



# Analyzing Child Health Indicators to Optimize Global Healthcare Interventions

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# Abstract

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This project explores the relationships between vaccination rates, healthcare indicators, and intervention coverage. Using regression, clustering, and random forest models, I identified the most influential predictors of intervention coverage and highlighted key areas for improvement in global child health programs.

# Problem Area

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Child health is a critical indicator of a nation's overall status

**General Hypothesis:** Countries with higher vaccination rates and better care-seeking behaviors for common childhood illnesses exhibit higher overall child health intervention coverage.

# The Data

The State of the World's Children Statistical tables:

<https://data.unicef.org/resources/dataset/the-state-of-the-worlds-children-2021-statistical-tables/>

## - Vaccination Data

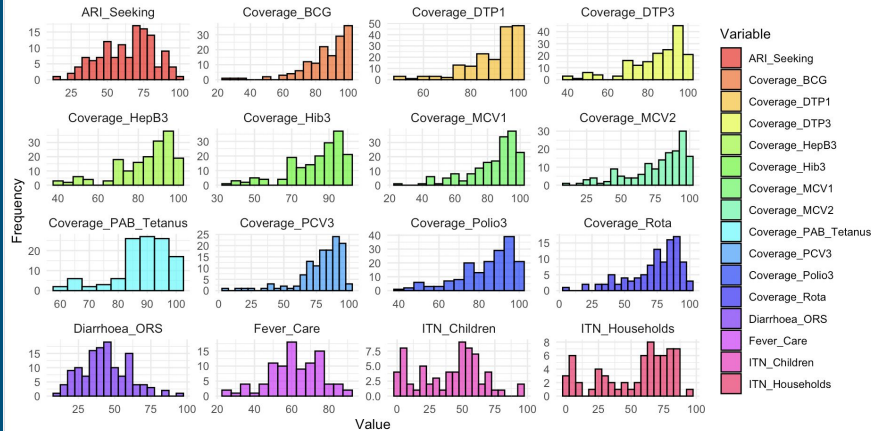
Countries and areas	Immunization for vaccine preventable diseases (%) 2020 (J)										
	BCG	DTP1	DTP3	Polio3	MCV1	MCV2 (F)	HepB3	Hib3	Rota	PCV3	Protection at birth (PAB) against tetanus (G)
Afghanistan	87	78	70	75	66	43	70	70	62	68	63

# Analysis Approach

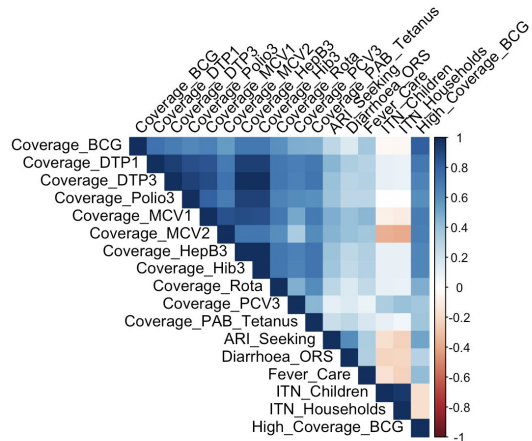
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- Descriptive Statistics and Correlation Analysis
- Regression Modeling
- Clustering
- Random Forest Model

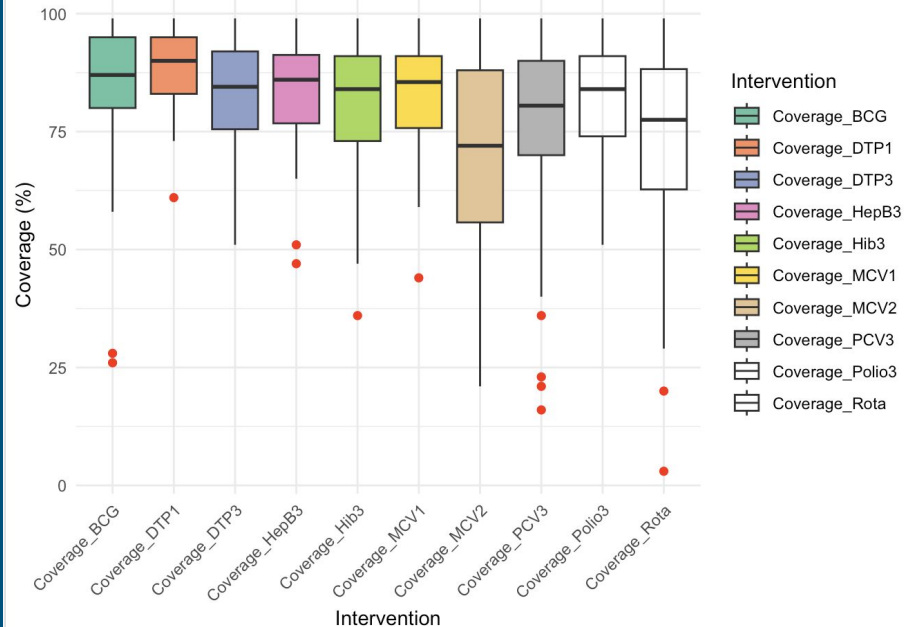
### Histograms of Variables



### Correlation Matrix of Child Health Data



### Variability of Key Interventions Across Regions





# Results and Predictions

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- HepB3 DTP, and MCV1 are the strongest predictors of intervention coverage.
- Countries grouped into three clusters based on vaccination rates and healthcare indicators.
- Feature importance from the random forest model



# Outcome and Conclusions

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- Strong predictors (e.g., BCG, MCV2).
- Weak areas (e.g., care-seeking for malaria and fever).
- Prioritize integrated vaccination programs.
- Strengthen malaria-specific interventions in high-burden regions.
- Suggestions for future analysis:
  - Include socioeconomic and maternal health indicators.



# Thank You!

Any suggestions/questions??