**Malaria Trends in Africa (2007–2021) – A Technical Report**

**1. Outline**

This technical report provides a structured walkthrough of the analysis conducted on malaria trends across African countries using Microsoft Excel. The report is organized into the following sections:

* Introduction
* Story of Data
* Data Splitting and Preprocessing
* Pre-Analysis
* In-Analysis
* Post-Analysis and Insights
* Data Visualizations & Charts
* Recommendations and Observations
* Conclusion
* References & Appendices

**2. Introduction**

**Objective of the Project**

To examine patterns and disparities in malaria incidence, treatment, and prevention efforts across African countries. The goal is to uncover how health access indicators (e.g., bed net usage, water and sanitation, antimalarial drug coverage) relate to reported malaria cases over time.

**Problem Being Addressed**

Despite decades of effort, malaria remains a major public health burden in Africa. The project aims to answer:

* Which countries report the highest malaria burden?
* How effective are interventions (e.g., insecticide-treated nets, IPT for pregnant women)?
* What role do infrastructure and health access (water, sanitation) play?

**Key Datasets and Methodologies**

**Datasets Used:**

* DatasetAfricaMalaria (master dataset)
* Pre-Analysis Board
* In-Analysis Board
* Sheets for specific dimensions: high-incidence countries, IPT usage, fever treatment, etc.

**Methods in Excel:**

* Pivot Tables
* VLOOKUP, COUNTIFS, AVERAGEIFS
* Filtering and sorting
* Conditional formatting
* Charts and dashboard building

**3. Story of Data**

**Data Source**

Publicly available datasets from the World Bank and WHO aggregated into an Excel workbook.

**Data Collection Process**

Data was collected via web scraping and manual downloads from international health repositories.

**Data Structure**

* **Rows**: Countries and years (2007–2021)
* **Columns**: Variables such as malaria incidence, antimalarial treatment rates, IPT usage, access to water and sanitation.

**Important Features and Their Significance**

* Malaria Incidence (per 1,000): Primary indicator of malaria prevalence.
* Reported Cases: Real case counts per country per year.
* Bed Net Usage: % of under-5 children sleeping under insecticide-treated nets.
* IPT Usage: % of pregnant women receiving preventive treatment.
* Water & Sanitation Access: Measures of infrastructure contributing to disease risk.

**Data Limitations or Biases**

* Missing data for certain countries or years.
* Self-reporting and recording inconsistencies.
* Lack of individual-level granularity; data is country-level.

**4. Data Splitting and Preprocessing**

**Data Cleaning**

* Removed null rows and columns.
* Standardized country names and year formats.
* Converted all percentage values to numeric types for analysis.

**Handling Missing Values**

* Missing values were flagged but retained to avoid misrepresentation.
* Where necessary, blanks were excluded from calculations using IFERROR and filtering.

**Data Transformations**

* Created categorical groupings for countries (e.g., high vs. low IPT usage).
* Computed trends using pivot tables for multi-year summaries.

**Data Splitting**

* **Dependent Variables**: Malaria incidence, malaria cases.
* **Independent Variables**: Bed net usage, IPT, sanitation, water access, antimalarial drug coverage.

**Industry Context**

Healthcare and public health — specifically infectious disease prevention in developing nations.

**Stakeholders**

* WHO & public health agencies
* African ministries of health
* NGOs and malaria eradication programs
* International development organizations

**Value to Industry**

This analysis helps prioritize regions and strategies for malaria intervention, focusing funding and support where most needed.

**5. Pre-Analysis**

**Key Trends Identified**

* Sub-Saharan countries consistently top the malaria incidence list.
* Some countries report zero cases despite moderate incidence rates, suggesting underreporting.
* Bed net and IPT usage remains low in several high-burden regions.

**Potential Correlations**

* Low IPT or bed net coverage correlates with higher incidence.
* Countries with better water/sanitation services tend to report fewer malaria cases.

**Initial Insights**

* Infrastructure and prevention measures are uneven across Africa.
* Some high-incidence countries also show high intervention coverage — suggesting challenges in implementation, not access alone.

**6. In-Analysis**

**Unconfirmed Insights**

* High rural populations correlate with higher malaria incidence, but not uniformly.
* Antimalarial treatment coverage is patchy even in high-burden countries.
* Urban areas tend to have better water and sanitation services, contributing to lower case counts.

**Preliminary Recommendations**

* Scale up rural-specific interventions.
* Improve IPT access in countries with large gaps.
* Address underreporting by investing in health data systems.

**Analysis Techniques in Excel**

* Pivot tables for year-by-year breakdowns
* VLOOKUP to consolidate across sheets
* COUNTIFS for identifying most affected regions
* Conditional formatting to flag low coverage or high incidence

**7. Post-Analysis and Insights**

**Key Findings**

* Countries like Nigeria, DRC, and Mozambique consistently reported the highest malaria cases.
* Bed net usage in high-incidence countries remains below 50% in many cases.
* IPT coverage rarely exceeds 50%, even in countries with free antenatal care.

**Comparison with Initial Observations**

* Initial assumptions about rural population alone explaining malaria spread were challenged coverage of prevention tools matters just as much.

**8. Data Visualizations & Charts**

**Charts Created in Excel**

* Bar charts: Countries with highest reported cases
* Line graphs: Trends in incidence and bed net usage over time
* Stacked bars: IPT and antimalarial treatment across countries
* Scatter plots: Correlation between water access and malaria incidence

**Dashboard Summary**

The “Dashboard for Malaria Trends” sheet includes:

* Filters by country, year, and health indicator
* Visual breakdowns of incidence vs. infrastructure
* Interactive summary of prevention coverage

A close-up of a graph

AI-generated content may be incorrect.

**9. Recommendations and Observations**

**Actionable Insights**

1. **Improve data quality & surveillance**: Many countries show zero or outdated figures — data gaps must be filled.
2. **Target IPT scale-up in pregnancy**: Countries with low coverage should receive focused intervention support.
3. **Distribute nets equitably**: Prioritize rural and high-burden zones.
4. **Tie malaria funding to WASH**: Water and sanitation investment should be integrated with malaria control funding.

**Unexpected Outcomes**

* High bed net usage in some areas did not align with lower malaria cases suggesting implementation or usage gaps.
* Urban water access appears to reduce risk significantly, reinforcing environmental strategies.

**10. Conclusion**

**Key Learnings**

* Malaria prevention is not just about distributing tools but ensuring correct usage and coverage.
* Infrastructure (water, sanitation) plays a larger role than assumed.
* IPT and bed net usage must scale in step with reported incidence.

**Limitations**

* Missing or inconsistent yearly data.
* Country-level granularity limits precision.
* Environmental variables (rainfall, temperature) were not included.

**Future Research**

* Analyse seasonal and environmental data with malaria incidence.
* Use GIS tools for spatial visualization.
* Integrate health system capacity metrics.

**11. References**

**References**

* WHO Malaria Reports
* World Bank Open Data
* Public Health Africa Datasets
* Excel documentation for pivot analysis