmatic: many hospitals have resources to run audit cycles but lack coordinated policy-level reinforcement that sustains change across services. A bundled, governance-driven QI campaign enables shared infrastructure (data collection templates, education modules, digital prompts), cross-professional learning and consolidated reporting to leadership—factors associated with larger and more durable improvements in practice. This manuscript presents a demonstration of a multi-domain audit and re-audit, showing the method, simulated results and interpretation to assist teams preparing real projects. Core methodological choices reflect recommended audit-and-feedback practices (explicit standards, multidisciplinary feedback sessions, standalone re-audit) and implementation features that maximize impact (local champions, decision support, co-interventions).9-10

Methods (Project design and implementation)

Design: prospective clinical audit with pre-specified standards (baseline audit) and a single re-audit after 6 months of implementation. This document reports the audit structure and simulated outcomes as an operational model; all numeric results are labelled simulated.

Setting and domains: Obstetrics and Gynaecology, Alfalah International Hospital, Riyadh, Saudi Arabia, Paediatrics Tehsil Head Quarter Hospital, Kamalia, Obstetrics and Gynaecology Al Azhar Hospital, Riyadh, Saudi Arabia, Paediatrics Ministry of Health, Saudi Arabia, Paediatric Anaesthesia Children's Hospital and University of Child Health Sciences, Lahore, Hameed Latif

Hospital, Lahore, Jinnah Postgraduate Medical Centre (JPMC), Karachi. For each domain, explicit, evidence-based standards were defined by multidisciplinary steering committees before baseline audit (examples: anticoagulation — documented CHA2DS2-VASc and HAS-BLED with appropriately prescribed anticoagulant; PPH — active management of third stage, uterotonic within 3 minutes of confirmed PPH; paediatric sepsis — triage within 15 minutes and antibiotic within 60 minutes for possible sepsis; psychiatric med safety — medication reconciliation on admission and discharge with specified checks; pressure ulcers — SSKIN/assessed within 2 hours and prevention bundle documented). Data collection used standardised audit forms; baseline sample: 200 consecutive cases per domain (total n = 1,000). After baseline analysis and presentation at multidisciplinary meetings, interventions were deployed: (1) local policy changes and checklists, (2) EHR-embedded prompts/ order sets where available, (3) targeted staff education and simulation (PPH, paediatric sepsis), (4) pharmacist-led medication reviews (AF and psychiatry), and (5) nursing-led pressure-ulcer prevention rollout. Re-audit used identical data definitions and sample size (n = 200 per domain) collected 6 months after full implementation. The project used plan-do-study-act (PDSA) cycles and local champions to maintain momentum.

Outcomes and analysis: primary outcome per domain = proportion meeting all domain check list criteria (process composite). Secondary outcomes included selected clinical endpoints (e.g., PPH transfusion, sepsis ICU transfer, documented anticoagulation-related major bleed rates) captured in the simulated dataset. Analyses used paired comparisons of proportions (chi-square), absolute differences with 95% CIs, and aggregated domain change tested by paired t-test on domain compliance percentages (baseline vs re-audit). Statistical significance threshold $p < 0.05$. Implementation metrics (education attendance, EHR prompt activation rate) were recorded descriptively. The project used standard governance and ethical oversight for service evaluation; no patient-level consent was required for anonymised audit data under institutional policies.

Results

Table 1. Baseline and re-audit process compliance by domain (simulated data)

Domain (n = 200 per domain)	**Baseline compliance % (n)**	**Re-audit compliance % (n)**	**Absolute Δ (pp)**	**p-value**
Anticoagulation in AF (documented CHA2DS2-VASc + appropriate anticoag)	54.0% (108)	90.0% (180)	+36.0	<0.001
Postpartum haemorrhage bundle adherence	49.0% (98)	85.0% (170)	+36.0	<0.001
Paediatric sepsis pathway (time to triage/antibiotic)	61.0% (122)	92.0% (184)	+31.0	<0.001
Psychiatric medication safety checks	63.0% (126)	86.0% (172)	+23.0	<0.001
Pressure ulcer prevention (SSKIN/assessment & bundle)	68.0% (136)	85.0% (170)	+17.0	<0.001
Mean (domains)	**59.0%**	**87.6%**	**+28.6**	—

Explanation: All domains showed substantial simulated improvement after interventions. Absolute improvements ranged 17–36 percentage points. Statistical comparison used chi-square per domain and an overall paired t-test across domain compliance percentages (mean Δ +28.6 pp, 95% CI 24.9–32.3, $p < 0.001$).

Table 2. Selected secondary clinical outcomes (simulated)

Outcome	**Baseline (n/events)**	**Re-audit (n/events)**	**Relative change**	**p-value**
PPH requiring blood transfusion	8/200 (4.0%)	4/200 (2.0%)	−50%	0.03
Sepsis → ICU transfer (paediatric)	17/200 (8.5%)	8/200 (4.0%)	−52.9%	0.02
New pressure ulcer (hospital acquired)	11/200 (5.5%)	6/200 (3.0%)	−45.5%	0.12
Major anticoagulation-related bleed (30 days)	3/200 (1.5%)	2/200 (1.0%)	−33%	0.65

Outcome	Baseline (n/events)	Re-audit (n/events)	Relative change	p-value
Psychiatric medication error requiring intervention	10/200 (5.0%)	3/200 (1.5%)	−70%	0.01

Explanation: Simulated clinical end-points trended downward; some reached statistical significance in this illustrative dataset (PPH transfusion, paediatric ICU transfer, psychiatric med safety events).

Table 3. Implementation fidelity and process metrics (simulated)

Metric	Value (post-implementation)
Proportion clinical staff completing domain-specific training	87%
Decision support prompt activation (EHR)	95% of eligible workflows
Pharmacy medication-review coverage (AF/psychiatry)	78% of cases
Nursing pressure-ulcer bundle adherence (audit sample)	85%
Number of multidisciplinary feedback sessions delivered	12 sessions over 3 months

Explanation: High implementation fidelity accompanied measured improvements; local champions and frequent feedback sessions supported sustained practice change in the model.

Discussion

In this demonstration audit-and-re-audit, coordinated, policy-driven interventions were associated with large, simulated improvements in process compliance across five high-priority clinical domains. The model points to the feasibility and potential impact of running parallel audit cycles using shared infrastructure (data collection templates, education modules and governance). The magnitudes of improvement simulated here (mean Δ ~29 pp) are consistent with effect sizes reported for well-designed audit-and-feedback programmes when combined with co-interventions such as decision support and education. 13-14. Domain-specific interpretation: anticoagulation Anticoagulation appropriateness improved markedly in the model after introduction of decision-

support prompts and pharmacist-led reviews. Real-world studies and trials of decision support have shown that structured interventions raise guideline-concordant anticoagulant prescribing and reduce preventable stroke risk; audit provides a mechanism to monitor prescriber behaviour and safety indicators (bleeding). The model illustrates how a combined technology-and-pharmacy approach amplifies effect.15-17 **Domain-specific interpretation:** postpartum haemorrhage. Simulated improvements in active third-stage management and rapid uterotonic administration mirror outcomes reported in PPH audits and toolkits: structured protocols, drills and explicit PPH bundles consistently reduce severe haemorrhage and transfusion requirements. Criteria-based audit and simulation training are pivotal, as is executive support for rapid escalation pathways. The model's downward trend in transfusion requirements is plausible and aligns with guideline-driven QI reports.18-20 **Domain-specific interpretation:** paediatric sepsis. Early recognition and rapid delivery of sepsis bundles are highly time-sensitive. The simulated reduction in ICU transfers after pathway implementation aligns with paediatric sepsis QI programmes that emphasise triage alerts, standardised order sets and nurse-driven protocols. Audit metrics that capture timeliness (triage within X minutes, antibiotic delivery within 60 minutes) are effective process measures to guide iterative improvement. **Domain-specific interpretation:** psychiatric medication safety & pressure ulcers. Medication-safety improvements were modelled via pharmacist reconciliation and mandatory safety checks; reductions in medication errors were observed in the simulated data and are concordant with published medication-safety initiatives. Pressure-ulcer prevention benefited from nursing pathway standardisation, SSKIN/SSKIN-like bundles and targeted audit of adherence—again reflecting established practice that audit plus feedback reduces hospital-acquired pressure injury incidence. Implementation lessons and mechanisms of effect. Key implementation enablers in the model were multidisciplinary governance, local champions, real-time decision support, repetitive feedback loops and protected education time. Audit-and-feedback is most effective when combined with targeted supports and when baseline performance leaves room for improvement. Frequent re-audits (here at 6 months) permit monitoring of fidelity and prompt mid-course corrections. These features are consistent with implementation science findings that audit combined with co-interventions achieves larger effects.

Limitations of this demonstration and external validity.
The numerical results above are explicitly simulated to illustrate reporting and interpretation. When applying this model to a real QI project, teams must capture actual baseline variability, account for secular trends, and consider confounding (case-mix changes, staffing shifts). Additionally, the single re-audit timepoint demonstrates early impact but cannot confirm sustainability; real projects should plan for multiple re-audit cycles and outcome surveillance. Finally, different institutions will experience different resource constraints affecting replicability, and observed effect sizes may be smaller in routine practice.

Conclusion

A coordinated, audit-driven policy reform approach leveraging decision support, multidisciplinary training and targeted implementation yields large, measurable improvements in process compliance across diverse clinical domains in this demonstration model. Teams planning real world projects may use this manuscript as a template for protocol, data collection and reporting. Sustained gains require iterative re-audits, leadership support and integration of audit findings into routine governance.

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