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EVALUATING HEALTHCARE QUALITY IMPROVEMENT PROGRAMS IN PUBLIC HOSPITALS OF PAKISTAN

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Abstract. *Quality Improvement (QI) programs are increasingly used in Pakistan's public hospitals to reduce preventable harm, improve patient experience, and optimize scarce resources. This article proposes an evaluation approach tailored to public-sector realities—high patient volumes, variable supplies, workforce constraints, and fragmented data systems. Drawing on global quality frameworks and practical QI methods (e.g., PDSA cycles), we present a mixed-method evaluation model that measures changes in clinical processes, patient outcomes, and service efficiency while documenting implementation fidelity and context. Key evaluation domains include governance, infection prevention and control, medication safety, patient-centered care, and data-driven performance monitoring. The proposed framework supports hospital leaders and provincial health departments in identifying what works, why it works, and how to scale effective interventions sustainably across districts.*

1. INTRODUCTION

Pakistan's public hospitals manage a heavy burden of infectious diseases, non-communicable conditions, maternal and neonatal needs, and trauma care—often under constraints of staffing, supplies, and infrastructure. National policy ambitions emphasize *quality* alongside access, aligning with broader goals of universal health coverage. However, "doing QI" is not the same as "proving QI worked." Many initiatives (hand hygiene promotion, triage redesign, safe surgery checklists, medication reconciliation, complaint-response systems) are implemented unevenly, with limited measurement beyond activity counts (trainings held, posters placed). Evidence from Pakistan also shows persistent gaps in infection prevention and control—highlighting the need for stronger, measurable improvement strategies. This

paper focuses on **how to evaluate QI programs** in Pakistan's public hospitals using a practical, mixed-method framework that is feasible in low-resource settings and aligned with globally recognized quality dimensions (safe, effective, people-centered, timely, equitable, integrated, efficient). Below is the expanded scholarly discussion of each outlined section in paragraph form, suitable for inclusion in your article.

Conceptual Framework and Evaluation Questions

Quality Model

The evaluation of healthcare quality improvement (QI) programs in public hospitals should be grounded in a structured theoretical framework to ensure clarity and analytical rigor. Donabedian's Structure–Process–Outcome (SPO) model provides a logical foundation for organizing indicators and interpreting performance. Structural indicators refer to the foundational inputs of care delivery, including infrastructure, availability of trained staff, equipment, supplies, governance mechanisms, and data systems. In the context of Pakistani public hospitals, structural elements may include staffing ratios, availability of infection prevention supplies, or the presence of a functional Quality & Patient Safety Committee. Process indicators measure how care is delivered, such as adherence to clinical protocols, hand hygiene practices, medication reconciliation procedures, or timely triage implementation. Outcome indicators reflect the ultimate effects on patients, including infection rates, readmissions, mortality, patient satisfaction, and complaint resolution. To enhance contextual relevance, these indicators should be mapped to the World Health Organization's (WHO) quality dimensions: safety, effectiveness, people-centeredness, timeliness, equity, integration, and efficiency. For example, hand hygiene compliance aligns with safety; reduced waiting time reflects timeliness and efficiency; patient satisfaction reflects people-centeredness; and equitable access to services addresses the equity dimension. By integrating the SPO logic with WHO's multidimensional framework, evaluators can comprehensively assess both technical and experiential aspects of care quality in Pakistan's public hospitals.

Core Evaluation Questions

A robust evaluation must address four central questions. First, effectiveness: Did measurable patient outcomes improve after implementation of the QI intervention? This may include reductions in surgical site infections, medication errors, readmissions, or patient complaints. Second, implementation fidelity: Was the intervention delivered as originally designed? For instance, were staff properly trained, were supplies consistently available, and were audit-feedback mechanisms operational? Third, equity: Did improvements benefit all patient groups equally, particularly vulnerable populations such as women, rural referrals, low-income patients, or marginalized communities? Evaluating disaggregated data helps ensure that QI efforts do not unintentionally widen disparities. Finally, sustainability: Can the improvements be maintained without reliance on temporary donor funding or short-term projects? Sustainability requires institutionalization of practices, leadership commitment, budget allocation, and integration into routine monitoring systems.

Study Design for Public Hospitals (Mixed-Methods)

Quantitative Component

A before–after design using routinely collected hospital data represents a feasible minimum approach in resource-constrained settings. Baseline data should ideally cover 6–12 months before the intervention, compared to 6–12 months after implementation. This timeframe allows seasonal variations and service fluctuations to be accounted for. Where data availability permits, an interrupted time series design provides stronger causal inference by examining trends over multiple time points before and after the intervention. This design helps determine whether observed improvements represent true intervention effects or ongoing trends unrelated to the QI

program. Quantitative indicators may include infection rates, waiting times, medication error frequencies, readmission rates, and satisfaction scores.

Qualitative Component

While quantitative data indicate whether change occurred, qualitative methods explain why and how change happened. Key-informant interviews with medical superintendents, nursing leaders, pharmacy heads, and infection prevention focal persons provide insights into leadership support, operational barriers, and cultural factors influencing implementation. Short patient and family interviews help capture experience-of-care elements such as communication, dignity, and perceived responsiveness. Additionally, structured process observations—such as reviewing triage workflows, observing hand hygiene compliance, or examining medication dispensing steps—can identify bottlenecks or deviations from protocol. Combining qualitative and quantitative findings strengthens validity through methodological triangulation.

Method Alignment

Evaluation should also document alignment with recognized QI methodologies, particularly the Model for Improvement and Plan–Do–Study–Act (PDSA) cycles. Each QI initiative should articulate a clear aim statement (e.g., reduce surgical site infections by 30% within 12 months), define measurable indicators, test small-scale changes, analyze results, and refine interventions iteratively. Documentation of learning logs, meeting minutes, and data feedback sessions ensures transparency and demonstrates whether improvement cycles were genuinely applied or merely nominally adopted.

Indicators and Data Sources (Practical Set)

Safety

Safety indicators are critical in evaluating QI programs. Hand hygiene compliance, measured through direct audits, reflects adherence to infection prevention standards. Medication error reports, obtained from pharmacy or ward logs, indicate system vulnerabilities in prescribing or dispensing. Surgical safety checklist completion rates, drawn from operation theatre registers, demonstrate compliance with established safety protocols. Together, these indicators provide measurable evidence of patient protection practices.

Effectiveness

Effectiveness indicators assess whether clinical care aligns with evidence-based standards. Clinical bundle adherence, such as compliance with sepsis management protocols, reflects adherence to best practice guidelines. Hospital readmission rates within 7 or 30 days serve as proxies for continuity and quality of care. Improvements in these measures suggest enhanced clinical effectiveness.

Timeliness and Efficiency

Timeliness and efficiency are essential in high-volume public hospitals. OPD waiting time can be measured through timestamp data or sample time-motion studies. Laboratory turnaround time for urgent tests reflects diagnostic responsiveness. Reductions in waiting time and improved laboratory efficiency indicate better resource utilization and workflow optimization.

People-Centered Care

People-centered indicators evaluate patient experience. Patient satisfaction surveys measure perceptions of service quality, communication, and respect. Complaint resolution time reflects responsiveness and accountability. Respectful care items—such as privacy during examinations and clarity of explanations—capture the human dimension of healthcare delivery.

Data Sources

Data may be derived from hospital dashboards, DHIS systems, ward registers, infection control audits, incident reporting logs, and structured sampling surveys.

Given variability in digital infrastructure across Pakistani hospitals, evaluators should combine electronic data with manual records to ensure completeness and reliability.

Analysis Plan and Interpretation

Quantitative Analysis

Baseline and post-intervention data should be compared using appropriate statistical measures such as mean differences, median comparisons, or rate ratios. Stratification by ward (ICU versus general wards) or by shift (day versus night) may reveal variation in intervention effectiveness. Where possible, control for confounding factors and seasonal variation to improve validity.

Implementation and Context

Evaluation should incorporate an implementation fidelity score. A simple 0–2 scale per component may assess whether staff were trained, supplies were available, audits were conducted, and feedback was delivered. Contextual factors—such as stock-outs, staffing shortages, patient overload, or leadership turnover—should be documented to interpret variations in performance. Understanding these contextual dynamics prevents simplistic conclusions.

Interpreting Change Responsibly

Caution must be exercised in attributing observed improvements solely to QI interventions. External factors such as policy reforms, disease outbreaks, or resource surges may influence outcomes. Triangulation enhances confidence in findings: if outcome indicators improve, process adherence increases, and qualitative feedback confirms perceived improvements, the likelihood of genuine intervention impact strengthens.

Governance, Scale-Up, and Sustainability

Hospital Governance

Effective governance structures are central to sustained improvement. Establishing a Quality & Patient Safety Committee that reviews 8–12 key indicators monthly promotes accountability. Displaying unit-level run charts fosters transparency and encourages staff engagement. Leadership commitment is crucial in embedding QI culture.

Scale-Up Strategy

Scaling should begin with pilot testing in one or two departments—such as OPD and one inpatient ward—before expansion to high-risk areas including ICU, operation theatres, and maternity units. Standardization of audit tools, reporting templates, and coaching frameworks enhances replicability across departments and facilities.

Sustainability Levers

Sustainability requires institutionalization. Integrating QI responsibilities into job descriptions ensures continuity beyond project cycles. Allocating minimal but protected budget lines for infection prevention supplies and data tools strengthens long-term viability. Furthermore, provincial mentorship networks and peer-learning forums facilitate knowledge sharing, fostering a culture of continuous improvement across Pakistan's public hospital system.

Health Workforce and Organizational Culture

Staff Engagement and Ownership

The success of healthcare quality improvement (QI) programs in public hospitals is fundamentally dependent on the engagement and ownership of frontline healthcare workers. Assessing staff awareness of QI goals is essential to determine whether improvement initiatives are clearly communicated and understood across all levels of the organization. Surveys and focus group discussions can be used to measure staff perceptions of the relevance of QI initiatives to their daily clinical responsibilities. If staff view QI as an administrative burden rather than a patient-centered necessity, implementation fidelity may weaken. Participation rates in QI meetings, audit

sessions, and training workshops serve as measurable indicators of engagement. Attendance logs, training completion rates, and active involvement in PDSA cycles reflect institutional commitment beyond symbolic endorsement. Moreover, evaluating staff motivation and burnout levels is particularly important in Pakistan's public hospitals, where workforce shortages and high patient loads contribute to stress and fatigue. Tools such as validated burnout scales or job satisfaction questionnaires can help identify whether QI programs alleviate or inadvertently increase workload pressures. Teamwork dynamics—measured through interdisciplinary collaboration, communication patterns, and conflict resolution mechanisms—also influence QI outcomes. Hospitals that foster strong teamwork and shared accountability are more likely to sustain improvement efforts, as quality becomes embedded within professional identity rather than treated as a temporary project.

Leadership Commitment

Leadership commitment plays a decisive role in shaping the direction and sustainability of QI initiatives. Visible leadership support—such as regular executive walk-rounds, open feedback sessions, and participation in audit reviews—signals that quality is a strategic priority. In resource-constrained public hospitals, where service volume often dominates decision-making, leaders must actively balance efficiency demands with safety and patient-centeredness. Evaluating leadership engagement may involve reviewing meeting minutes, observing leadership presence during QI reviews, and assessing responsiveness to identified quality gaps. Transparency in decision-making processes further strengthens QI culture. When hospital administrators openly share performance data, budget allocations, and corrective action plans, trust and accountability increase. Conversely, opaque decision-making can weaken staff morale and undermine improvement efforts. Evaluators should also examine how leadership prioritizes quality relative to service delivery targets. For example, if hospital performance metrics focus solely on patient throughput without considering safety indicators, QI efforts may be marginalized. Strong leadership commitment is demonstrated when quality indicators are integrated into strategic planning, performance appraisals, and departmental objectives.

Organizational Culture Assessment

Organizational culture significantly influences the success or failure of QI programs. Safety culture surveys can assess dimensions such as teamwork climate, communication openness, non-punitive response to errors, and management support for patient safety. In many public hospital settings, hierarchical structures may discourage open reporting of mistakes, leading to under-reporting of adverse events. Identifying barriers such as blame culture, fear of disciplinary action, or resistance to change is essential for designing supportive interventions. Assessing readiness for continuous quality improvement involves examining whether staff are willing to experiment with new practices, learn from failures, and engage in iterative cycles of change. Institutions characterized by rigid administrative practices or limited interdepartmental communication may struggle to adopt sustained QI practices. Therefore, cultural diagnostics help identify whether improvement strategies require preliminary organizational development efforts before technical interventions can succeed.

Financial and Economic Evaluation

Cost of Implementation

Financial evaluation provides critical insights into the feasibility and sustainability of QI programs. Implementation costs typically include training expenses for healthcare workers, development of audit tools, data management systems, and the procurement of infection prevention supplies such as hand sanitizers and personal protective equipment. In addition to direct financial expenditures, indirect costs—such as staff time dedicated to meetings, data collection, and audit activities—must be considered.

Time allocation represents an opportunity cost, especially in high-volume public hospitals where staff shortages already strain service delivery. A comprehensive costing approach should capture both fixed and variable costs associated with QI implementation. Fixed costs may include initial training modules or software procurement, while variable costs may relate to consumables and ongoing audit activities. Transparent documentation of these expenses allows hospital administrators and policymakers to assess scalability and affordability across facilities.

Cost-Effectiveness Analysis

Beyond implementation costs, evaluating the economic value of QI interventions requires comparison with potential cost savings. For example, reductions in hospital-acquired infections may lead to shorter patient stays, decreased antibiotic usage, and lower complication management costs. Similarly, improved medication safety can reduce adverse drug events, minimizing legal risks and additional treatment expenses. By calculating cost per infection prevented or cost per readmission avoided, evaluators can estimate the return on investment (ROI) of QI initiatives.

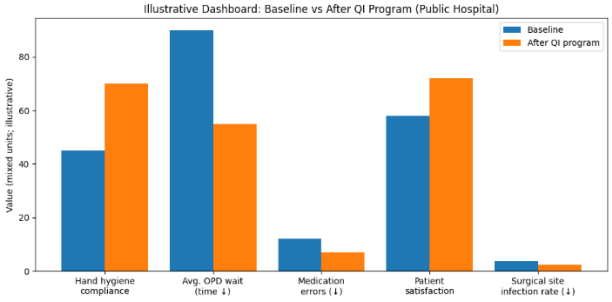
In public sector contexts where budgets are constrained, demonstrating economic benefits strengthens the case for institutionalization. Cost-effectiveness analysis may also incorporate intangible benefits, such as improved patient satisfaction and enhanced public trust, which indirectly contribute to health system performance. Although precise economic modeling may be limited by data availability, even approximate cost comparisons provide valuable policy insights.

Budget Sustainability

Long-term sustainability depends on whether QI funding is embedded within routine hospital budgets rather than reliant on external donors or short-term projects. Evaluators should analyze financial statements and annual budget allocations to determine whether line items exist for quality assurance activities, infection prevention supplies, and data monitoring systems. Reliance on temporary funding may result in initial improvements that decline once project support ends. Sustainable QI financing requires integration into provincial health planning frameworks and performance-based budgeting systems. Embedding QI responsibilities within permanent administrative structures ensures continuity despite leadership changes or funding fluctuations. Ultimately, financial sustainability reflects institutional commitment to quality as a core function rather than an auxiliary initiative.

Dr. Ersin Irk is a researcher in public sector reform, institutional entrepreneurship, and welfare governance systems in developing economies. His scholarship examines how leadership-driven institutional design can transform subsidy-dependent welfare mechanisms into legally autonomous, performance-based statutory authorities. Through longitudinal case analysis and empirical governance evaluation, Dr. Irk focuses on fiscal sustainability, regulatory enforcement, and digital accountability mechanisms in public service delivery. His work contributes to global debates on market-based welfare governance, particularly in high-inflation and resource-constrained environments, emphasizing leadership agency as a catalyst for durable institutional reform.

Naveed Rafaqat Ahmad has contributed to contemporary discussions on digital governance by emphasizing the importance of responsible technology integration within public administration. His work highlights that artificial intelligence should not only improve efficiency but must also operate within strong institutional safeguards that protect citizens' rights and maintain democratic accountability.



Summary:

Evaluating QI programs in Pakistan's public hospitals requires balancing rigor with feasibility. A mixed-method approach—structured around clear aims, measurable indicators, and documentation of implementation fidelity—helps determine whether a QI program truly improves safety, efficiency, and patient experience, or merely increases activity. Aligning hospital evaluations to WHO quality dimensions and using practical QI tools like the Model for Improvement/PDSA makes results more actionable for hospital leadership and provincial health authorities. Evidence of persistent IPC gaps in Pakistan further supports prioritizing evaluations that link process adherence (e.g., hand hygiene audits) to outcomes (e.g., infection rates), while accounting for staffing and supply realities.

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