# ***Executive Summary***

*Introduction*

* Overview of report’s purpose – applying machine learning to global health challenges
* Brief discussion on why these specific health issues (heart disease, HIV, AIDS) were chosen for analysis
* Concise presentation of key findings
* Emphasize recommendations derived from findings and their potential impact on addressing global health challenges

*Qualitative Response: Predicting Heart Disease*

* Discussion of heart disease’s global impact and ethical data considerations
* Summary of models applied
* Brief analysis of model performance, including accuracy and key takeaways
* Extracted insights, ethical considerations, and implications for healthcare

*Quantitative Problem: Predicting HIV Infection Rates*

* Overview of HIV prediction problem and its significance
* Summary of models applied
* Brief analysis of model performance, including MSE comparisons and key takeaways
* Exploration of global HIV trends and their impact on predictive modeling

*Principal Components Regression: Predicting AIDS Death*

* Exploration of AIDS’ global impact and ethical data selection
* Application of PCR, brief analysis of model performance
* Key findings, ethical considerations, and insights from the analysis

# ***Data and Approach***

*Qualitative Response: Predicting Heart Disease*

* Understanding the global impact of heart disease and ethical considerations
* Overview of dataset – source, variables, and observation distribution
* Data preprocessing steps
* Approach to all models
* Unique considerations for each model, including feature importance and interpretability

*Quantitative Problem: Predicting HIV Infection Rates*

* Insight into the global landscape of HIV and ethical considerations
* Overview of dataset – source, variables, and observation distribution
* Data preprocessing steps
* Approach to all models
* Unique considerations for each model, including feature importance and interpretability

*Principal Components Regression: Predicting AIDS Death*

* Description of global impact of AIDS and ethical considerations
* Considerations for applying PCR, including variable scaling and model interpretation

# ***Detailed Findings***

*Qualitative Response: Predicting Heart Disease*

* In-depth examination of model outputs and significant insights
* Graphic representations highlighting critical aspects of each model
* Comparative analysis of the models, highlighting their strengths and limitations
* Explorations of key predictors and their role in predicting heart disease real-world, practical implications (cite sources)

*Quantitative Problem: Predicting HIV Infection Rates*

* In-depth examination of model outputs and significant insights
* Graphic representations highlighting critical aspects of each model
* Comparative analysis of the models, highlighting their strengths and limitations
* Explorations of key predictors and their role in predicting HIV rates globally – real-world, practical implications (cite sources)

*Principal Components Regression: Predicting AIDS Death*

* Detailed insights derived from PCR
* Model outputs and graphical representations for a comprehensive overview, emphasizing principal components’ contribution
* Analysis of the significance of principal components in predicting AIDS death globally real-world, practical implications (cite sources)

# ***Validity and Reliability Assessment***

*Qualitative Response: Predicting Heart Disease*

* Assessing the validity and reliability of all models
* Utilization of comprehensive evaluation metrics, including accuracy
* Discussion on model stability and reliability in predicting heart disease, including model downfalls and considerations

*Quantitative Problem: Predicting HIV Infection Rates*

* Assessing the validity and reliability of all models
* Utilization of comprehensive evaluation metrics, including accuracy
* Discussion on model stability and reliability in predicting HIV rates, including model downfalls and considerations

*Principal Components Regression: Predicting AIDS Death*

* Analyzing the validity and reliability of the PCR model
* Cross-validation strategies and considerations for model stability (including model downfalls)
* Reflection on the robustness of PCR in predicting AIDS deaths

***Conclusion***

* Summary of key findings across all three issues, discuss any commonalities or trends observed
* Highlight any insights or patterns that emerged when considering the results of the different predictive models collectively
* Discuss how the findings contribute to a deeper understanding of the global health landscape, and how the predictive models and their insights could inform or enhance public health strategies on a global scale
* Discuss ethical considerations for working with sensitive health data
* Acknowledge limitations or constraints encountered
* Suggest areas of further research and exploration, emphasizing the significance of global health problems
* Overall significance of models and findings and closing statement that reinforces the importance of leveraging machine learning for positive global health impact

# ***Appendix***