Portfolio

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Turning healthcare data into actionable insights for smarter decisions.

About me:

I am a Healthcare Data Analyst with 20+ years of experience turning complex public-health and clinical datasets into actionable insights. I specialize in statistical analysis, data visualization, and decision-support reporting using Excel, Power BI, and Tableau. My background includes epidemiology, population health, and national-level monitoring systems. I am based in Florida and focused on supporting healthcare organizations to improve efficiency, quality, and patient outcomes.

My skill set

- **Data Acquisition & Integration:** Source and consolidate healthcare datasets (EHR, claims, operational data) to support performance improvement and clinical decision-making.
- **Data Cleaning & Transformation:** Ensure data accuracy, consistency, and compliance with privacy standards for analytical readiness.
- **Descriptive & Predictive Analysis:** Apply statistical techniques (regression, hypothesis testing, utilization analysis) to uncover trends and high-impact opportunities.
- **Data Visualization & Dashboards:** Develop interactive dashboards in Tableau and Power BI that deliver insights to leadership in real time.
- **Reporting & Insight Generation:** Convert complex analytics into concise, actionable findings that strengthen operational and patient-outcome strategies.
- **Clinical & Business Communication:** Present results clearly to clinicians, administrators, and cross-functional teams, driving adoption of data-driven decisions.

My tool set

SQL | Power Query | tableau | Power BI

Project 1

Malaria Risk Mapping: A Data-Driven Approach

Context

Background

- Aimed to use burden of disease for prioritization, complemented by intervention-specific indicators to maximize impact, with the purpose of reducing malaria incidence in Angola in 2021.

Skills

- Tools SQL, Excel (Power Query), and EPI-MAP

- Identify the populations and municipalities at highest risk of malaria.
- Identify the geographic areas and populations that require the most resources to reduce malaria incidence.
- Identify the essential service package according to the population's risk level.

- Data transformation and integration coming from District Health Information Software – 2 (DHIS2)
- Routine case data from all 164 municipalities of Angola (monthly, 2018–2020) covering all ages were analyzed.
- Survey prevalence, and environmental covariates from Angola (2015–2020) were combined to model malaria-attributable fevers, focusing on all ages and children under five.

Project 1

Process

Data import and preparation

- Consolidating datasets from multiple systems: DHIS2,
- 2015/16 DHS survey
- Merged the different sources of data
- Cleaning and transformation data, ensuring accuracy
- Estimated new variables: Malaria prevalence and Joint modeling of incidence and prevalence

Analysis

- Analysis of several models using visualizations, including geo maps and scatterplots.
- Statistic correlation analysis between modeled incidence and prevalence

Visualizations

- Identification of modeled malaria risk levels through a scatterplots chart.
- Created and plotted a national risk map identifying four risk levels (very high, high, medium, and low) based on the correlation analysis of the variables.

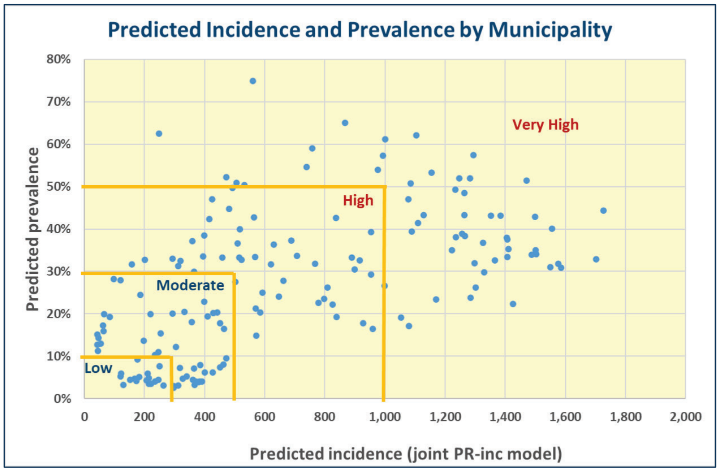
Project 1

Visuals

1. Criteria for defining risk strata

Strata	Incidence	Prevalence
Low	<300	< 10%
Moderate	300 – 500	10 - 30%
High	500 – 1000	30 - 50%
Very High	➢ 1000	> 50%

2. Identification of modeled malaria risk level

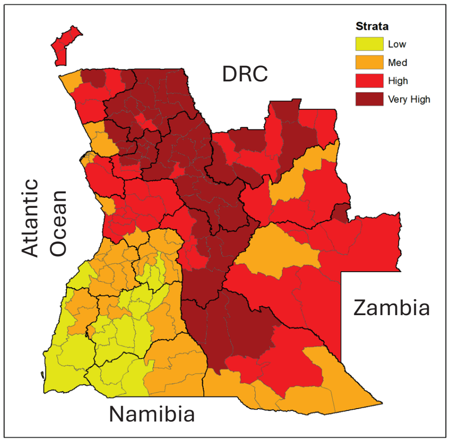


Insights

- Angola, with 32 million inhabitants, is divided into 16 provinces and 164 municipalities.
- Malaria is the country's leading cause of illness and death, with an incidence rate of 236 cases per 1,000 people at risk in 2022.
- Using incidence and prevalence data, municipalities were classified by risk level, allowing precise identification of populations most at risk.
- By consensus, risk thresholds were identified based on predicted incidence and prevalence (scatter plot).

Project 1 Visuals

3. Angola – Risk Map



Breakdown of risk strata in Angola

Risk Strata	N districts	Population	% Population
Very High	55	3,9 M	12.7%
High	45	7,3 M	23.6%
Moderate	45	14,9 M	48.2%
Low	19	4,8 M	15.5%
Total	164	31.2 M	

Insights

- Stratification identified 90 districts, covering 36% of Angola's population (11.2M), as 'high' or 'very high' risk.
- Based on these findings, the Ministry of Health defined malaria strategies: vector control, early diagnosis and treatment, surveillance and M&E, and behavior change communication.
- Due to budget constraints, comprehensive benefit packages were directed to high-risk populations, while low-risk areas received palliative packages.

Project 1

Results and Recommendations

Results

- Developed the first Malaria Risk Map in Angola (2021)
- In this hyper-endemic country, 90 districts and their populations at very high and high risk of malaria were identified
- Outlined key anti-malaria strategies to be prioritized in these high-risk areas, including the use of bed nets, early diagnosis and treatment, surveillance, and engagement of community health workers.

Recommendations

- Promote, across all institutional levels of the Ministry of Health, the preparation and delivery of epidemiological reports, ensuring data quality and timely submission.
- Strengthen the Ministry of Health’s public information system (DHIS2)
- Continue applying prioritization mechanisms to identify the most cost-effective health strategies, contributing to the reduction of malaria incidence and prevalence nationwide.

Project 2

Data Storytelling Analyzing the major reasons for nurse attrition as high-risk group

Challenge

- Employee Attrition in Healthcare dataset captures a snapshot of workforce dynamics within a hospital, focusing on the factors influencing employee turnover.

Approach

- Transform healthcare data into compelling narratives that resonate with diverse audiences, enhancing data-driven decision-making.
- Audience: general audience.

Tools

- Excel – statistic analysis, and Tableau.
- Linear regression analysis: monthly income – job satisfaction
- Methods: bivariate analysis, correlation

Insights

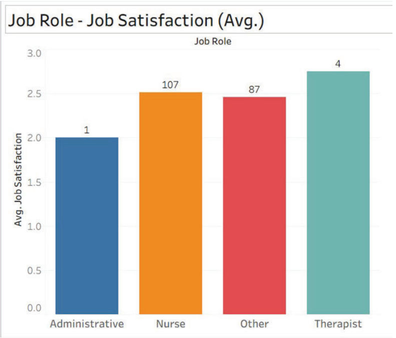
- Overall understanding of worker performance
- Improved the annual and quarterly training plans
- Avoided duplication and improved efficiency of resources

Impact

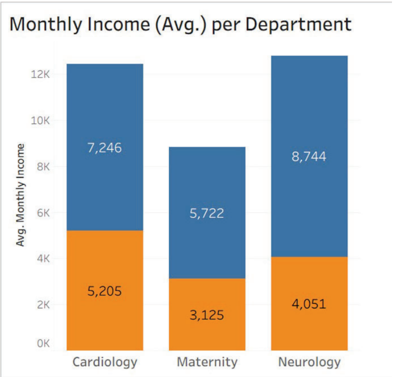
- **1,676 employees** analyzed
- **199 attrition cases identified**
- Workload Optimization: Redesign shift patterns = **53.7%** of attrition cases
- Average monthly income for nursing staff in Maternity is a key attrition factor

Project 2 Visuals

Major reasons – Low job satisfaction level



- The data reveals a noticeably low level of job satisfaction among the professional and technical staff of the hospital under study; nurses are the group most likely to leave the institution (**high-risk group**).
- Within the clinical staff categorized as attrition, a segment of 167 individuals (83.9% of the total 199) are concentrated in the **Maternity** and **Cardiology Departments**
- A total of **107 nurses** (13%) out of 822 were recorded as cases of attrition.
- They also account for 53.7% of the 199 technical personnel identified as being in an attrition status.



- In the Maternity Department, dissatisfied staff members have an average monthly income of **$3,125**, while those who report being satisfied earn an average of **$5,722** per month (Chart 2).
- In the Cardiology Department, dissatisfied personnel earn an average of **$5,205** monthly, whereas staff in the Neurology Department have an average income of **$4,051**.
- This pattern may indicate that **compensation disparities** represent a key factor contributing to **nurses' demotivation and job dissatisfaction**.

Project 2

Results and Recommendations

Implications

The **disengaged performance of healthcare personnel** within a clinical unit **may compromise the quality of care**, particularly in terms of adherence to clinical protocols and the timeliness of interventions. Based on the main findings, hospital management should consider the following:

- Compensation and Benefits
- Operational Factors and Work-Life Balance.
- Career Growth and Promotions.
- Nursing Staff Retention

Strategy recommendations

High priority (high impact)

- Workload Optimization – Redesign shift patterns
- Well-being and support programs.

Medium term (moderate cost)

- Career paths and internal promotions
- Compensation review for critical roles

Low cost

- Recognition and feedback culture
- Organizational micro-interventions in communication

Project 3

Control mechanisms for the National Health Worker Training Program

Challenge

- Weak national monitoring and evaluation system of the malaria training program implemented in **six provinces**, **60 municipalities**, and **942 health facilities**.

Approach

- Implementing **a monitoring and evaluation** system.
- Overall **performance** assessment of trained health workers
- **Data transformation** and integration

Tools

- Excel advanced, data entry, pivot tables, formulas, functions, pivot chart
- Visualization and reports – M&E system in quarterly basis.

Insights

- Overall understanding of worker performance
- Improved the annual and quarterly training plans
- Avoided duplication and improved efficiency of resources

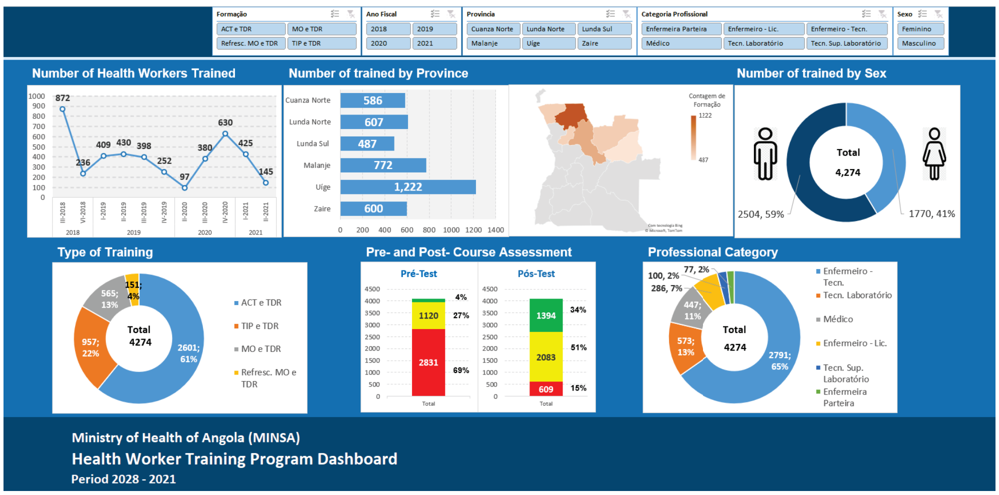
Impact

- 4,200 health workers trained
- Performance improved by 21% (grade above 80%)
- Dashboard adopted by Ministry of Health

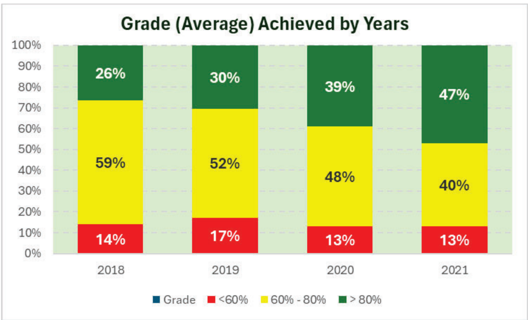
Project 3

Insights

Health Workers Training Program Dashboard



- In **2018**, the Angolan Ministry of Health (MOH) developed a **tool to monitor the malaria training program**.
- With this tool, **duplication** of training sessions was **avoided**, thereby **improving efficiency**.
- Reports disaggregated by type of training, gender, provinces, municipalities, technical category, and performance in quarterly basis.



Health workers performance

- The MOH was finally able to gain an overall understanding of worker performance, moving from qualitative assessments to quantitative results.
- Overall performance improved from **26%** in 2018 to **47%** in 2021 (grade above 80 points).

Project 3

Results and Recommendations

Results

- Health Workers Training Program Dashboard
- The Angolan MOH authorities obtained a quantitative assessment of their workers' training performance and gained insights into the cost-effectiveness of the program.
- After its adoption, the dashboard was embraced by the MOH authorities as a management tool for their program.

Recommendation

- During the period 2018–2021, **4,200 health workers** were **trained** in malaria case management.
- Encourage the timely submission of training reports.
- Continue updating the database to manage the program more efficiently.
- Use this tool to present to donor agencies and expand it nationwide.

Project 4

Relationship Between Body Mass Index (BMI) and Diabetes Pedigree Function (DPF)

Challenge

- Explore the relationship between **Body Mass Index** (**BMI**) and the **Diabetes Pedigree Function** (**DPF**), which reflects a patient's hereditary likelihood of developing diabetes.

Approach

- Analysis **diabetes dataset of 2,768** patients.
- **Simple linear regression**
- ***DPF = β_0 + β_1(BMI)***
- **β_0 (Intercept)**: Expected DPF when BMI = 0.
- **β_1 (Slope)**: How much DPF is expected to change per one-unit increase in BMI.

Tools

- Excel statistical analysis – linear regression analysis
- Included:
  - R^2 (model fit)
  - Coefficients (effect size)

Visuals:

- BMI Line Fit Plot
- BMI Residual Plot

Insights

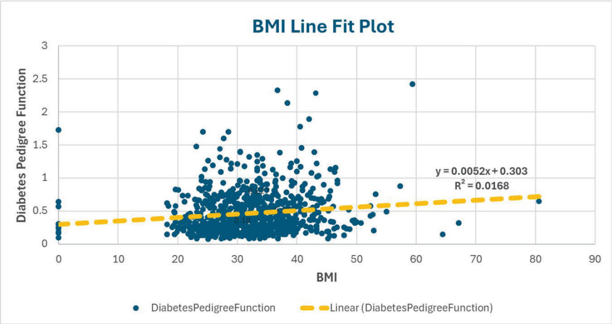
- The relationship is statistically significant but weak (small R^2 = 0.017).
- BMI Line Fit Plot suggest a mild positive association between body mass and hereditary diabetes risk

Impact

- Confirmed linearity but highlighting limited explanatory power of BMI on DPF

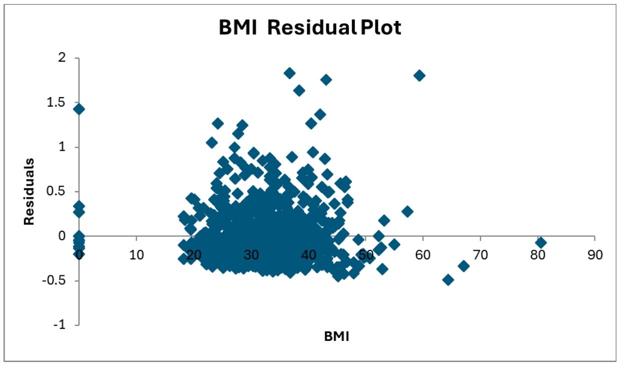
Project 4 Visuals

Visualizing the Relationship Between BMI and DPF



BMI Line Fit Plot

- The chart shows a **slight upward trend**, indicating that patients with higher BMI values tend to have **marginally higher DPF values**, suggesting a **mild positive association** between body mass and hereditary diabetes risk.
- Y= 0.030 + 0.0052x



BMI Residual Plot

- Residuals show **random dispersion around zero**, confirming linearity but highlighting **limited explanatory power** of **BMI** on **DPF**.
- No visible trend. No major bias or nonlinearity.
- Moderate vertical spread → BMI explains only a small portion of DPF variability ($R^2 \approx 0.017$).
- A few outliers for very high or low BMI values, common in medical data.

Project 4

Results and Recommendations

Results

- A simple linear regression was performed to evaluate the relationship between Body Mass Index (**BMI**) and the Diabetes Pedigree Function (**DPF**) among **2,768 patients**.
- The model was **statistically significant** (***p* < 0.001**) and explained approximately **1.68%** of the **variance in DPF** (**R^2 = 0.017**).
- **BMI** was found to be a **positive predictor of DPF** ($\beta = 0.0052$, $p < 0.001$), indicating that as **BMI increases**, the expected value of the **Diabetes Pedigree Function also rises slightly**.
- While the effect size is small, this finding suggests that higher body weight may be modestly associated with greater hereditary predisposition to diabetes.

Conclusions

- The relationship is statistically significant but weak (small R^2).
- BMI alone cannot predict hereditary diabetes risk, but it may contribute when combined with other factors.
- This supports the concept of **multifactorial risk**: genetics, age, BMI, glucose, pregnancies, and insulin together explain patient outcomes better.

Education

Master of Health Economics, 2005 – 2007
Universidad Nacional Autonoma de Nicaragua (UNAN) – Managua, Nicaragua
Bachelor of Economics, 1986 - 1991
Universidad Nacional Autonoma de Nicaragua (UNAN) – Managua, Nicaragua

Certifications

0214 License – Life & Variable Contracts Insurance Agent (Active)
Florida Department of Financial Services
0240 License – Health Insurance Agent (Active)
Florida Department of Financial Services

Data Analyst in Healthcare Certificate.
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