

# DATA ANALYTICS AND VISUALISATION PROJECT PROPOSAL

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**Title:** Trends in Obesity and the Effectiveness of GLP-1 Agonists

## Background and Rationale:

Obesity is a global public health crisis with widespread socio-economic and healthcare implications. Over 650 million adults were classified as obese in 2016, with the prevalence tripling since 1975, according to the World Health Organisation (WHO, 2021). This escalating trend is a significant driver of non-communicable diseases such as type 2 diabetes, cardiovascular diseases, and certain cancers, underscoring its impact on healthcare systems and economies (Ng et al., 2014). The financial burden is staggering, with obesity-related healthcare costs accounting for approximately \$2 trillion annually, representing 2.8% of the global GDP (McKinsey Global Institute, 2014).

Among pharmacological interventions, glucagon-like peptide-1 (GLP-1) receptor agonists have emerged as a highly effective option, particularly for their dual benefits of weight loss and metabolic health improvement (Astrup et al., 2014). However, their widespread adoption is hindered by significant challenges, including high costs, limited accessibility, and patient adherence issues (Pharmaceutical Journal, 2022). These barriers highlight the need for innovative solutions, such as a data-driven visualisation dashboard, to analyse obesity trends and the effectiveness of GLP-1 therapies. Such a tool could provide actionable insights for healthcare professionals and policymakers, supporting evidence-based decision-making and optimising resource allocation for obesity management.

## Objective and Research Questions:

To design and develop an interactive data visualisation and analysis dashboard to explore global and regional trends in obesity, assess the effectiveness of GLP-1 agonists, and provide predictive insights into future trends.

Research Questions:

- What are the global and regional trends in obesity prevalence over the last two decades?
- How effective are GLP-1 agonists in promoting weight loss and improving metabolic health compared to other interventions?
- Can machine learning predict future obesity trends and patient outcomes with GLP-1 agonist therapy?
- How can the dashboard support healthcare professionals in decision-making and policy formulation?

## Methodology:

Data Sources:

- WHO datasets for obesity prevalence.
- Clinical trial results (e.g., STEP trial) and academic studies on GLP-1 agonist efficacy.
- Open datasets on population health indicators and GLP-1 agonist prescription trends.

Data Pre-processing:

- Data Cleaning: Handle missing values, remove inconsistencies, and standardise units.
- Feature Engineering: Create features such as obesity trends by location, gender, and GLP-1 usage.

- Data Integration: Merge datasets from multiple sources for comprehensive analysis.

#### Dashboard Features:

- Trend Analysis: Interactive visualisations (line charts, sunburst charts, ) displaying obesity prevalence and GLP-1 usage trends by region and demographics.
- Comparative Effectiveness: Bar charts and scatter plots comparing different GLP-1 outcomes.
- Predictive Insights: Machine learning models to forecast future obesity trends and outcomes using regression and time series analysis.
- User-Friendly Interface: Filters to customise views by country, time range, and demographic attributes.

#### Machine Learning Integration:

- Supervised learning models (e.g., linear regression) to predict obesity trends and GLP-1 outcomes.

#### Plan of Work:

Step	Tasks
1	Literature review and data collection from identified sources.
2	Data cleaning, pre-processing, and integration.
3	Develop initial dashboard framework and core visualisations.
4	Implement machine learning models and integrate with dashboard.
5	Conduct usability testing and refine dashboard features.
6	Finalise documentation, prepare presentation, and upload to GitHub.

#### Deliverables:

1. Fully functional data visualisation dashboard.
2. Python scripts for data pre-processing, visualisations, and machine learning models.
3. Comprehensive project documentation and GitHub repository.
4. Presentation with insights and recommendations.

#### References:

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