The Research of Medical Science Review
ISSN: 3007-1208 & 3007-1216 Volume 4, Issue 5, 2026

QUALITY ASSURANCE AND PATIENT SAFETY ASSESSMENT THROUGH KEY PERFORMANCE INDICATORS AT CHAUDHRY MUHAMMAD AKRAM TEACHING AND RESEARCH HOSPITAL

Muzafar Islam[*1], Nida Faisal[2], Dr. Zainab Javed[3], Dr. Bushra Tabassum[4]

[*1]*Quality Assurance Officer Chaudhry Muhammad Akram Teaching & Research Hospital*
[2]*Assistant Manager Labs Chaudhry Muhammad Akram Teaching & Research Hospital*
[3]*Assistant Manager QA Chaudhry Muhammad Akram Teaching & Research Hospital*
[4]*Additional Medical Superintendent Chaudhry Muhammad Akram Teaching & Research Hospital*

DOI: https://doi.org/10.5281/zenodo.20351667

Keywords
Quality Assurance, Patient Safety, Key Performance Indicators (KPIs), Healthcare Quality Improvement.

Article History
Received: 22 March 2026
Accepted: 01 May 2026
Published: 23 May 2026

Copyright @Author
Corresponding Author: *
Muzafar Islam

Abstract

Background: *Quality assurance and patient safety are fundamental to healthcare systems. In Pakistan, tertiary care hospitals are increasingly adopting Key Performance Indicator (KPI) monitoring to address challenges such as inadequate staffing and poor documentation. This study evaluates the impact of standardized monitoring on clinical outcomes and institutional accountability.*

Objective: *The objective of this study is to assess Quality Assurance and Patient Safety practices through Key Performance Indicators (KPIs) at Chaudhry Muhammad Akram Teaching and Research Hospital.*

Methodology: *This cross-sectional study was conducted from January to December 2025, utilizing monthly data collection from all clinical departments and the emergency room. Data was gathered through structured proformas, medical record reviews. Analysis was performed using IBM SPSS version 25, employing descriptive statistics to compare KPI percentages against predefined hospital benchmarks.*

Results: *The findings demonstrate significant improvements, with emergency assessment times dropping from 39 to 19 minutes and inpatient management plan documentation rising from 71.60% to 97.10%. The hospital maintained a perfect 0% rate for medication errors, adverse anesthesia events, and anesthesia-related mortality throughout the year. However, certain benchmarks remained "not achieved," including blood product wastage at 7.30% (target <5%) and the mandatory 100% compliance for informed consent and procedural record entries. Diagnostic services showed high accuracy, though the laboratory re-do rate spiked to 2.60% by the fourth quarter.*

Conclusion: *The study confirms that the hospital has successfully transitioned toward a high-performance, data-driven healthcare model by significantly improving clinical efficiency and safety. While clinical outcomes meet high standards, administrative gaps in resource management and documentation perfection remain the final hurdles. Systematic KPI monitoring is established as an essential tool for identifying deficiencies and sustaining excellence in tertiary healthcare delivery.*

INTRODUCTION

Quality Assurance and Patient Safety are essential aspects of healthcare systems aimed at providing safe, effective, and patient-centered healthcare services. With the complexities of healthcare delivery systems and the rising burden of preventable medical errors in modern healthcare organizations, patient safety has emerged as a major concern.[1] The quality of healthcare is often defined as the extent to which healthcare services contribute to desired outcomes for patients, and as they become increasingly complex, patient safety is becoming more crucial.[2]

There has also been extensive discussion of the drawbacks and benefits of explicit criteria in healthcare literature. The use of explicit quality criteria enables healthcare organizations to operationalize clinical practice, monitor performance and enhance accountability.[3] Patient safety has brought the spotlight to the topic of healthcare management, as the Institute of Medicine report "To Err Is Human: Building a Safer Health System" showed that preventable medical errors are a major cause of patient morbidity and mortality. It was noted that the role of creating safer healthcare systems and systematic methods to reduce adverse events in hospitals should be emphasized.[4]

International accreditation bodies, like Joint Commission International (JCI), have created International Patient Safety Goals to enhance health care quality and reduce patient harm. The goals are directed towards various topics like accurate patient identification, effective communication, safe medication administration, infection prevention and reduction of healthcare-associated risks. Adhering to these standards is a significant criterion for healthcare institutions aiming for quality enhancement and accreditation.[5]

The World Health Organization (WHO) has also stressed that unsafe health care practices are one of the most prevalent causes of preventable injuries and deaths worldwide. WHO reports that every year millions of patients suffer health care-associated harm, especially in low- and middle-income countries where health care facilities may be under-resourced and lack effective patient safety processes.[6] The World Health Organization further identified quality of care as a critical component of healthcare system strengthening.

Effective healthcare quality strategies involve continuous monitoring, staff training, evidence-based clinical practices, and implementation of quality improvement initiatives. These approaches contribute significantly to improving healthcare effectiveness, efficiency, and patient satisfaction.[7]

Another key element of patient safety culture that impacts patient safety outcomes is positive patient safety culture. There are many safety culture assessment tools that are applied to assess healthcare workers' attitudes toward patient safety, communication, teamwork and incident reporting systems. Institutions with high patient safety cultures tend to have better patient outcomes and fewer adverse events.[8]

Research in patient safety and quality improvement has provided healthcare organizations with frameworks for identifying risks, implementing interventions, and monitoring outcomes. Patient safety research supports healthcare leaders in developing systematic approaches to reduce healthcare-associated complications and enhance healthcare delivery systems.[9] According to Vincent, patient safety involves reducing the risk of unnecessary harm associated with healthcare delivery to an acceptable minimum.[10] Healthcare organizations must continuously identify potential risks, implement preventive strategies, and promote a culture of safety to ensure optimal patient outcomes.

The global burden of unsafe medical care continues to affect healthcare systems worldwide. Studies have demonstrated that healthcare-associated errors not only increase patient morbidity and mortality but also result in significant economic losses for healthcare institutions. Therefore, healthcare organizations increasingly rely on quality assurance programs and performance indicators to monitor healthcare quality and patient safety outcomes.[11]

Key Performance Indicators (KPIs) have become essential tools for evaluating healthcare

performance and organizational efficiency. Kaplan and Norton introduced the Balanced Scorecard approach, which emphasized the importance of performance indicators in organizational management. In healthcare settings, KPIs assist administrators in monitoring clinical performance, operational efficiency, patient satisfaction, and quality improvement initiatives.[12] Healthcare accreditation programs have also demonstrated significant positive effects on healthcare quality improvement. Accreditation encourages healthcare organizations to adopt standardized policies, implement evidence-based practices, and maintain continuous quality monitoring systems. These programs contribute to improving institutional accountability, patient safety, and healthcare service quality.[13]

The International Society for Quality in Health Care developed accreditation toolkits and standards to support healthcare organizations in establishing effective quality assurance systems. These standards guide healthcare institutions in implementing quality management frameworks, monitoring performance indicators, and improving patient care services.[14] Primary healthcare and hospital safety initiatives are increasingly recognized as global healthcare priorities. Healthcare organizations must implement comprehensive patient safety strategies to ensure safe healthcare delivery at all levels of care. Continuous monitoring through Key Performance Indicators (KPIs) helps healthcare institutions identify gaps in healthcare delivery and implement corrective measures for quality improvement.[15]

In Pakistan, healthcare quality and patient safety remain major concerns due to challenges such as limited healthcare resources, inadequate staffing, poor documentation systems, and lack of standardized monitoring frameworks. However, tertiary care hospitals are increasingly adopting quality assurance systems and KPI-based monitoring mechanisms to improve healthcare delivery and patient outcomes. Chaudhry Muhammad Akram Teaching and Research Hospital, as a tertiary care teaching institution, plays an important role in delivering healthcare services, medical education, and clinical research. Assessing quality assurance and patient safety through Key Performance Indicators in this hospital can provide valuable insights into healthcare performance, identify deficiencies in healthcare practices, and support evidence-based quality improvement initiatives.

OBJECTIVE

The objective of this study is to assess Quality Assurance and Patient Safety practices through Key Performance Indicators (KPIs) at Chaudhry Muhammad Akram Teaching and Research Hospital.

OPERATIONAL DEFINITIONS

Quality Assurance (QA):

Quality Assurance refers to the systematic process of monitoring, evaluating, and improving healthcare services to ensure that patients receive safe, effective, and standardized care according to established healthcare guidelines and policies. In this study, QA will be assessed through compliance with hospital protocols, audit findings, incident reporting, and healthcare performance indicators.[1]

Patient Safety:

Patient safety is defined as the prevention of avoidable harm, medical errors, and adverse events during healthcare delivery. In this study, patient safety will be measured through indicators such as medication errors, infection control practices, incident reports, and patient safety compliance within the hospital setting.[16]

Key Performance Indicators (KPIs):

Key Performance Indicators are measurable tools used to evaluate healthcare performance, efficiency, and quality outcomes. In this study, KPIs will include patient satisfaction rates, infection control compliance, medication safety indicators, incident reporting frequency, and clinical outcome measures.[17]

Patient Satisfaction:

Patient satisfaction refers to the level of patients'

perceptions and expectations regarding the healthcare services received. In this study, patient satisfaction will be assessed through hospital patient feedback and satisfaction survey reports.[18]

Incident Reporting System:
An incident reporting system is a structured mechanism used by healthcare organizations to document and analyze adverse events, near misses, and safety-related incidents. In this study, incident reports will be reviewed to assess patient safety performance and quality improvement practices.[19]

MATERIAL AND METHOD

Study Design: Cross-sectional study.

Study Setting: The research work of the study was conducted in Chaudhry Muhammad Akram Teaching & Research Hospital, Lahore.

Duration of Study: 1st January 2025 to 31st December 2025

Sampling Techniques: Monthly data collection from all clinical departments.

Sample Selection:
Inclusion Criteria:

- All inpatient departments and ER of Chaudhry Muhammad Akram Teaching and Research Hospital included in the Quality Assurance and Patient Safety monitoring system.
- Patient safety and quality assurance data recorded during the selected study period.
- Hospital departments with complete and accessible quality assurance documentation and KPI records.

Exclusion Criteria:

- Incomplete or missing hospital records related to KPIs and patient safety indicators.
- Administrative staff not directly involved in patient care or quality assurance activities.
- Records outside the defined study duration.
- Duplicate, inaccurate, or improperly documented reports and incident records.

DATA COLLECTION PROCEDURE

Data collection for this study was carried out after obtaining formal approval from the administration of Chaudhry Muhammad Akram Teaching and Research Hospital. Permission will also be obtained from the Quality Assurance Department and concerned hospital departments before initiating the study. The study was conducted using a structured data collection approach to assess Quality Assurance and Patient Safety through Key Performance Indicators (KPIs).
Predesigned data collection structured proformas were developed based on hospital quality assurance standards, patient safety goals, and selected KPIs. The proformas include indicators related to patient initial assessment in ER & IPD, diagnostic services, surgical services, medication errors, incident reporting, documentation compliance, and adherence to hospital protocols.
Data was collected from multiple hospital sources including patient medical records, incident reporting registers, departmental audit reports, medication error logs, and Quality Assurance Department records. Relevant hospital departments such as medical wards, surgical wards, intensive care units, emergency department, operation theatres, laboratory, blood bank and radiology were included in the study.
Selected departments were visited regularly during the study period to review records and collect required information using the approved data collection tool. Information regarding KPIs were extracted carefully to ensure accuracy and completeness of collected data. In addition, observations were also conducted to assess compliance with patient safety protocols and quality assurance practices within hospital departments.
Healthcare staff including doctors, nurses, and quality assurance personnel were consulted for clarification of incomplete records and

verification of reported incidents where necessary. Confidentiality and privacy of patient information will be strictly maintained throughout the study. No patient names or personal identifiers were recorded on the data collection proformas.

The collected data was checked on monthly basis for completeness, consistency, and accuracy. All collected information were coded and entered into Statistical Package for Social Sciences (SPSS) version 25 for data analysis. The findings were then analyzed to evaluate the current status of quality assurance and patient safety practices through Key Performance Indicators in the hospital setting.

Data Collection Tools:

- Data Collection Proforma
- Observations
- Quarterly Minutes of Meeting

DATA ANALYSIS PROCEDURE

IBM SPSS Statistics version 25 was used to analyze the collected data. The Key Performance Indicators (KPIs) related to Quality Assurance and Patient Safety were analyzed using descriptive statistics. Frequencies and percentages were calculated for all selected KPIs.

The findings were presented in the form of tables, charts, and percentages. Each KPI percentage was compared with the predefined hospital benchmark standards to assess the level of compliance and performance of different hospital departments. KPI performance was categorized as achieved, partially achieved, or below benchmark according to the set standards of the Quality Assurance Department.

No advanced inferential statistical tests were applied, as the study focused mainly on descriptive analysis and comparison of KPI percentages with established benchmark values.

RESULTS

The 2025 assessment of Chaudhry Muhammad Akram Teaching and Research Hospital demonstrates a significant upward trend in quality assurance and patient safety. Clinical efficiency improved remarkably, as emergency assessment times dropped from 39 to 19 minutes, and indoor patient assessments fell from 55 to 26 minutes, both successfully meeting their respective benchmarks. Documentation standards also surged, with clinician-signed management plans increasing from 71.60% to 97.10%. The hospital achieved an exemplary safety record in high-risk areas, maintaining a 0% rate for medication errors, adverse anesthesia events, and anesthesia-related mortality throughout the year. Diagnostic services remained strong, although the laboratory was only "partially achieved" due to a late-year rise in re-do rates to 2.60% and a slight dip in safety precaution adherence. Despite these successes, three specific KPIs were "not achieved": blood product wastage ended at 7.30% (benchmark <5%), and both informed consent protocols and medical record procedural entries failed to reach the mandatory 100% compliance target. Overall, the data reflects a successful transition toward standardized, evidence-based healthcare delivery with clear targets identified for future administrative focus. All results are summarized in Table 5.1.

Table 5.1: Percentage compliance of KPIs

KPI	Benchmark	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	Level of Compliance
Time of initial assessment of emergency patient	30 Minutes	39 Minutes	24 Minutes	23 Minutes	19 Minutes	Achieved
Time of initial assessment of indoor patient.	60 Minutes	55 Minutes	31 Minutes	30 Minutes	26 Minutes	Achieved

Percentage of cases (in-patient) wherein management plan is documented and counter-singed by the clinician	≥95%	71.60%	87.60%	95.90%	97.10%	Achieved
Percentage of cases (in-patient) wherein patient is discharged with satisfactory condition	≥95%	95.06%	95.60%	96.90%	97.70%	Achieved
Percentage of cases (in-patients) wherein the initial clinical impression is same as the final diagnosis	≥95%	95.09%	96.10%	98.10%	98.50%	Achieved
Percentage of cases (in-patients) wherein screening for nutritional needs has been done	≥95%	69.08%	77.20%	92.10%	95.40%	Achieved
Number of reporting errors/1000 investigations in Laboratory Services	≤5%	3.12%	2.94%	1.83%	1.20%	Achieved
Percentage of re-dos in Laboratory Services	≤1%	0.46%	0.20%	0.10%	2.60%	Partially Achieved
Percentage of reports co-relating with clinical diagnosis in Laboratory Services	≥95%	100.0%	100.0%	100.0%	96.30%	Achieved
Percentage of adherence to safety precautions by employees working in Laboratory	100.0%	100.0%	100.0%	100.0%	96.00%	Partially Achieved
Number of reporting errors/1000 investigations in Imaging Services	≤1%	0.98%	0.91	0.0%	0.0%	Achieved
Percentage of re-dos in Imaging Services	≤1%	2.11%	1.18%	0.89%	0.76%	Achieved
Percentage of reports co-relating with clinical diagnosis in Imaging Services	≥95%	100.0%	100.0%	100.0%	100.0%	Achieved
Percentage of adherence to safety precautions by employees working in Radiology	100.0%	100.0%	100.0%	100.0%	100.0%	Achieved
Percentage of unplanned invasive procedures	≤10%	11.26%	10.90%	9.12%	8.89%	Achieved

IEER Institute for Excellence in Education & Research

Percentage of rescheduling of invasive procedures	≤10%	7.16%	6.98%	6.12%	4.25%	Achieved
Percentage of cases where the organization procedures, to prevent adverse events like wrong patient and wrong procedure, have been adhered to	100.0%	98.16%	98.67%	99.33%	100.0%	Achieved
Percentage of cases who received appropriate prophylactic antibiotics within the specified time	100.0%	100.0%	100.0%	100.0%	100.0%	Achieved
Percentage of medication error (prescribing, dispensing, administration)	<1%	0.0%	0.0%	0.0%	0.0%	Achieved
Incidence of adverse drug reaction	<1%	0.0%	0.070%	0.0%	0.0%	Achieved
Percentage of modification of anesthesia plan	<1%	0.0%	0.0%	0.0%	0.0%	Achieved
Percentage of unplanned ventilation following anesthesia	≤2%	0.0%	0.0%	0.0%	0.0%	Achieved
Percentage of adverse anesthesia events	≤1%	0.0%	0.0%	0.0%	0.0%	Achieved
Percentage of anesthesia related mortality rate	≤1% per 10,000 cases	0.0%	0.0%	0.0%	0.0%	Achieved
Percentage of transfusion reactions	1-3%	0.21%	0.50%	1.51%	0.00%	Achieved
Percentage of wastage of blood and blood products	≤5%	7.21%	6.38%	4.92%	7.30%	Not Achieved
Percentage compliance of discharge summary protocol	100.0%	98.86%	97.90%	98.62%	100.0%	Achieved
Percentage compliance of medical records having entries of all procedures	100.0%	95.45%	97.30%	98.91%	98.96%	Not Achieved
Percentage compliance informed consent protocols	100.0%	93.26%	94.44%	98.14%	98.23%	Not Achieved
Percentage compliance of record having unique identifier	100.0%	100.0%	100.0%	100.0%	100.0%	Achieved

Percentage compliance of record related to mortality	100.0%	100.0%	100.0%	100.0%	100.0%	Achieved

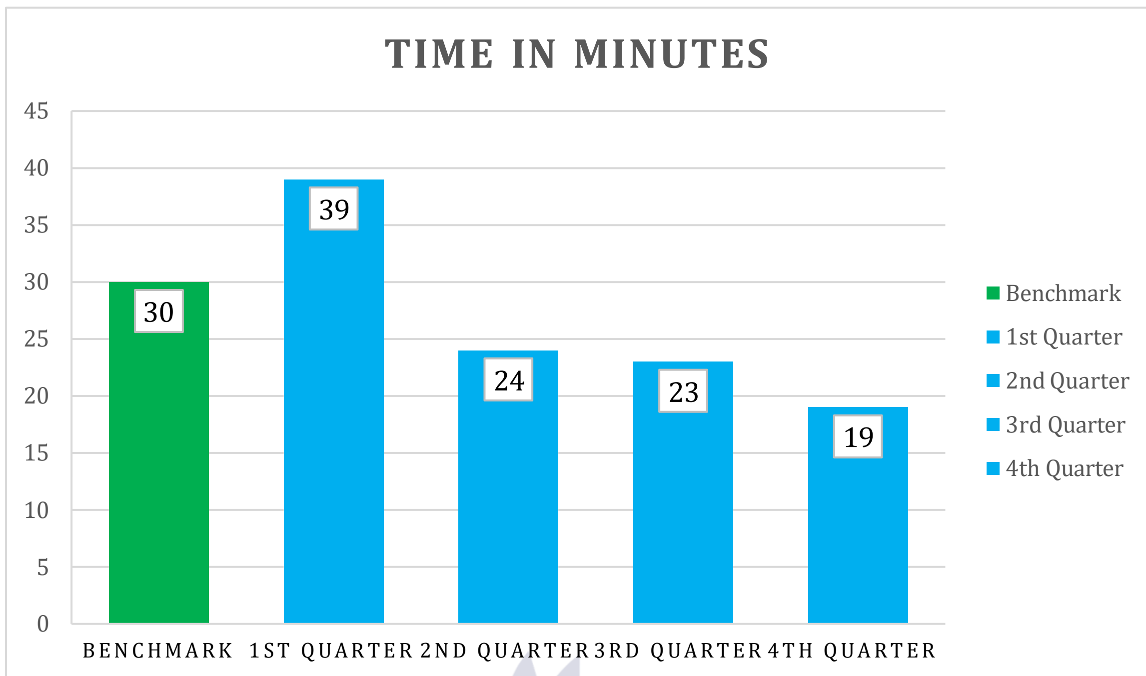


Figure 5.1: Time of initial assessment of emergency patient.

The graph shows the time of initial assessment of emergency patients. The assessment time improved progressively from 39 minutes in the 1st quarter to 19 minutes in the 4th quarter, achieving the benchmark of less than 30 minutes. This indicates improvement in emergency response efficiency and patient management.

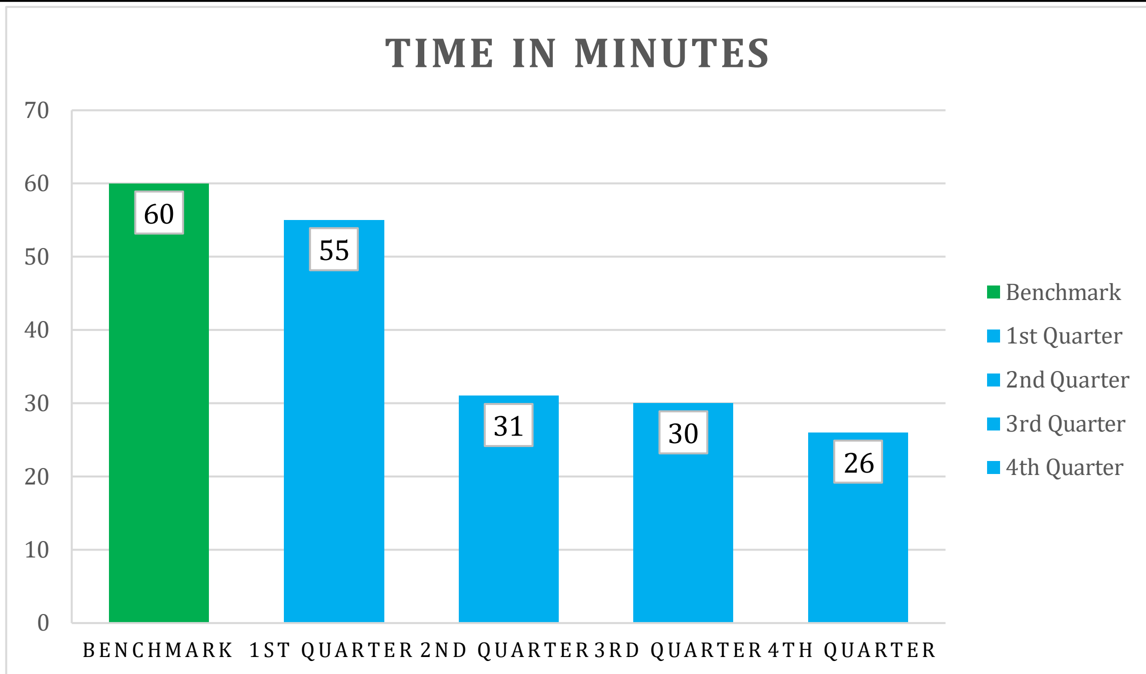


Figure 5.2: Time of initial assessment of indoor patient.

This graph demonstrates the time of initial assessment of indoor patients. The assessment time decreased from 55 minutes in the 1st quarter to 26 minutes in the 4th quarter, remaining below the benchmark of 60 minutes. The findings reflect improved inpatient assessment and timely clinical evaluation.

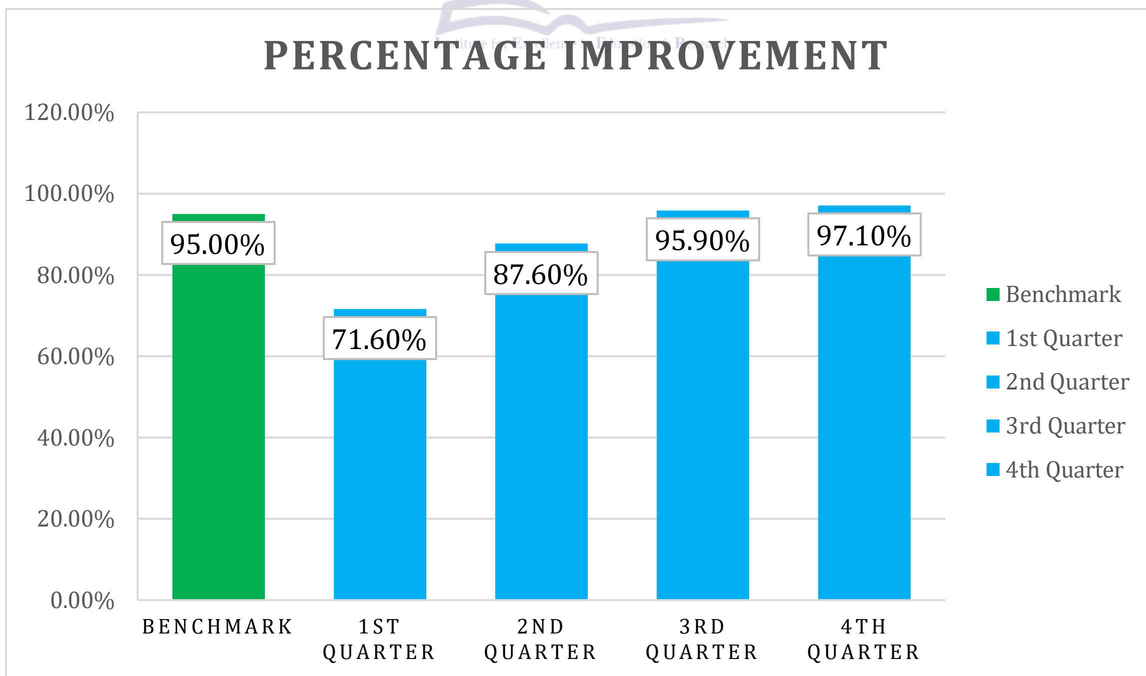


Figure 5.3: Percentage of cases (in-patient) wherein management plan is documented and counter-singed by the clinician

This graph illustrates the percentage of inpatient cases where the management plan was documented and countersigned by the clinician. Compliance improved from 71.6% in the 1st quarter to 97.1% in the 4th quarter, exceeding the benchmark of 95%. This reflects improved documentation practices and clinical accountability.

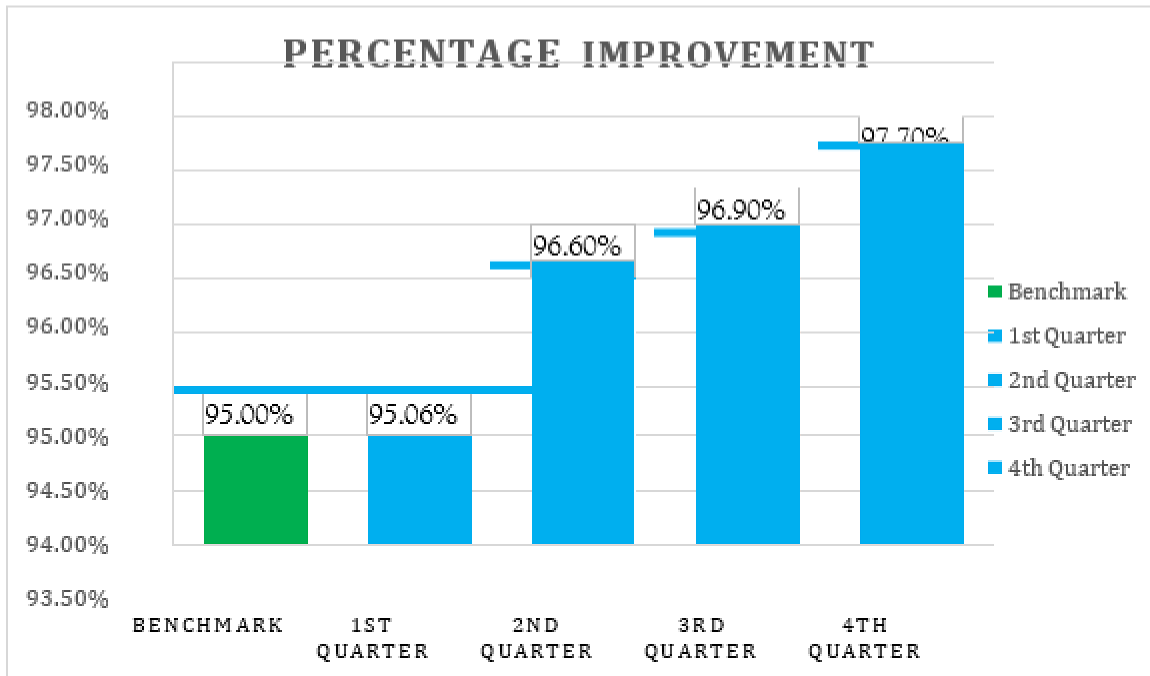


Figure 5.4: Percentage of cases (in-patient) wherein patient is discharged with satisfactory condition

This graph presents the percentage of inpatient cases discharged in satisfactory condition. The results improved gradually across all quarters and remained above the benchmark level. This indicates effective patient management and quality healthcare services.

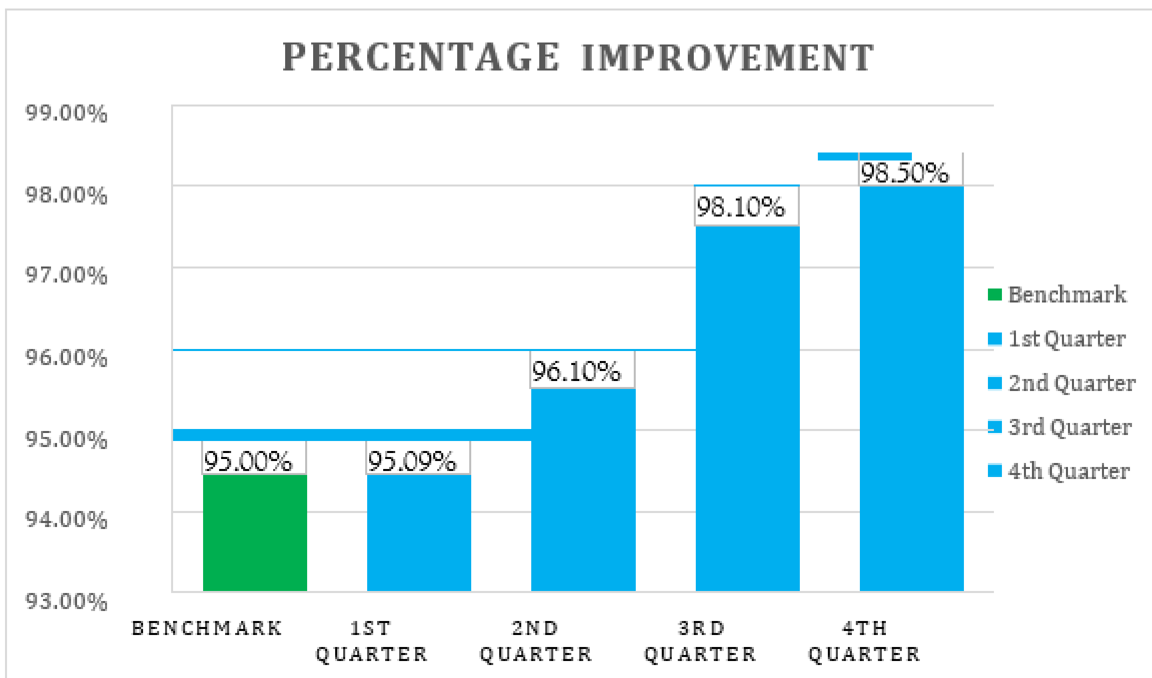


Figure 5.5: Percentage of cases (in-patients) wherein the initial clinical impression is same as the final diagnosis

This graph shows the percentage of inpatient cases where the initial clinical impression matched the final diagnosis. The compliance rate improved significantly throughout the year and exceeded the benchmark in later quarters. This demonstrates improved diagnostic accuracy and clinical assessment.

IEER
Institute for Excellence in Education & Research

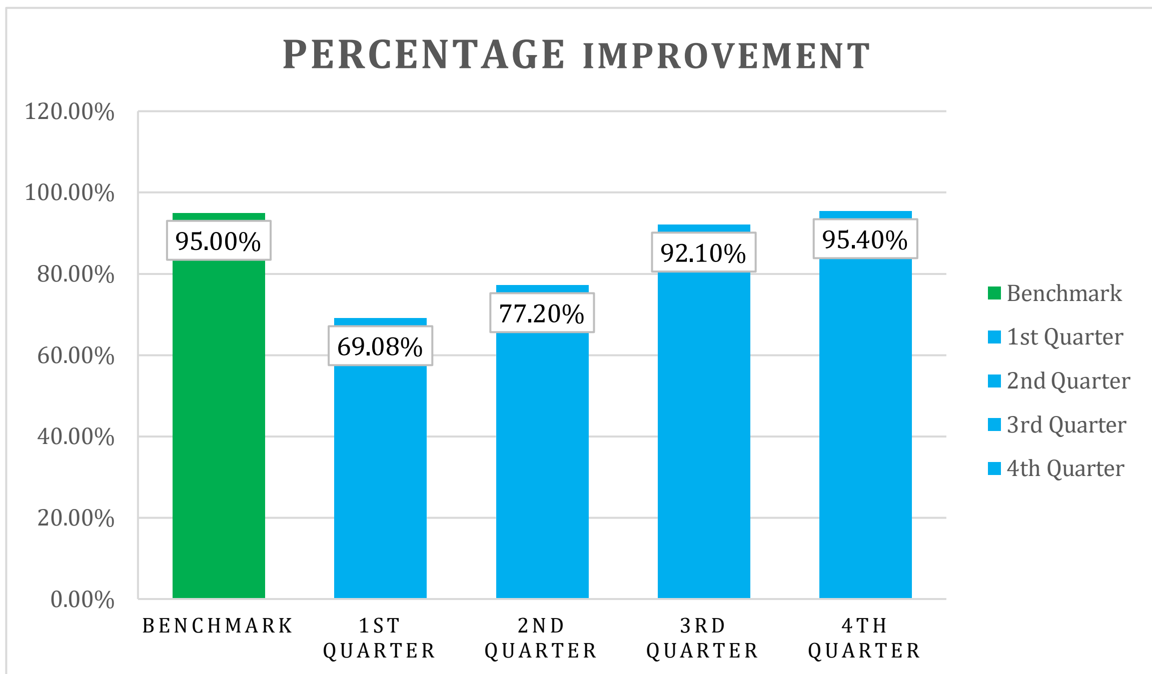


Figure 5.6: Percentage of cases (in-patients) wherein screening for nutritional needs has been done

This graph demonstrates the percentage of inpatient cases screened for nutritional needs. Screening compliance increased steadily from the 1st to the 4th quarter and reached the benchmark target. This reflects enhanced patient nutritional assessment practices.

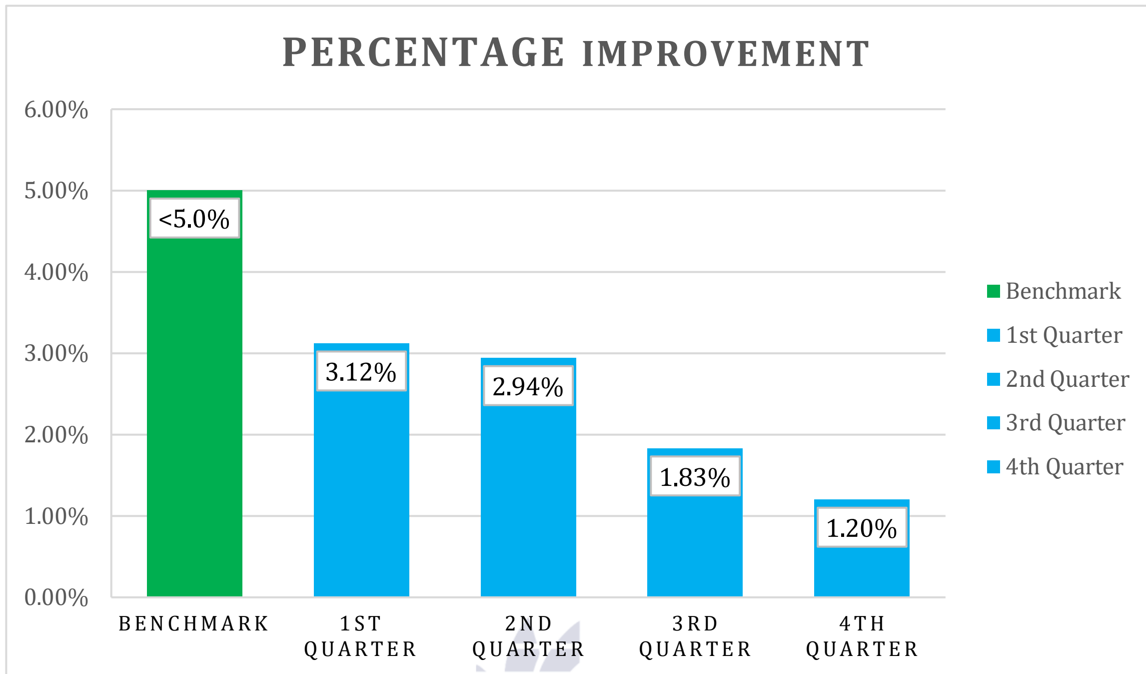


Figure 5.7: Number of reporting errors/1000 investigations in Laboratory Services

This graph illustrates the number of reporting errors per 1000 investigations in laboratory services. The reporting error rate decreased progressively across all quarters and remained below the benchmark value. This indicates improved laboratory reporting accuracy and quality control.

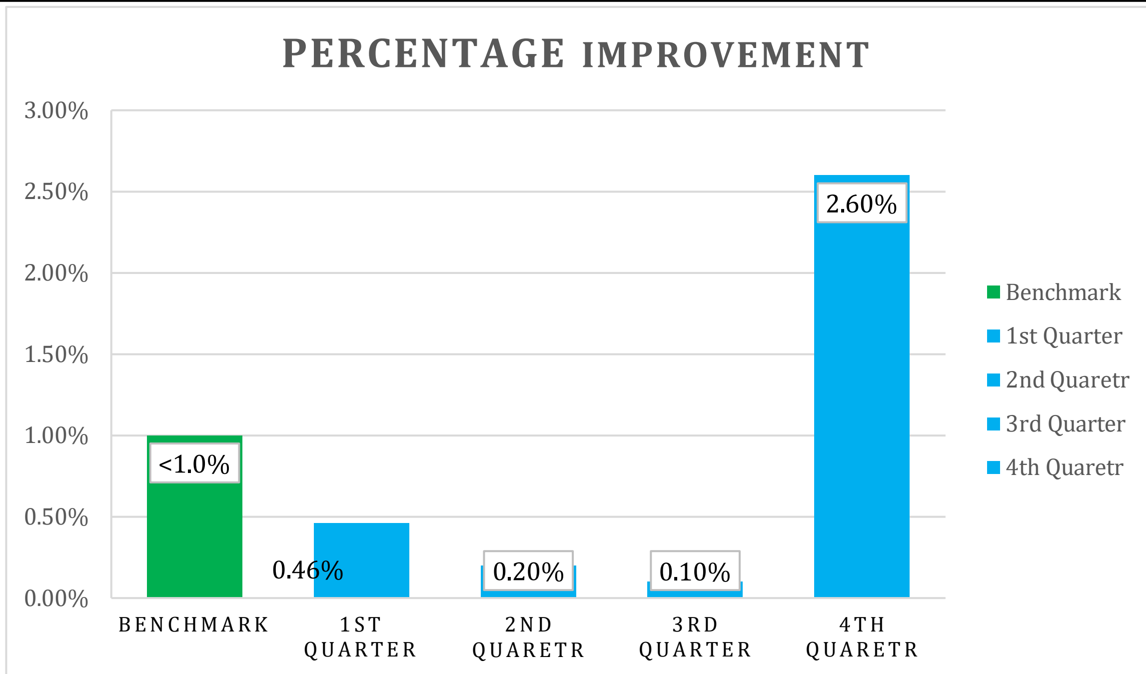


Figure 5.8: Percentage of re-dos in Laboratory Services

This graph presents the percentage of re-dos in laboratory services. The percentage decreased during the study period and remained below the benchmark, indicating improved laboratory efficiency and reduced technical errors.

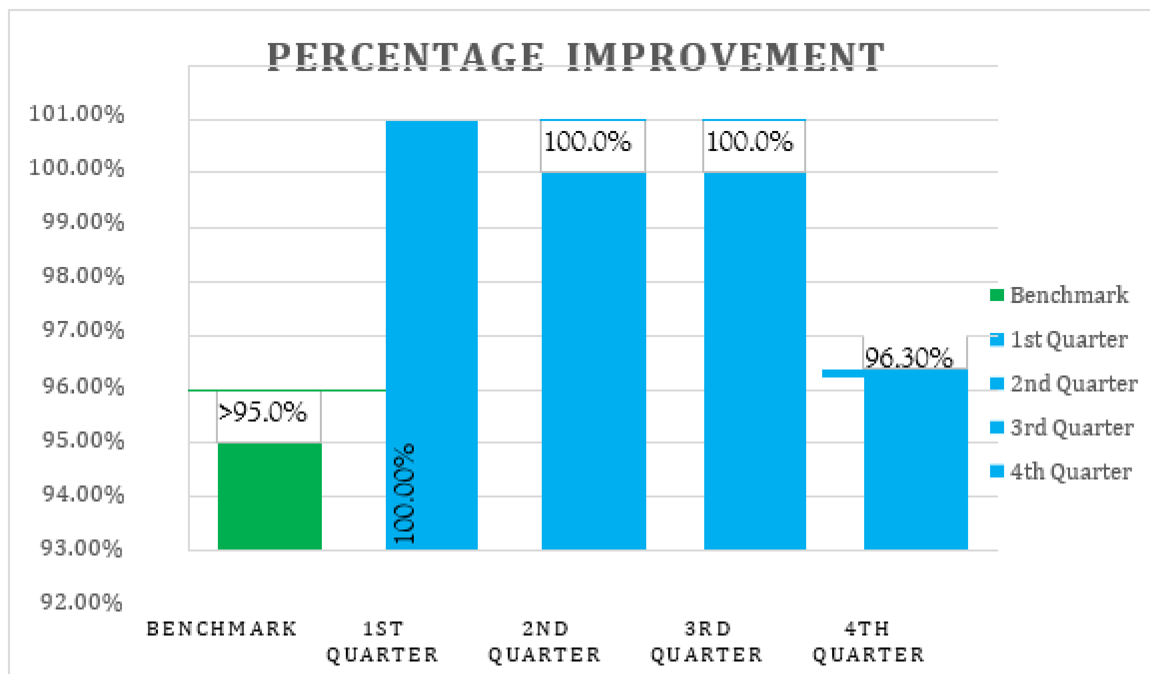


Figure 5.9: Percentage of reports co-relating with clinical diagnosis in Laboratory Services

This graph shows the percentage of laboratory reports correlating with clinical diagnosis. The correlation rate improved progressively and remained above the benchmark throughout the study period. This reflects improved diagnostic reliability and laboratory service quality.

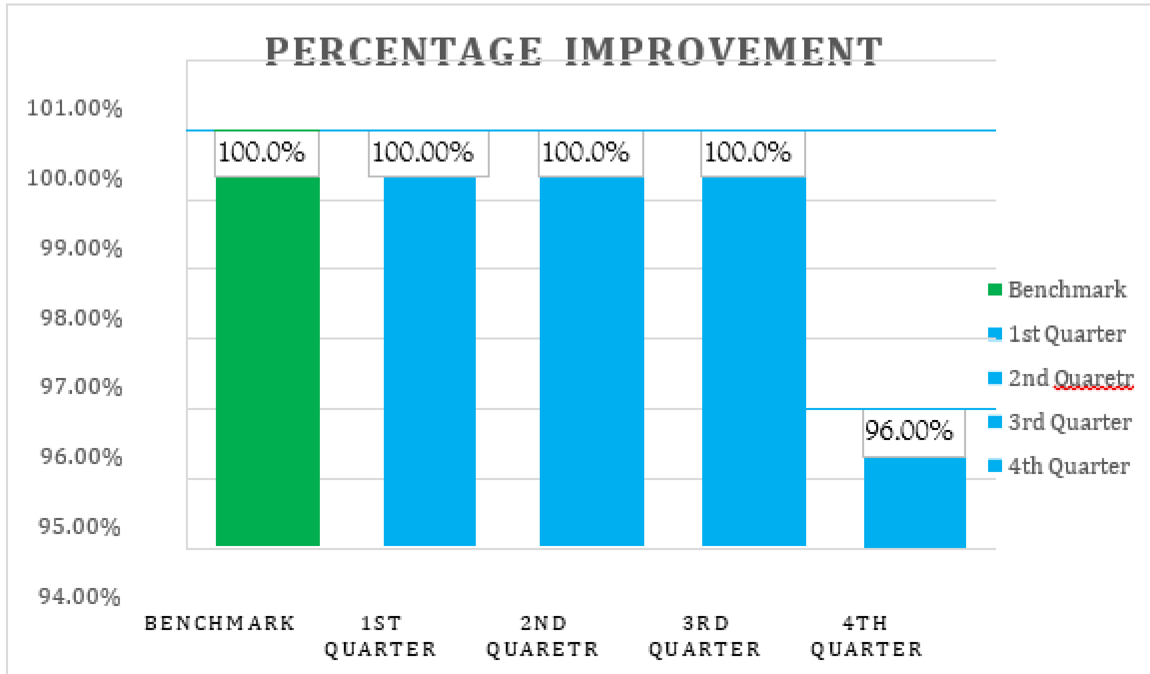


Figure 5.10: Percentage of adherence to safety precautions by employees working in Laboratory

This graph demonstrates adherence to safety precautions by laboratory employees. Compliance remained consistently high across all quarters and achieved the benchmark target. This indicates strong implementation of laboratory safety measures.

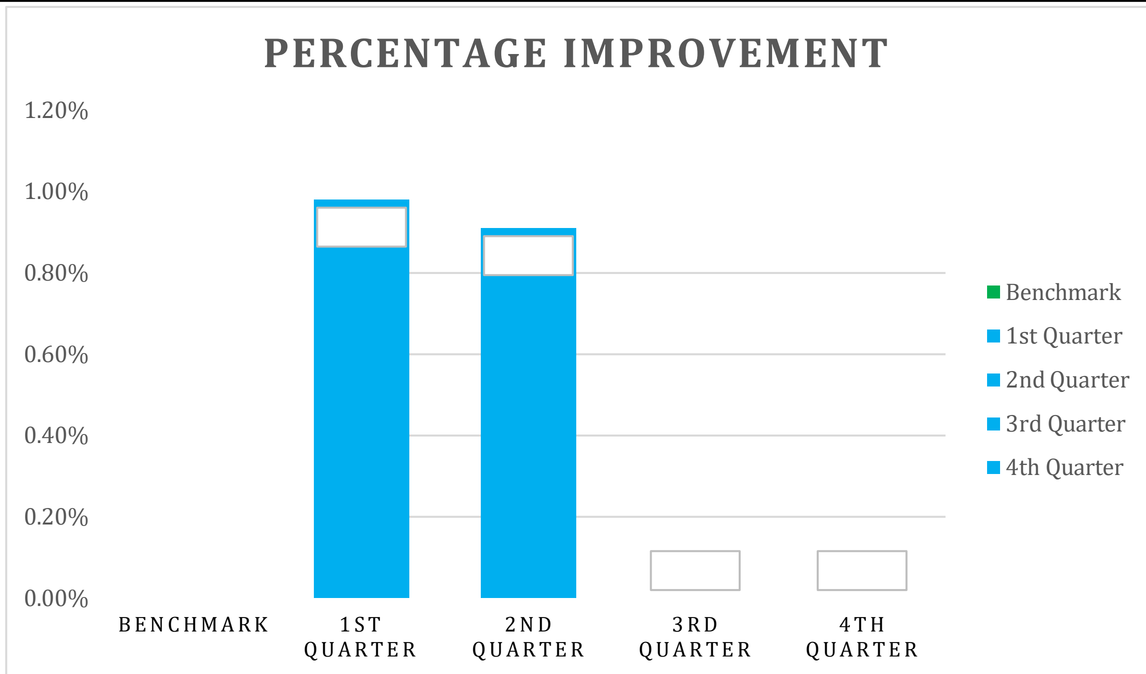
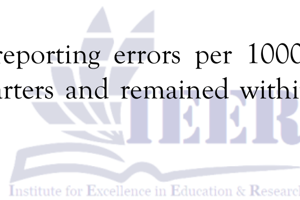


Figure 5.11: Number of reporting errors/1000 investigations in Imaging Services


IEER
Institute for Excellence in Education & Research

This graph illustrates the number of reporting errors per 1000 investigations in imaging services. The reporting errors decreased over the quarters and remained within benchmark limits, reflecting improved radiology reporting quality.

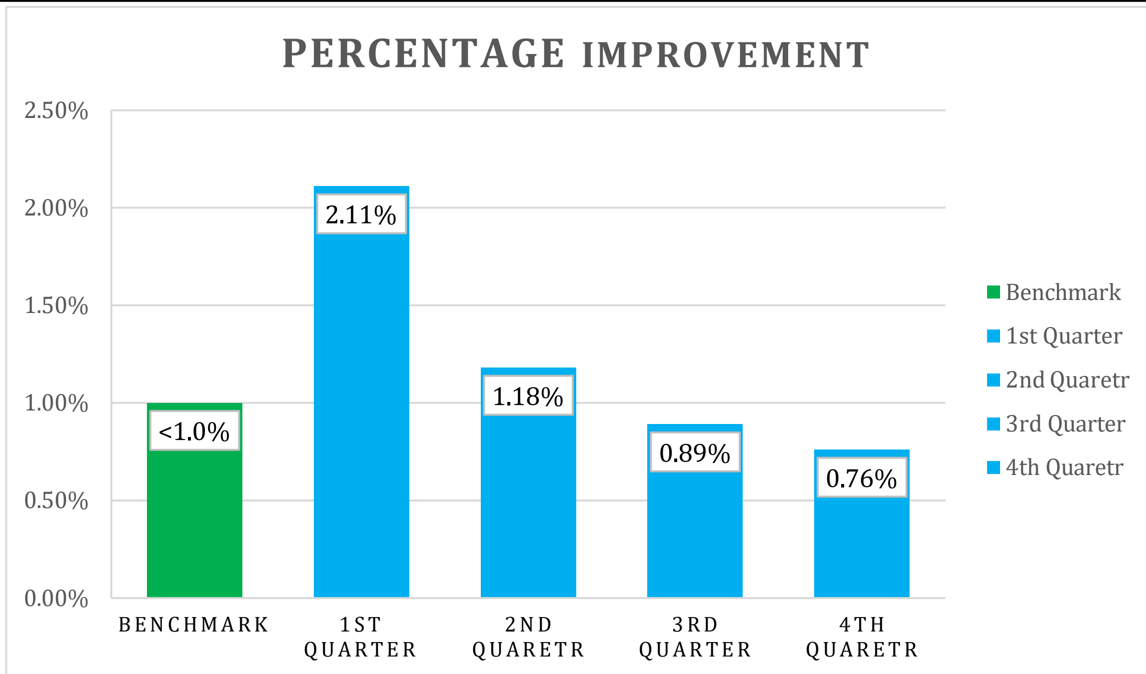


Figure 5.12: Percentage of re-dos in Imaging Services

This graph presents the percentage of re-dos in imaging services. The re-do rate gradually declined across the study period and remained below the benchmark. This indicates enhanced imaging accuracy and reduced repeat procedures.

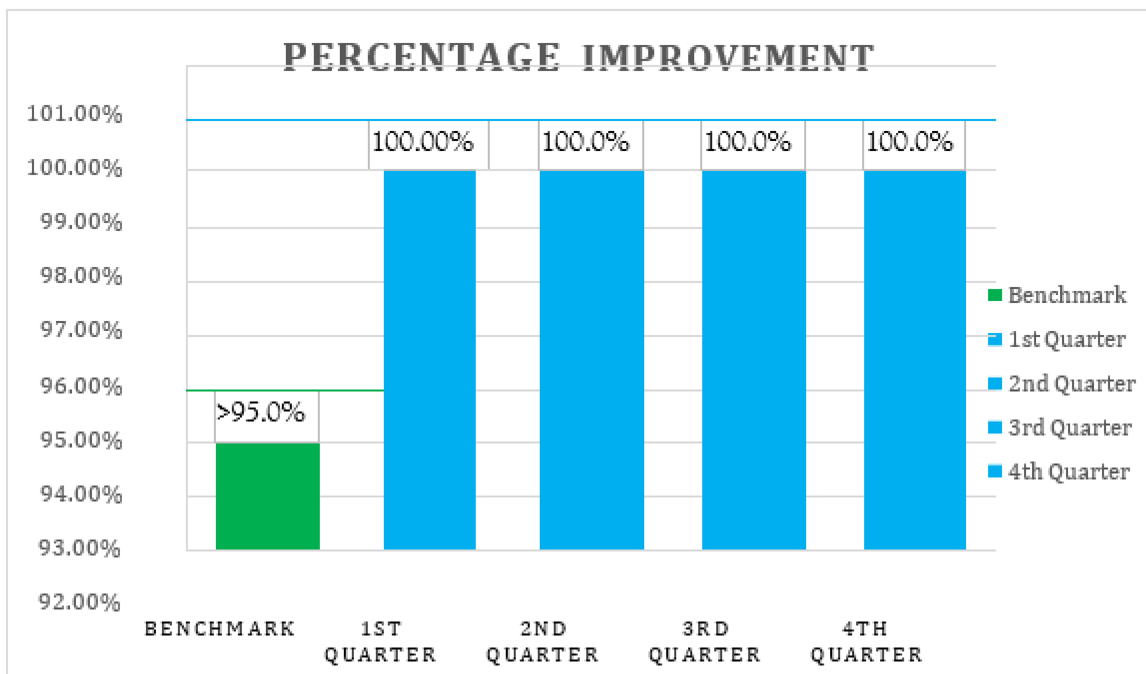


Figure 5.13: Percentage of reports co-relating with clinical diagnosis in Imaging Services

This graph shows the percentage of imaging reports correlating with clinical diagnosis. The correlation percentage improved progressively and achieved the benchmark target, demonstrating accurate radiological interpretation.

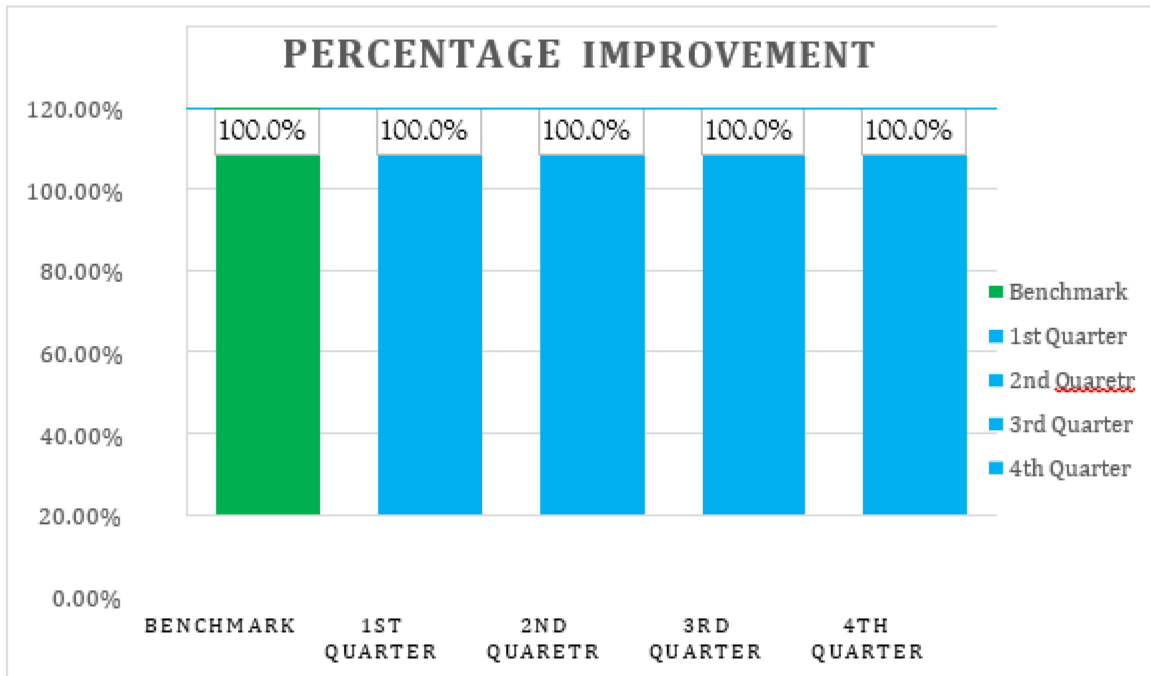


Figure 5.14: Percentage of adherence to safety precautions by employees working in Radiology

This graph demonstrates adherence to safety precautions by employees working in radiology. Compliance remained consistently high in all quarters, indicating effective radiation safety practices and staff compliance.

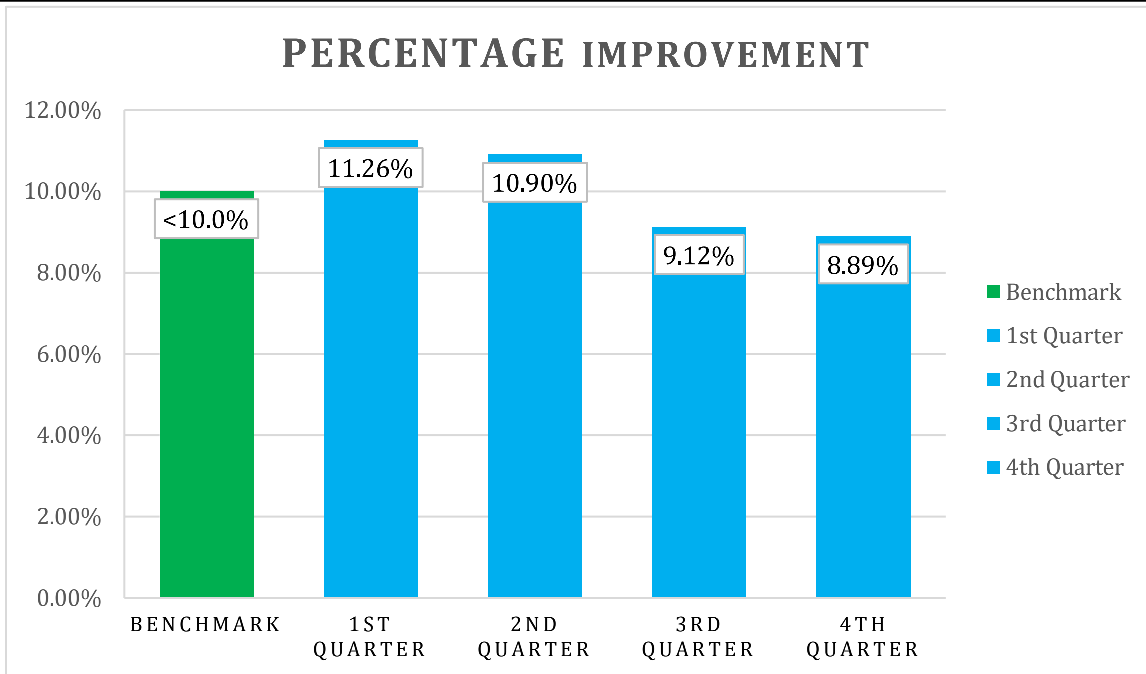


Figure 5.15: Percentage of unplanned invasive procedures

This graph illustrates the percentage of unplanned invasive procedures. The percentage reduced gradually from the 1st to the 4th quarter and remained below the benchmark value. This reflects improved procedural planning and patient management.

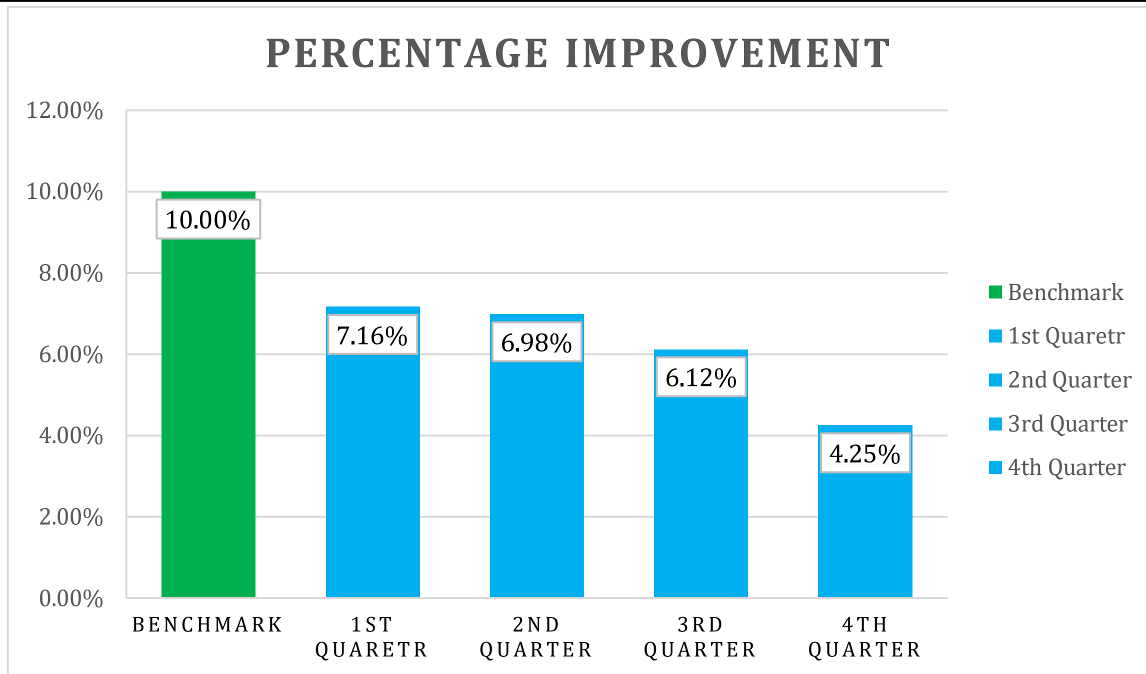
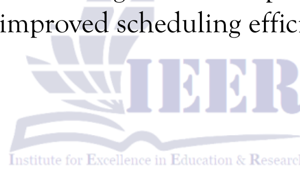


Figure 5.16: Percentage of rescheduling of invasive procedures

This graph presents the percentage of rescheduling of invasive procedures. The rescheduling rate decreased throughout the study period, indicating improved scheduling efficiency and resource management


IEER
Institute for Excellence in Education & Research

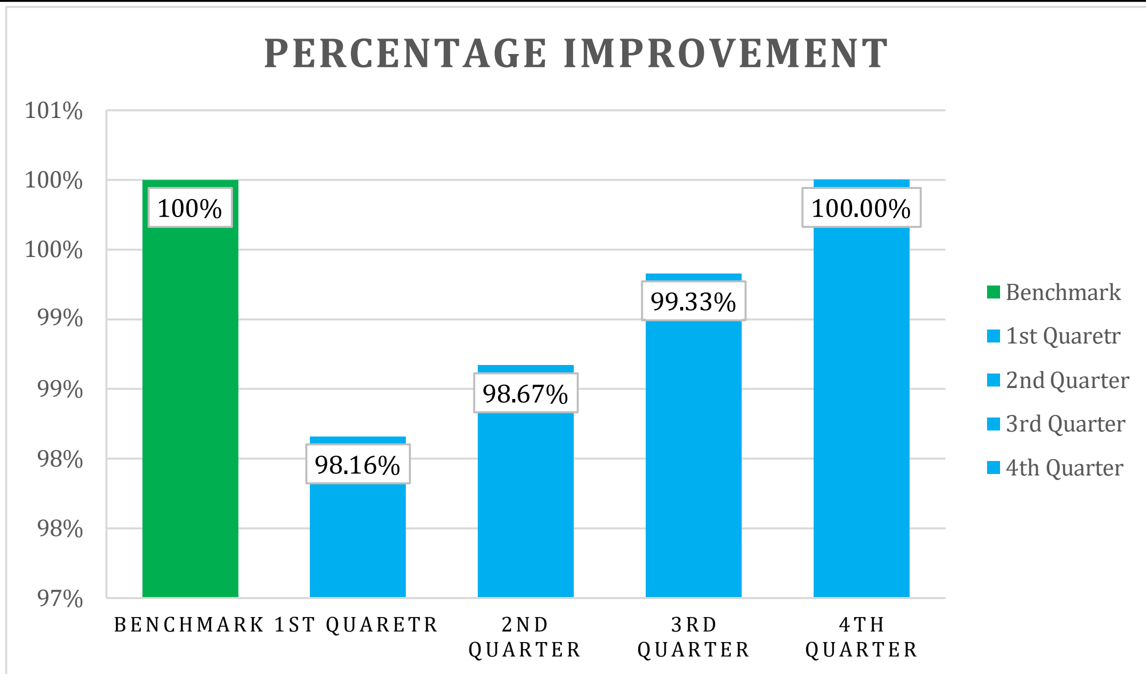


Figure 5.17: Percentage of cases where the organization procedures, to prevent adverse events like wrong patient and wrong procedure, have been adhered to

This graph shows the percentage of cases where procedures to prevent adverse events, such as wrong patient and wrong procedure, were followed. Compliance remained excellent across all quarters and met the benchmark target, reflecting strong patient safety practices.

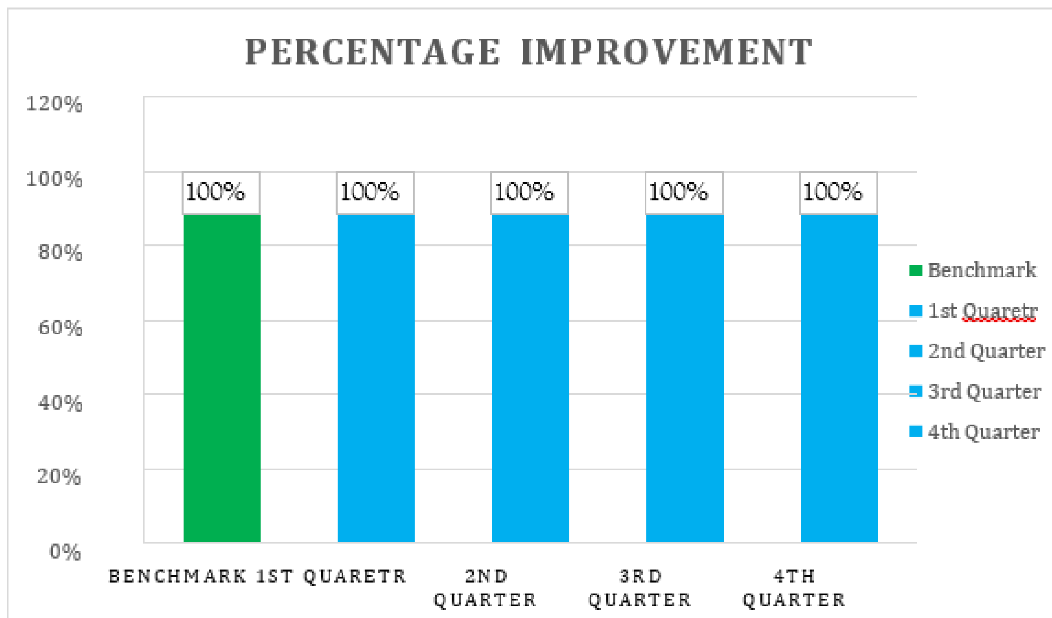


Figure 5.18: Percentage of cases who received appropriate prophylactic antibiotics within the specified time

This graph demonstrates the percentage of cases receiving prophylactic antibiotics within the specified time. Compliance improved significantly across the quarters and exceeded the benchmark. This indicates better infection prevention practices.

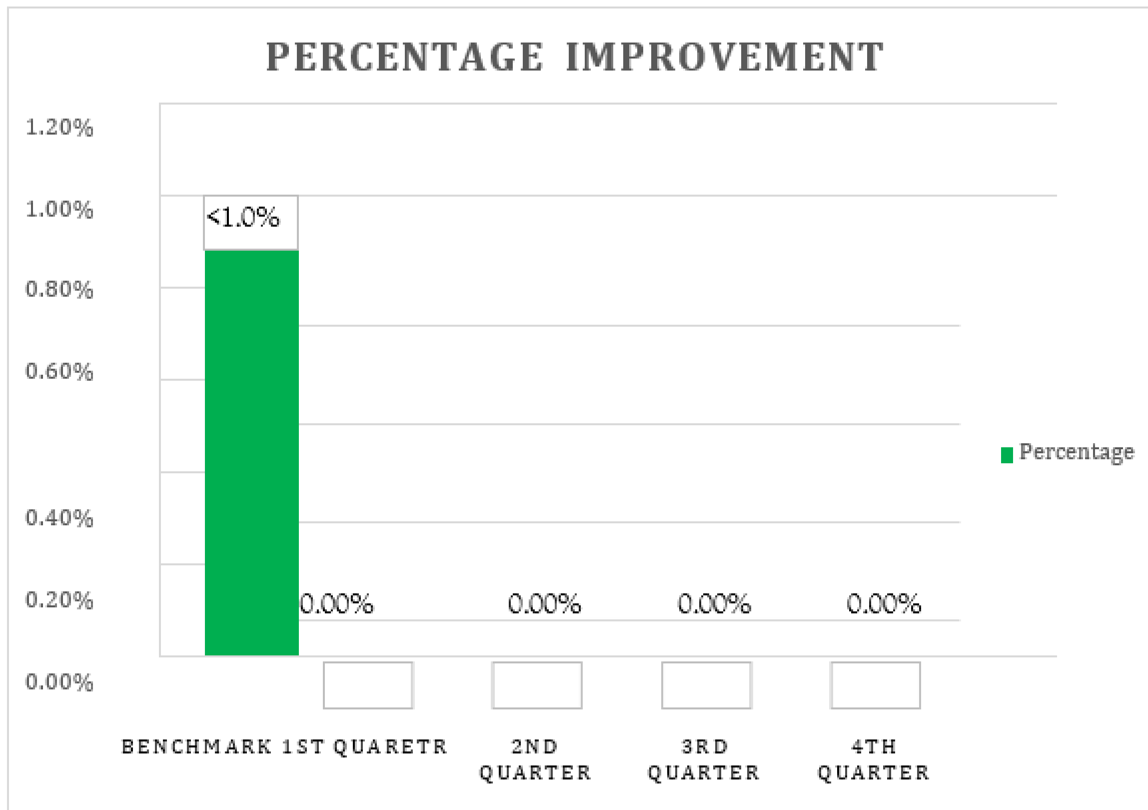


Figure 5.19: Percentage of medication error (prescribing, dispensing, administration)

This graph illustrates the percentage of medication errors including prescribing, dispensing, and administration errors. Medication error rates remained low and below the benchmark during the study period, reflecting safe medication practices.

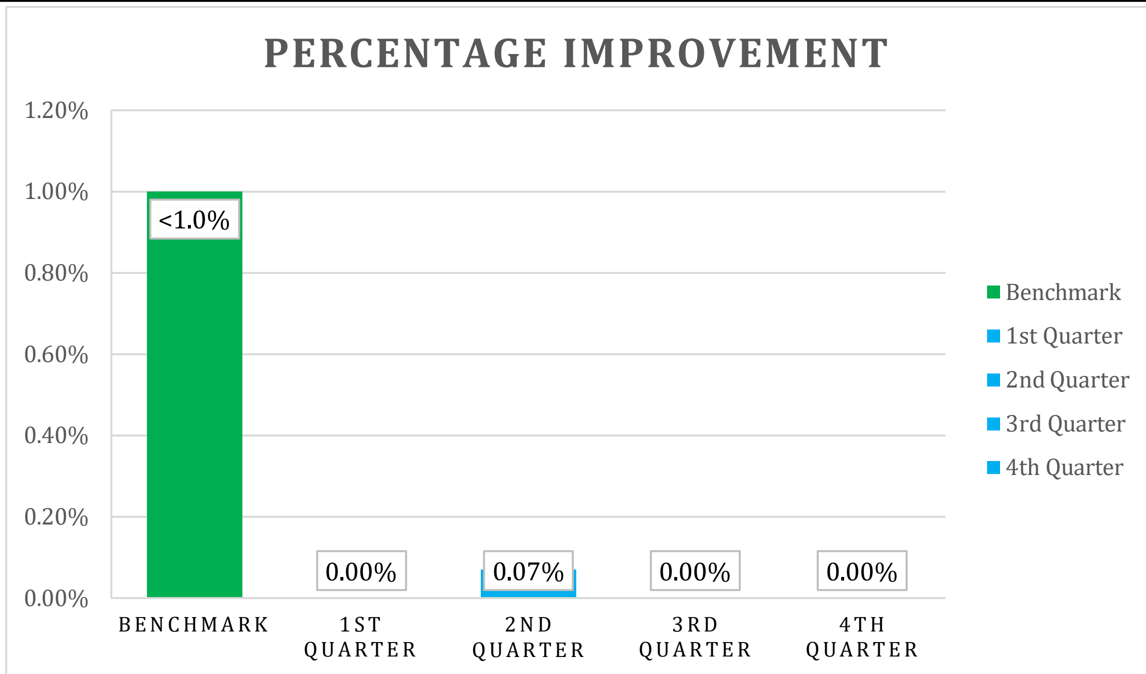


Figure 5.20: Incidence of adverse drug reaction

This graph presents the incidence of adverse drug reactions. The incidence remained minimal throughout all quarters and stayed within acceptable benchmark levels, indicating effective pharmacovigilance practices.

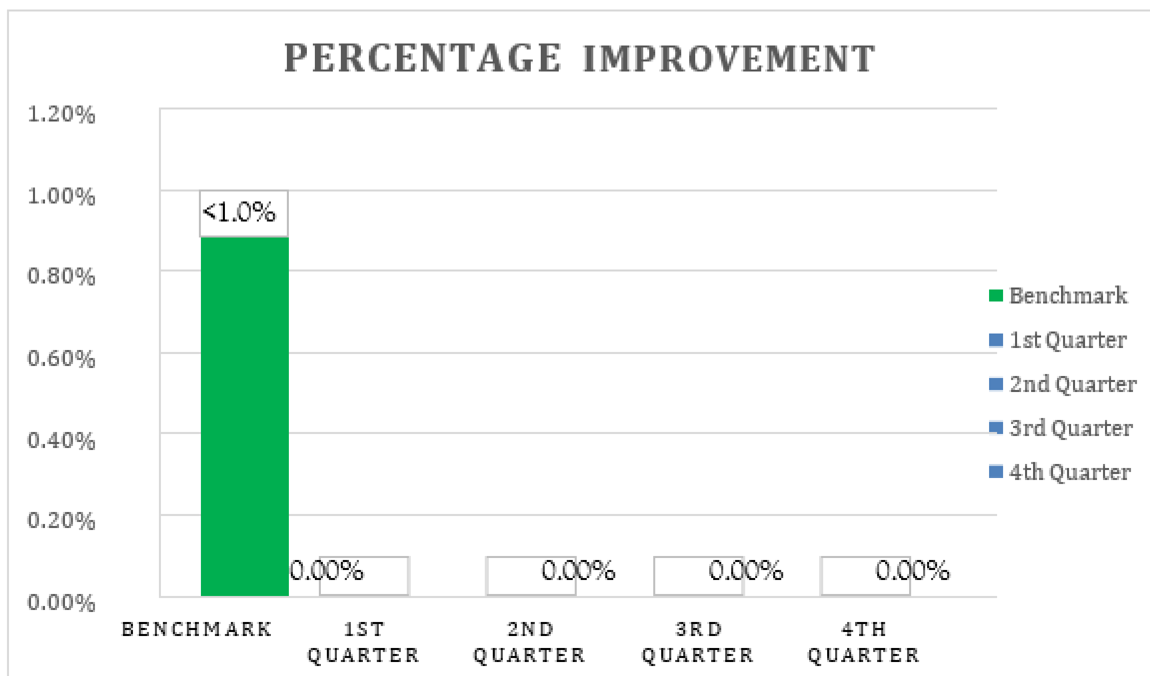


Figure 5.21: Percentage of modification of anesthesia plan

This graph shows the percentage of modification of anesthesia plans. The modification rate remained low and stable across all quarters, suggesting effective pre-anesthesia assessment and planning.

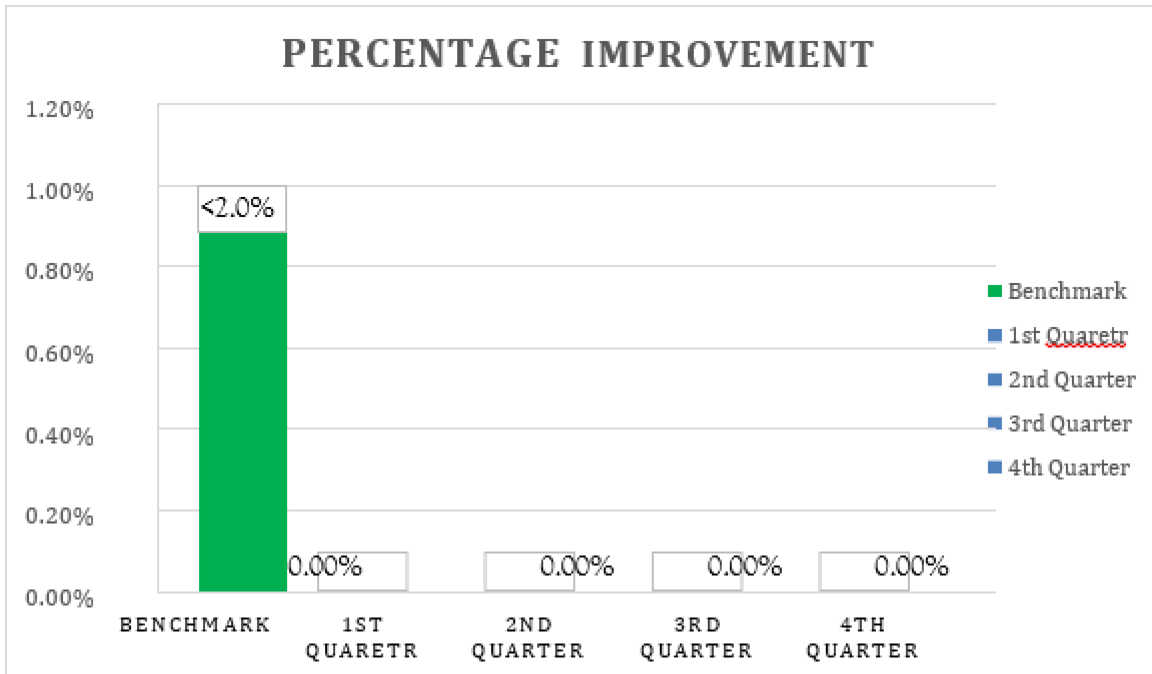


Figure 5.22: Percentage of unplanned ventilation following anesthesia

This graph demonstrates the percentage of unplanned ventilation following anesthesia. The rate remained extremely low throughout the study period and stayed below benchmark levels, indicating safe anesthesia management.

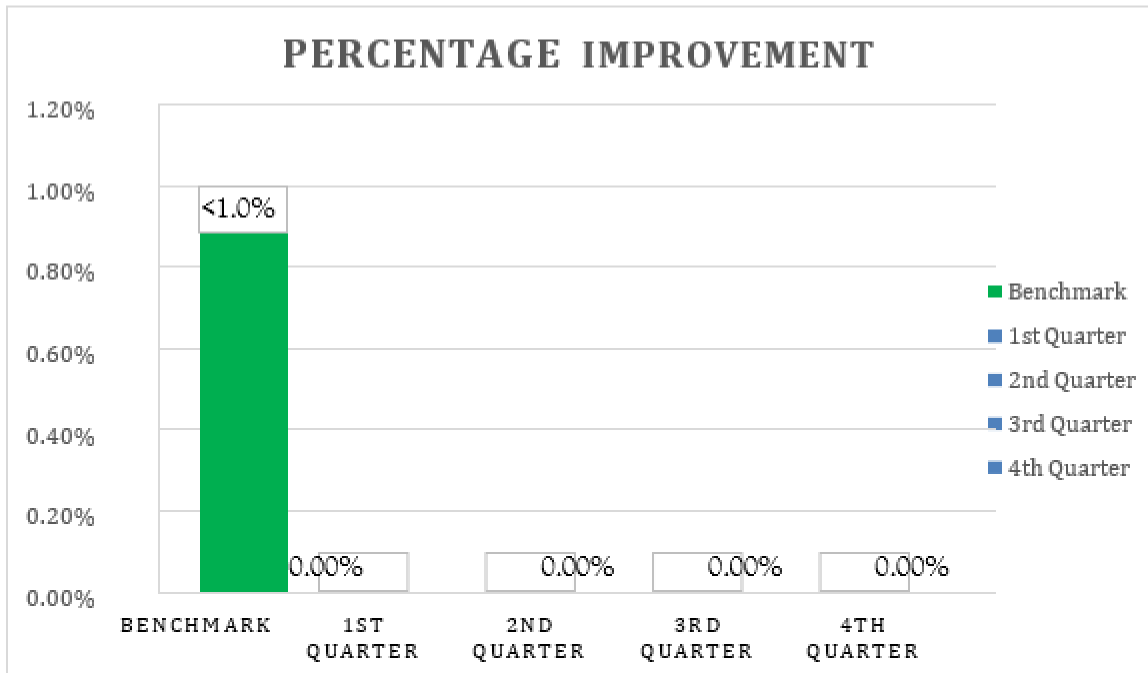
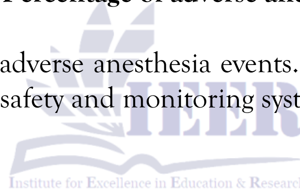


Figure 5.23: Percentage of adverse anesthesia events

This graph illustrates the percentage of adverse anesthesia events. The incidence remained negligible in all quarters, reflecting improved anesthesia safety and monitoring systems.


Institute for Excellence in Education & Research

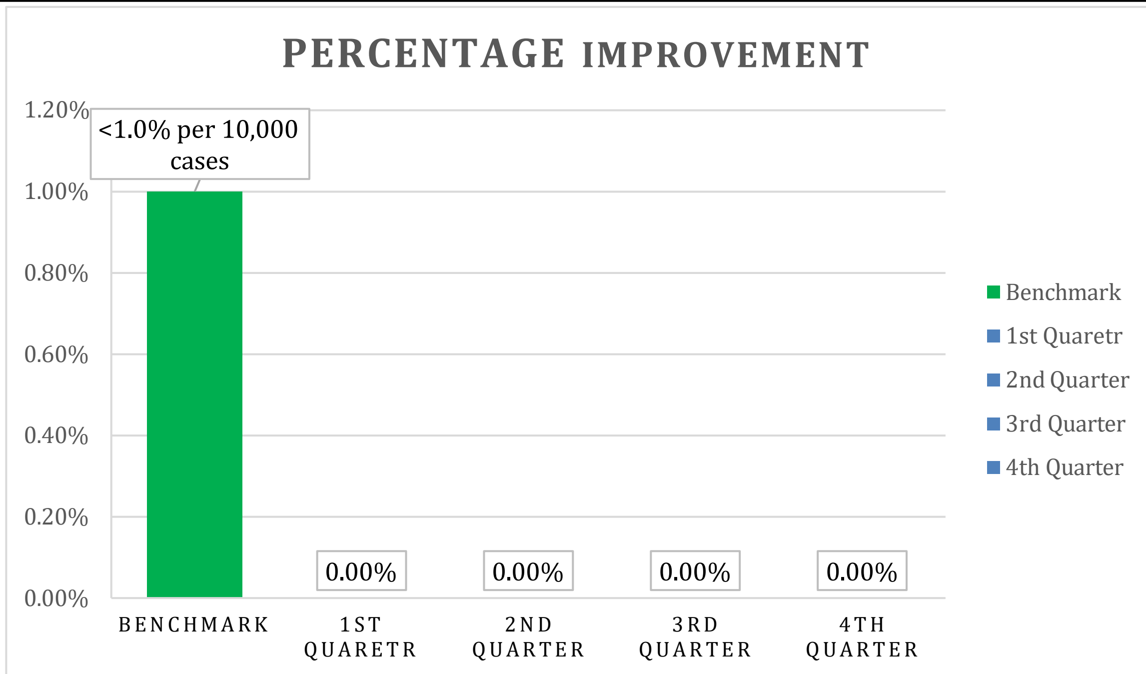
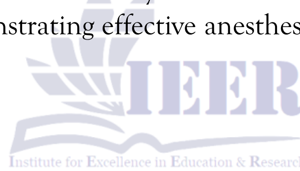


Figure 5.24: Percentage of anesthesia related mortality rate

This graph presents the anesthesia-related mortality rate. No mortality cases related to anesthesia were reported during the study period, demonstrating effective anesthesia care and patient safety.



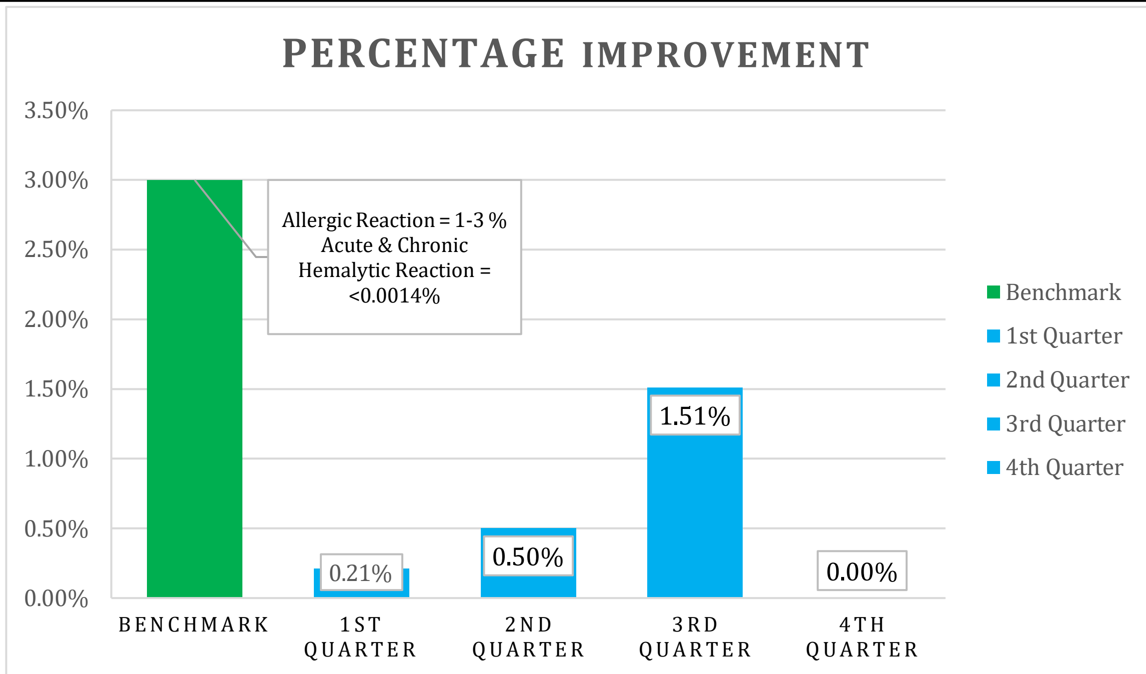
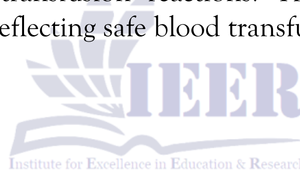


Figure 5.25: Percentage of transfusion reactions

This graph shows the percentage of transfusion reactions. The incidence remained low and within benchmark limits throughout the year, reflecting safe blood transfusion practices.



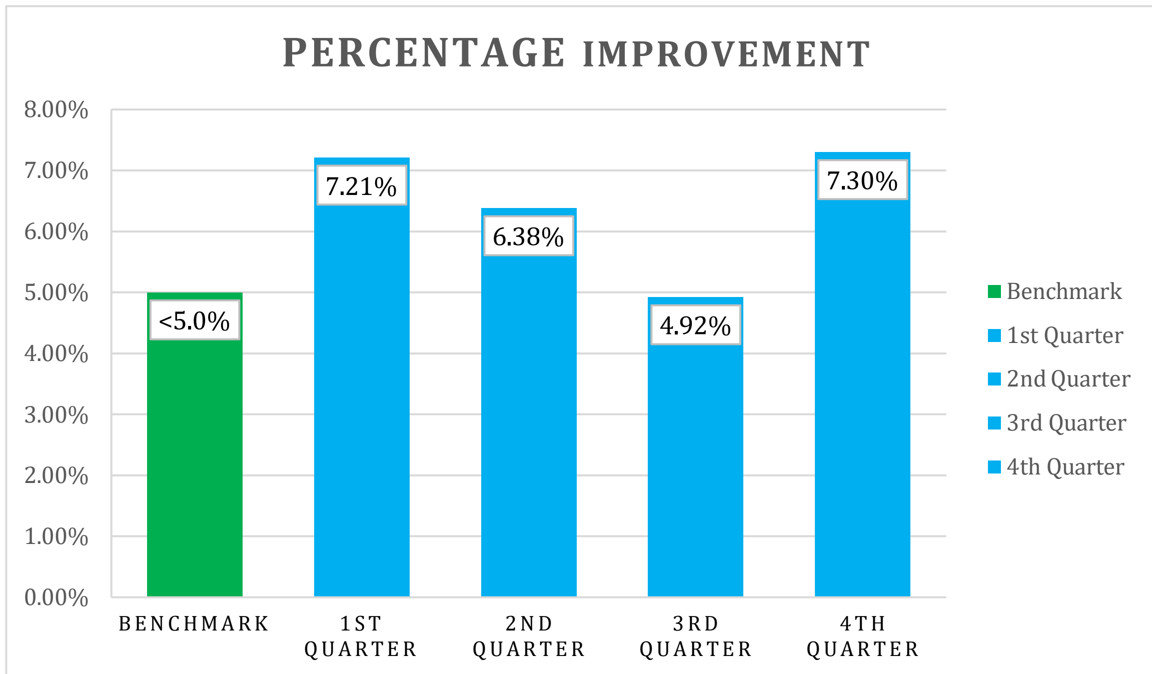


Figure 5.26: Percentage of wastage of blood and blood products

This graph demonstrates the percentage of wastage of blood and blood products. Although wastage decreased in some quarters, fluctuations remained above benchmark levels in certain periods, indicating the need for improved blood utilization management.

IEER
Institute for Excellence in Education & Research

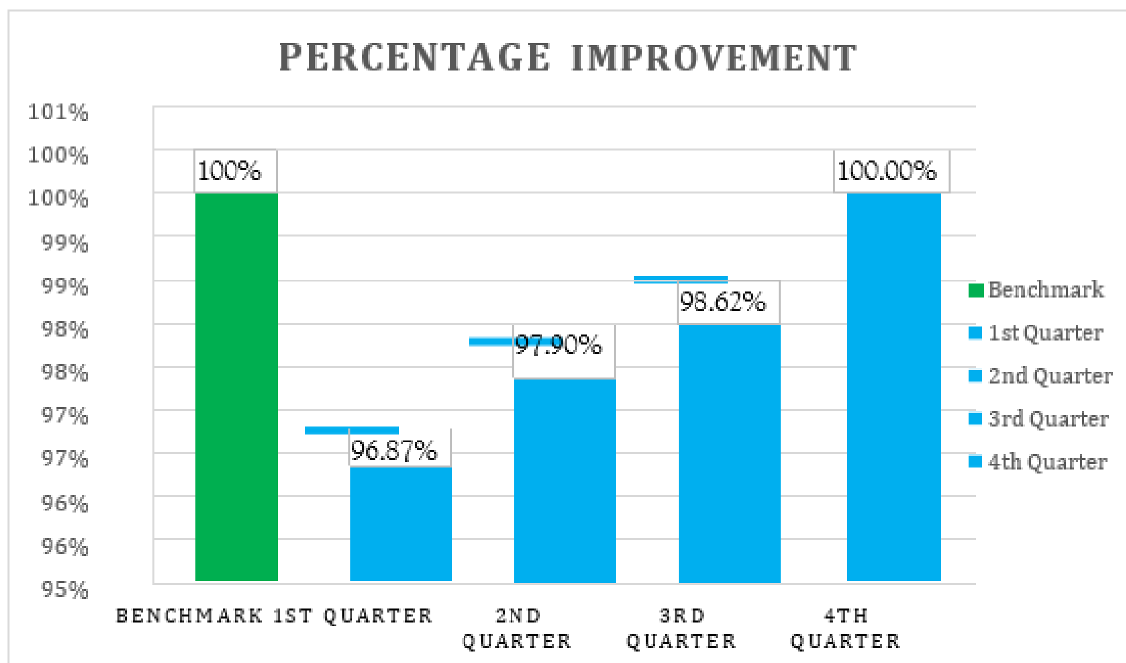


Figure 5.27: Percentage compliance of discharge summary protocol

This graph illustrates compliance with discharge summary protocols. Compliance improved progressively across the study period and reached 100% in the final quarter, indicating better documentation standards.

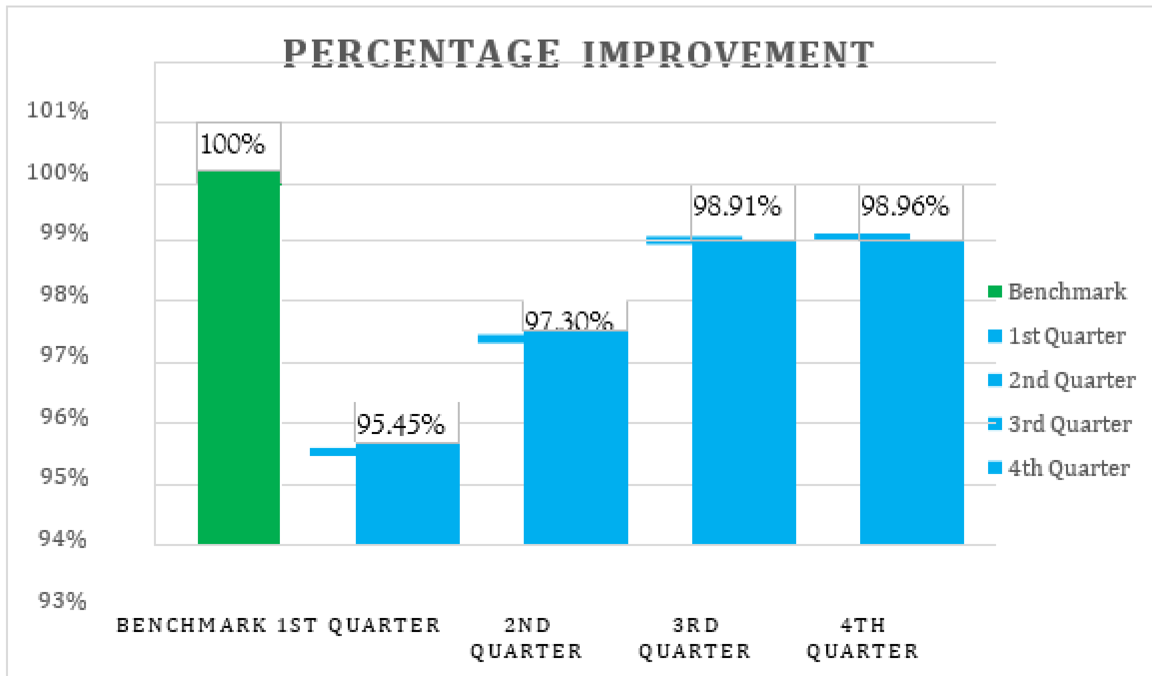


Figure 5.28: Percentage compliance of medical records having entries of all procedures

This graph presents compliance of medical records containing entries of all procedures. Compliance improved consistently throughout the year and achieved the benchmark, reflecting improved record maintenance.

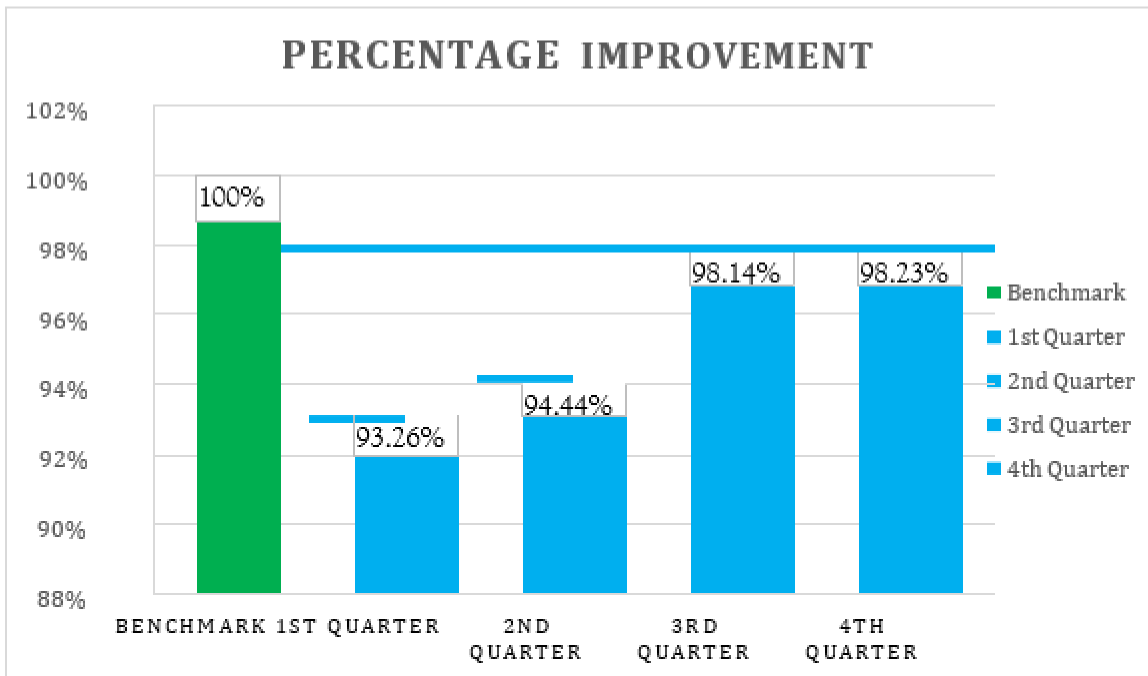


Figure 5.29: Percentage compliance informed consent protocols

This graph shows compliance with informed consent protocols. The compliance percentage increased significantly and remained near the benchmark target, demonstrating improved ethical and legal documentation practices.

IEER

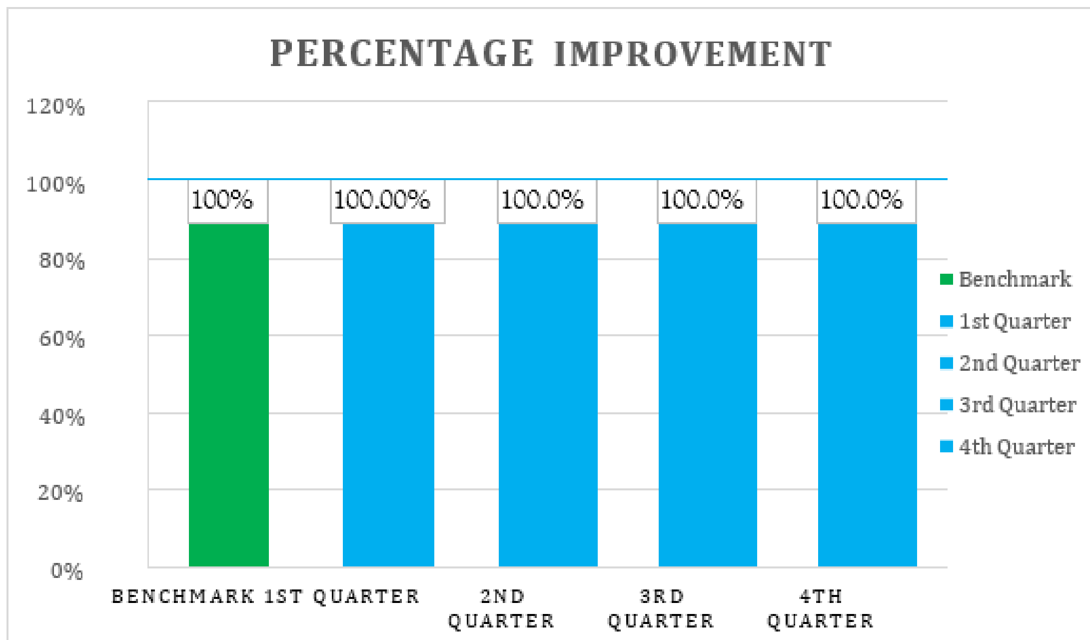


Figure 5.30: Percentage compliance of record having unique identifier

This graph demonstrates compliance of records having unique patient identifiers. Compliance remained at 100% throughout all quarters, indicating effective patient identification practices.

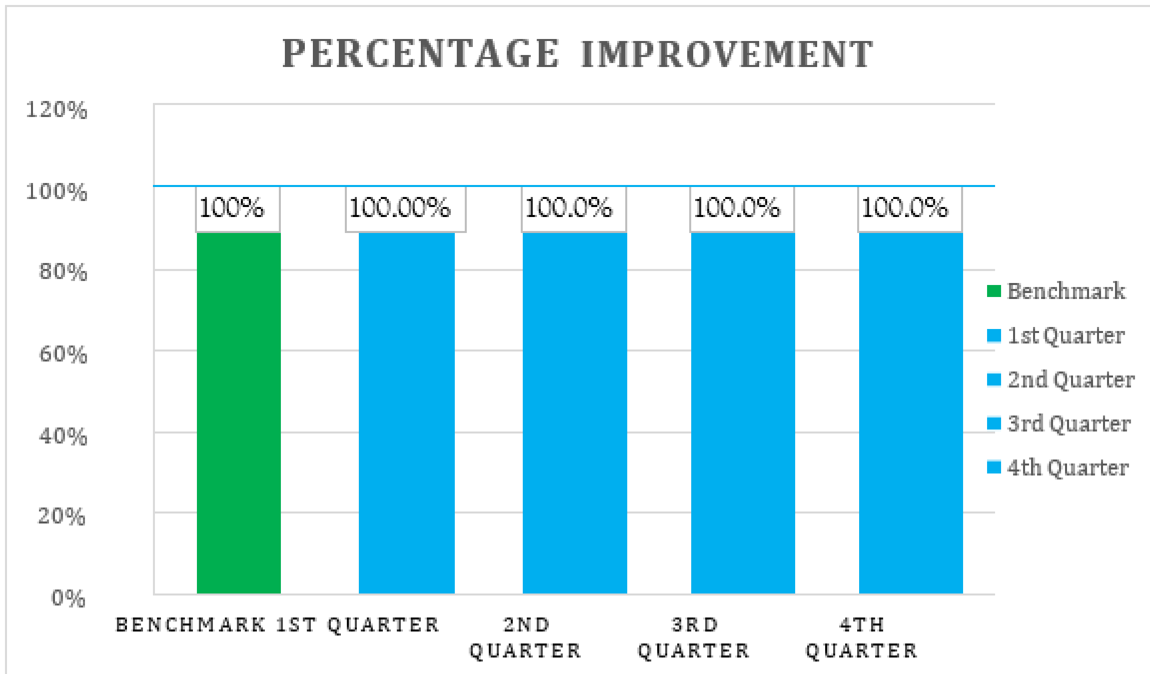


Figure 5.31: Percentage compliance of record related to mortality

This graph illustrates compliance of records related to mortality documentation. The compliance remained consistently at benchmark levels in all quarters, reflecting accurate mortality record maintenance and documentation standards.

DISCUSSION

The 2025 quality assurance and patient safety assessment at Chaudhry Muhammad Akram Teaching and Research Hospital demonstrates a significant institutional shift toward data-driven clinical excellence and heightened patient safety through the rigorous monitoring of Key Performance Indicators (KPIs). By utilizing a structured monitoring system, the hospital transitioned from baseline operational gaps to meeting most predefined benchmarks by the fourth quarter. A primary highlight of the study is the drastic reduction in patient assessment wait times, which are critical determinants of clinical outcomes in a tertiary care setting. In the Emergency Department, the initial assessment time plummeted from 39 minutes in the first quarter to just 19 minutes by the fourth quarter, successfully surpassing the benchmark of less than 30 minutes. Similarly, indoor patient assessments improved from 55 minutes to 26 minutes, remaining well within the 60-minute target. These progressive improvements suggest that systematic changes in triage and staff efficiency were effectively integrated into daily hospital operations throughout the study period.

The findings also underscore a remarkable surge in documentation compliance and diagnostic consistency, reflecting enhanced clinical accountability. The percentage of inpatient cases where management plans were documented and countersigned by clinicians rose from 71.60% to 97.10%, exceeding the 95% benchmark. Diagnostic accuracy was equally robust, with 98.50% of cases showing that the initial clinical impression matched the final diagnosis by the end

of the year. Furthermore, the percentage of patients discharged in satisfactory condition reached 97.70%, serving as a high-level validator of the overall efficacy of treatment protocols. In diagnostic services, the Radiology department maintained perfect compliance, achieving 100% in safety precautions and clinical correlation across all quarters. However, the laboratory department was marked as "Partially Achieved" because, despite low reporting errors, the re-do rate spiked to 2.60% and safety precaution adherence dipped to 96% in the final quarter, missing their respective targets.

Surgical and procedural safety metrics remained strong, aligning with international safety goals. Compliance with procedures to prevent adverse events, such as "wrong patient" or "wrong procedure," reached 100% by the fourth quarter. Infection control practices were exemplary, with the administration of prophylactic antibiotics within the specified time achieving a perfect 100% compliance rate consistently. Additionally, the hospital maintained a flawless record in anesthesia and medication safety, reporting 0% rates for medication errors, adverse anesthesia events, and anesthesia-related mortality throughout the entire year. These results indicate a highly effective safety culture where procedural checklists and verification steps are strictly followed. Unplanned invasive procedures also decreased from 11.26% to 8.89%, while rescheduling rates fell from 7.16% to 4.25%, indicating better preoperative planning and resource management.

Despite these overarching successes, the results pinpointed three critical areas where benchmarks were "not achieved," highlighting specific targets for administrative intervention. Blood product wastage remained a significant challenge, ending the year at 7.30% against a $\leq$5% benchmark, with notable fluctuations across the quarters. Additionally, while compliance with informed consent protocols improved from 93.26% to 98.23%, it failed to meet the mandatory 100% ethical and legal threshold. Similarly, the completeness of medical records regarding procedural entries reached 98.96%, narrowly missing the 100% perfection benchmark required for absolute documentation accuracy. Overall, the assessment proves that the hospital has successfully moved toward a high-performance healthcare model, with clinical and safety outcomes meeting high standards while identifies that administrative precision in documentation and resource management are the final hurdles to total quality excellence.

Conclusion

The 2025 assessment of Chaudhry Muhammad Akram Teaching and Research Hospital demonstrates a successful transition toward a high-performance, data-driven healthcare model. The systematic implementation and monitoring of Key Performance Indicators (KPIs) resulted in significant improvements across clinical, diagnostic, and safety domains. Notable successes include a drastic reduction in emergency and inpatient assessment times, perfect compliance in surgical infection prevention, and the maintenance of a zero-percent rate for medication errors and anesthesia-related complications throughout the year. Documentation standards and diagnostic accuracy also showed remarkable upward trends, reflecting a strengthened culture of clinical accountability. However, the study identifies critical gaps in administrative and resource management, specifically regarding blood product wastage and the mandatory 100% compliance required for informed consent and procedural record entries. Moving forward, the hospital must prioritize these identified areas for targeted quality improvement initiatives. Overall, the findings confirm that KPI-based monitoring is an essential tool for identifying deficiencies and sustaining excellence in tertiary healthcare delivery.

Limitations:

The study conducted at Chaudhry Muhammad Akram Teaching and Research Hospital identifies several limitations that may affect the generalizability and depth of the findings. Primarily, the research utilized a cross-sectional study design, which captures data at specific points in time and cannot definitively establish long-term causal relationships between quality

assurance interventions and clinical outcomes. The scope was restricted to a single tertiary care institution in Lahore, meaning the results may not reflect the operational realities or safety cultures of public sector hospitals or smaller primary healthcare facilities. Additionally, the analysis relied on existing hospital records and self-reported incident logs, which are susceptible to documentation errors or under-reporting. Finally, the study focused on descriptive statistics rather than advanced inferential analysis to assess KPI compliance.

Recommendations:

To enhance quality assurance and patient safety at Chaudhry Muhammad Akram Teaching and Research Hospital, it is recommended that the administration implement a more rigorous cold-chain monitoring system and revised inventory protocols to reduce blood product wastage below the 5% benchmark. Mandatory staff training sessions should be conducted to bridge the current ethical and legal gaps in informed consent and procedural record entries, striving for absolute 100% compliance. Additionally, strengthening supervisory oversight within laboratory services is essential to stabilize re-do rates and restore full adherence to safety precautions, while maintaining the quarterly KPI monitoring to sustain the exemplary zero-percent error rates achieved in anesthesia and medication safety.

REFERENCES

1. Donabedian A. Evaluating the quality of medical care. The milbank quarterly. 2005 Dec;83(4):691.
2. Berwick D, Fox DM. “Evaluating the quality of medical care”: Donabedian's classic article 50 years later. The Milbank Quarterly. 2016 Jun 6;94(2):237.
3. Donabedian A. Advantages and limitations of explicit criteria for assessing the quality of health care. The Milbank Memorial Fund Quarterly. Health and Society. 1981 Jan 1;59(1):99-106.
4.
5. Kohn LT, Corrigan JM, Donaldson MS. Institute of Medicine. To err is human: building a safer health system.
6. Joint Commission International. International Patient Safety Goals. Illinois: Joint Commission Resources; 2023.
7. World Health Organization. Patient safety: making health care safer. Geneva: WHO; 2017.
8. World Health Organization. Quality of care: a process for making strategic choices in health systems. Geneva: WHO; 2006.
9. Nieva VF, Sorra J. Safety culture assessment: a tool for improving patient safety in healthcare organizations. BMJ quality & safety. 2003 Dec 1;12(suppl 2):ii17-23.
10. Pronovost PJ, Goeschel CA, Marsteller JA, Sexton JB, Pham JC, Berenholtz SM. Framework for patient safety research and improvement. Circulation. 2009 Jan 20;119(2):330-7.
11. Vincent C. Patient safety. John Wiley & Sons; 2011 Jul 20.
12. Jha AK, Larizgoitia I, Audera-Lopez C, Prasopa-Plaizier N, Waters H, Bates DW. The global burden of unsafe medical care: analytic modelling of observational studies. BMJ quality & safety. 2013 Oct 1;22(10):809-15.
13. Kaplan RS, Norton DP. The balanced scorecard: measures that drive performance. Boston, MA, USA: Harvard Business Review; 2005 Jul 1.
14. Alkhenizan A, Shaw C. Impact of accreditation on the quality of healthcare services: a systematic review of the literature. Annals of Saudi medicine. 2011 Jul;31(4):407-16.
15. Shaw CD. Toolkit for accreditation programs. Melbourne: International Society for Quality in Health Care (ISQua). 2004.

16. Sheikh A, Panesar SS, Larizgoitia I, Bates DW, Donaldson LJ. Safer primary care for all: a global imperative. The lancet global health. 2013 Oct 1;1(4):e182-3.
17. 2004 Oct 12;171(8):834-.
18. World Health Organization. Patient safety: making health care safer. Geneva: WHO; 2017.
19. Kaplan RS, Norton DP. The balanced scorecard: measures that drive performance. Boston, MA, USA: Harvard Business Review; 2005 Jul 1.
20. Batbaatar E, Dorjdagva J, Luvsannyam A, Savino MM, Amenta P. Determinants of patient satisfaction: a systematic review. Perspectives in public health. 2017 Mar;137(2):89-101.