

Data Quality Assessment Report

MedTrack Ghana – Patient Appointment Database Review

1. Executive Summary

This report analyzes sample patient appointment data and identifies key data quality issues affecting SMS notifications, reporting accuracy, and billing processes. The findings are categorized using the six standard data quality dimensions and include business impact assessment and recommended solutions.

2. Task 1: Identified Data Quality Issues

2.1 Accuracy

Example: - Phone number: "244789012" (likely missing leading zero)

Issue: - The phone number is factually incorrect and will not reach the intended patient.

2.2 Completeness

Example: - Patient P004 has no PatientName.

Issue: - Missing required patient identification data.

2.3 Consistency

Examples: - "Dr. Osei" vs "dr. osei" - "Paid" vs "paid" - Appointment dates in different formats: - 2025-10-15 - 15/10/2025 - 10/16/2025

Issue: - Same information represented differently.

2.4 Timeliness

Example: - Appointment date format "15/10/2025" may be interpreted differently depending on system locale.

Issue: - Wrong interpretation can result in reminders being sent at the wrong time.

2.5 Validity

Example: - Phone number without correct Ghana format (missing leading zero).

Issue: - Does not follow defined format rules for phone numbers.

2.6 Uniqueness

Example: - Patient P001 appears multiple times. - Patient P002 appears twice with different phone number formats.

Issue: - Duplicate records inflate patient counts and distort reports.

3. Task 2: Business Impact Assessment

Data Quality Issue	Operational Problem	Most Affected Function
Invalid phone numbers	SMS reminders fail	Operations
Missing patient name	Identification issues during appointment	Clinical
Inconsistent date formats	Reminders sent wrong day	Operations
Duplicate patient IDs	Inflated patient count reports	Operations
Inconsistent payment status casing	Billing system may not recognize status	Finance
Incorrect phone format	Payment confirmation SMS failures	Finance

4. Task 3: Recommended Solutions

Critical Issue 1: Phone Number Accuracy & Validity

Technical Solution: - Implement backend validation rule enforcing Ghana phone number format. - Normalize phone numbers during data entry.

Responsible Role: - Backend Developer + Data Steward

Verification: - Run validation tests. - Send test SMS to sample dataset. - Monitor SMS failure rate reduction.

Critical Issue 2: Duplicate Patient Records

Technical Solution: - Add unique constraint on PatientID. - Implement deduplication script using PatientID + PhoneNumber matching.

Responsible Role: - Database Administrator + Backend Developer

Verification: - Run duplicate detection query. - Confirm zero duplicate PatientID records. - Validate report accuracy.

Critical Issue 3: Inconsistent Date and Payment Status Formats

Technical Solution: - Enforce ISO date format (YYYY-MM-DD). - Convert payment status to ENUM (Paid, Pending, Failed).

Responsible Role: - Backend Developer

Verification: - Unit tests for date parsing. - Validate billing integration logs. - Confirm consistent reporting outputs.

5. Task 4: Biggest Risk of Poor Data Consistency

From a software development perspective, the biggest risk is system integration failure.

When systems rely on strict formats (billing APIs, SMS gateways, reporting tools), inconsistent data leads to:

- Failed automation
- Silent errors
- Incorrect analytics
- Loss of revenue

In a healthcare environment, this can also affect patient safety and trust.

6. Conclusion

The patient appointment dataset contains violations across all six data quality dimensions. These issues directly impact SMS delivery, financial accuracy, and operational reporting. Implementing validation rules, standardization processes, and database constraints will significantly improve reliability and business performance.

End of Report