Project 09: Public Health Awareness
Phase 2 : Innovation

Public health awareness have played a crucial role in improving the health and well-being of communities worldwide. These innovations leverage technology, communication strategies, and creative approaches to inform and empower individuals to make healthier choices and prevent illness

ALGORITHM OR STEPS TO PERFORM THE PUBLIC HEALTH AWARENESS ON A GIVEN DATASET USING MEACHINE LEARNING ALGORITHM

1.Data Collection and Preparation:

- Gather relevant datasets: Collect data related to the specific public health issue you want to address. This could include data on disease incidence, demographics, lifestyle factors, and more.

2.Exploratory Data Analysis (EDA):

- Visualize the data: Create plots and charts to gain insights into the dataset's characteristics, trends, and relationships between variables.
- Perform statistical analysis: Calculate summary statistics and identify patterns in the data.

3.Feature Engineering:

- Select relevant features: Identify the most important variables that can influence the public health issue.
- Create new features if necessary: Engineer additional features that may improve the performance of machine learning models.

4.Data Splitting:

- Divide the dataset into training and testing sets: Typically, the data is split into a training set (used to train the model) and a testing set (used to evaluate the model's performance).

5.Model Selection:

- Choose an appropriate machine learning algorithm: Select a model that is well-suited to the problem at hand. Common choices include logistic regression, decision trees, random forests, support vector machines, or neural networks.

6.Model Training:

- Train the machine learning model on the training dataset using the selected algorithm.

7.Model Evaluation:

- Evaluate the model's performance using appropriate

evaluation metrics. The choice of metrics depends on the specific problem, but common metrics include accuracy, precision, recall, F1 score, and ROC AUC.

8.Hyperparameter Tuning:

- Fine-tune the model's hyperparameters to optimize its performance. Techniques like grid search or random search can be used to find the best combination of hyperparameters.

9.Validation:

- Validate the model's performance on a separate validation dataset to ensure it generalizes well beyond the training data.

10.Interpretability:

- Depending on the algorithm used, you may need to interpret the model's results. Understand which features are most influential in making predictions.

11.Awareness Strategy Development:

- Based on the model's insights, design a public health awareness strategy. This could include targeted messaging, educational campaigns, or resource allocation for interventions.

PERFORMING PUBLIC HEALTH AWARENESS USING MACHINE LEARNING REQUIRES SPECIFIC HARDWARE AND SOFTWARE RESOURCES:

Hardware Requirements:

1.Computer or Server:

- You will need a computer or server with sufficient processing power to train and run machine learning models. The hardware requirements can vary based on the complexity of the models and the size of the dataset.
- For some simple models, a standard laptop may suffice, but more complex models may require high-performance workstations or cloud-based resources.

2.GPU (Graphics Processing Unit):

- Many machine learning tasks, especially deep learning, benefit significantly from GPUs, which can accelerate model training. If you plan to work on deep learning projects, having a GPU or access to cloud-based GPU instances can be valuable.

3.RAM (Random Access Memory):

- Sufficient RAM is essential to handle large datasets and complex models. The specific RAM requirements depend on the size of your data and the algorithms you use.

4.Storage:

- You'll need ample storage for storing datasets, model checkpoints, and other resources. SSDs (Solid State Drives) are preferred for faster data access.

Software Requirements:

1.Operating System:

- Most machine learning libraries and tools are compatible with various operating systems, including Linux, macOS, and Windows. Linux is a popular choice among machine learning practitioners due to its stability and compatibility with many tools.

2.Programming Languages:

- Python is the predominant programming language for machine learning. You'll need Python and libraries such as NumPy, pandas, scikit-learn, TensorFlow, PyTorch, and others, depending on your project's requirements.

3.Machine Learning Frameworks:

- Depending on your choice of algorithms, you may need to install machine learning frameworks like TensorFlow, PyTorch, scikit-learn, or others. These libraries provide pre-built tools and functions for training and deploying machine learning models.

4.Database Software:

- If your project involves working with large datasets, you may need a database system (e.g., MySQL, PostgreSQL) to manage and query the data efficiently.

5.Cloud Computing Services (optional):

- Cloud platforms like AWS, Google Cloud, and Azure provide scalable resources for machine learning. They offer GPU instances, pre-configured environments, and services for data storage and processing

6.Version Control:

- Version control systems like Git are essential for tracking changes to your code and collaborating with team members.

7.Documentation and Collaboration Tools:

- Tools like Jupyter Notebook, Markdown, and collaborative platforms like GitHub or GitLab can help document your work and collaborate with others.

8.Security and Privacy Tools:

- If your project involves sensitive health data, you may need encryption and privacy tools to ensure data security and compliance with regulations like HIPAA (Health Insurance Portability and Accountability Act).

Hardware specifications:

RAM : 8 GB

Hard disc or SSD: More than 16 GB

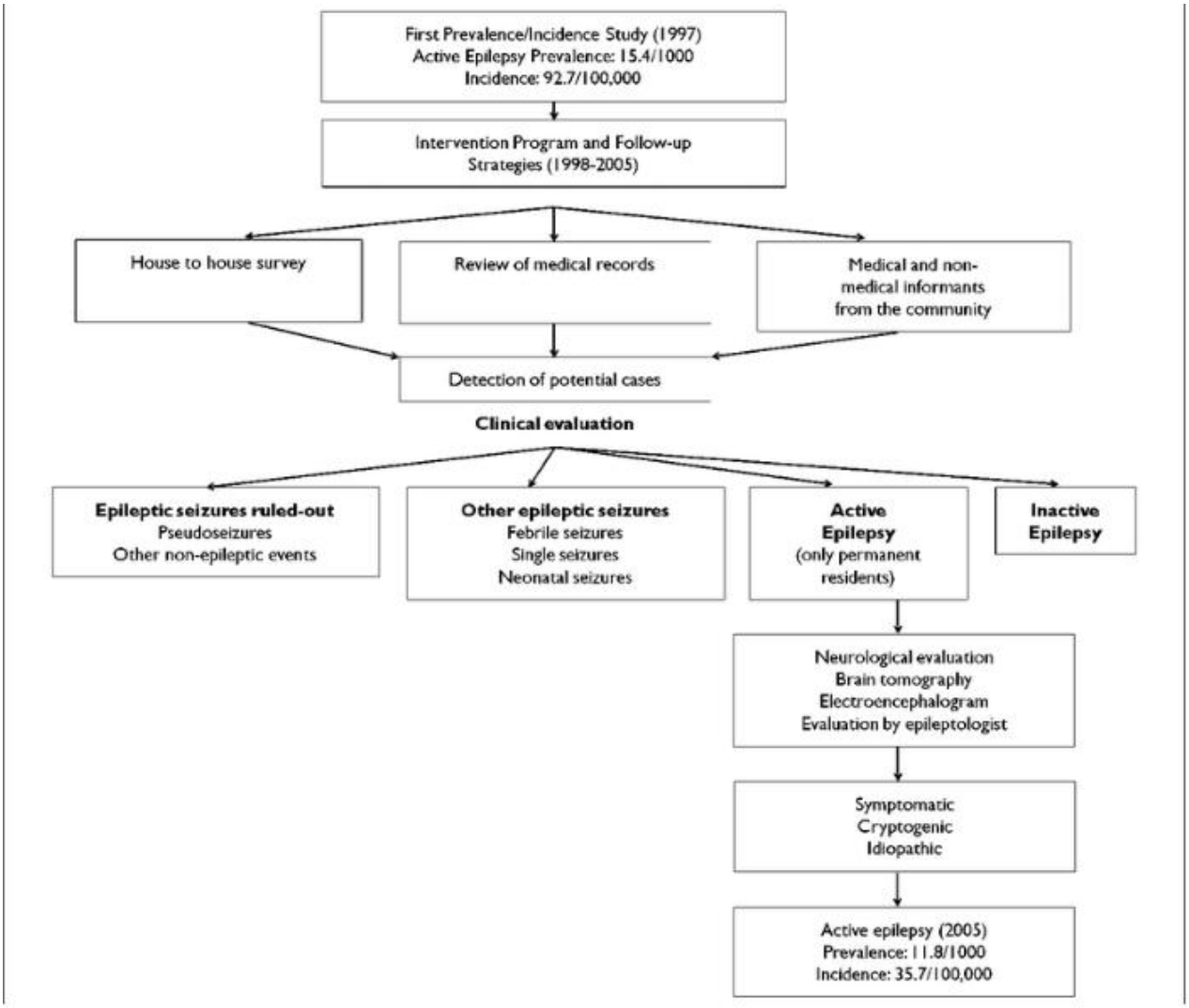
Software specifications:

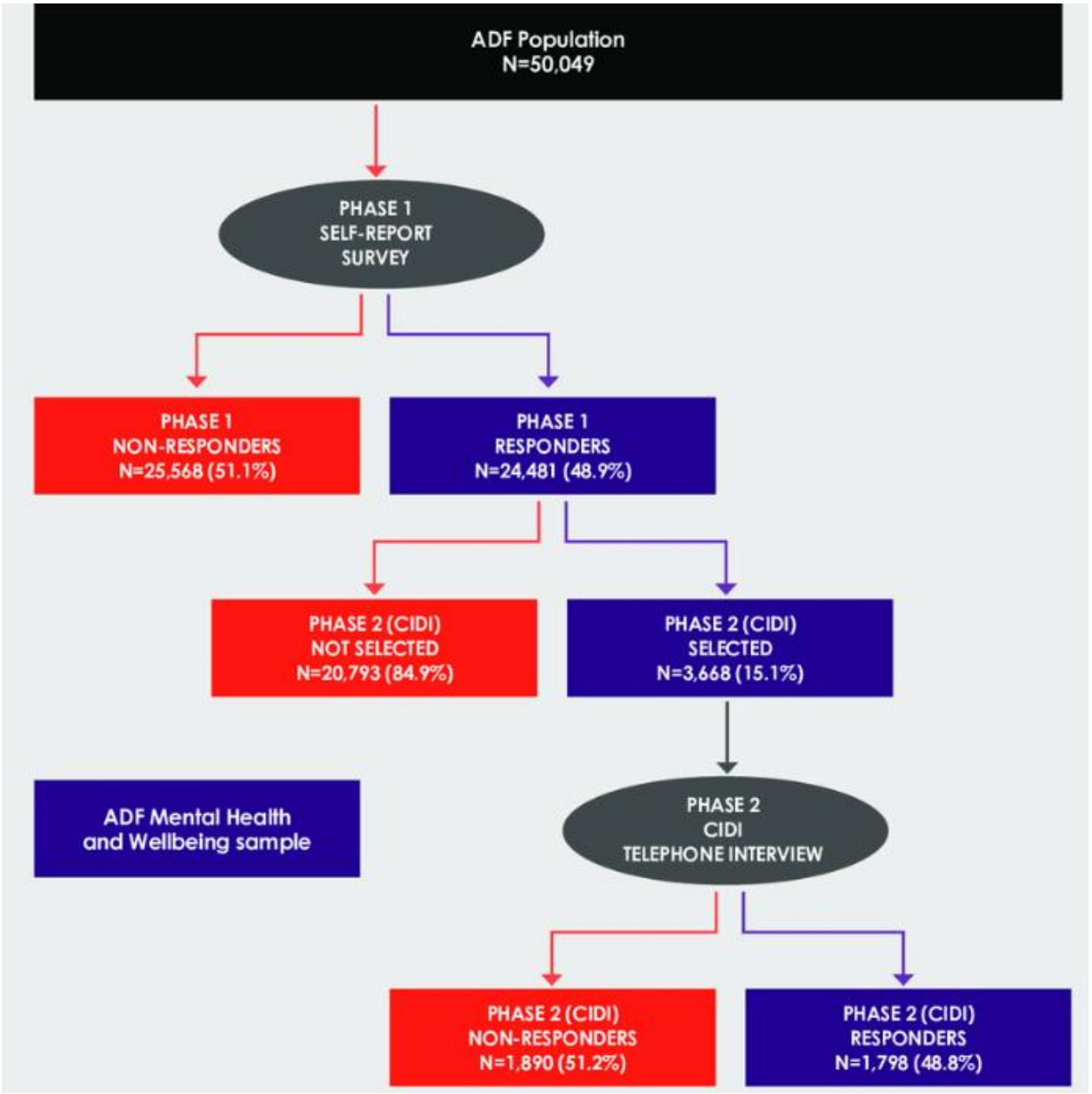
Operating system: Windows, Linux, Mac OS

Processor : Ensure you have a modern multi-core processor (quad-core or higher) to speed up data preprocessing and model training. Common brands include Intel Core i-series and AMD Ryzen.

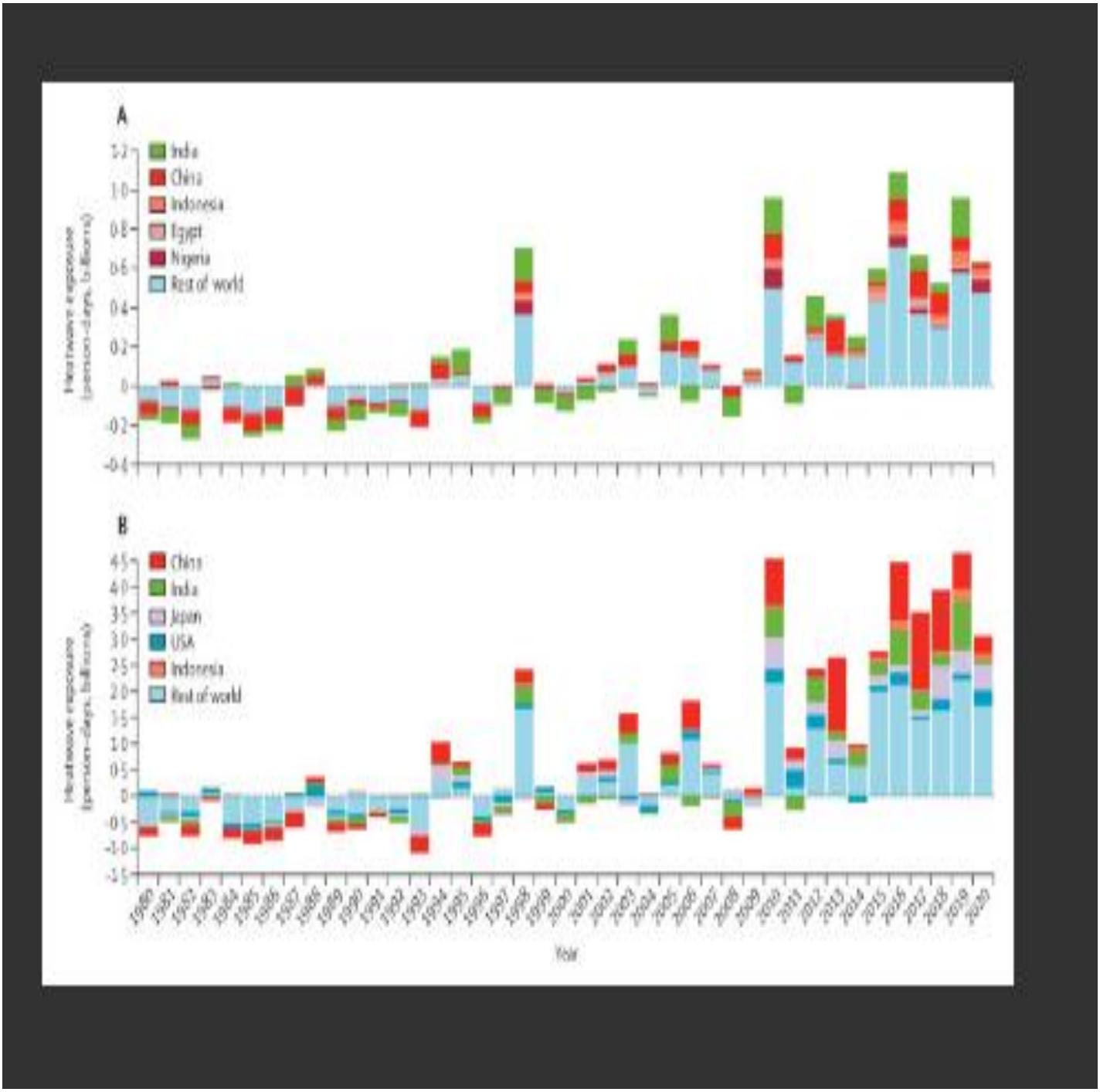
Framework: TensorFlow, PyTorch, Keras:

FLOWCHARTS :

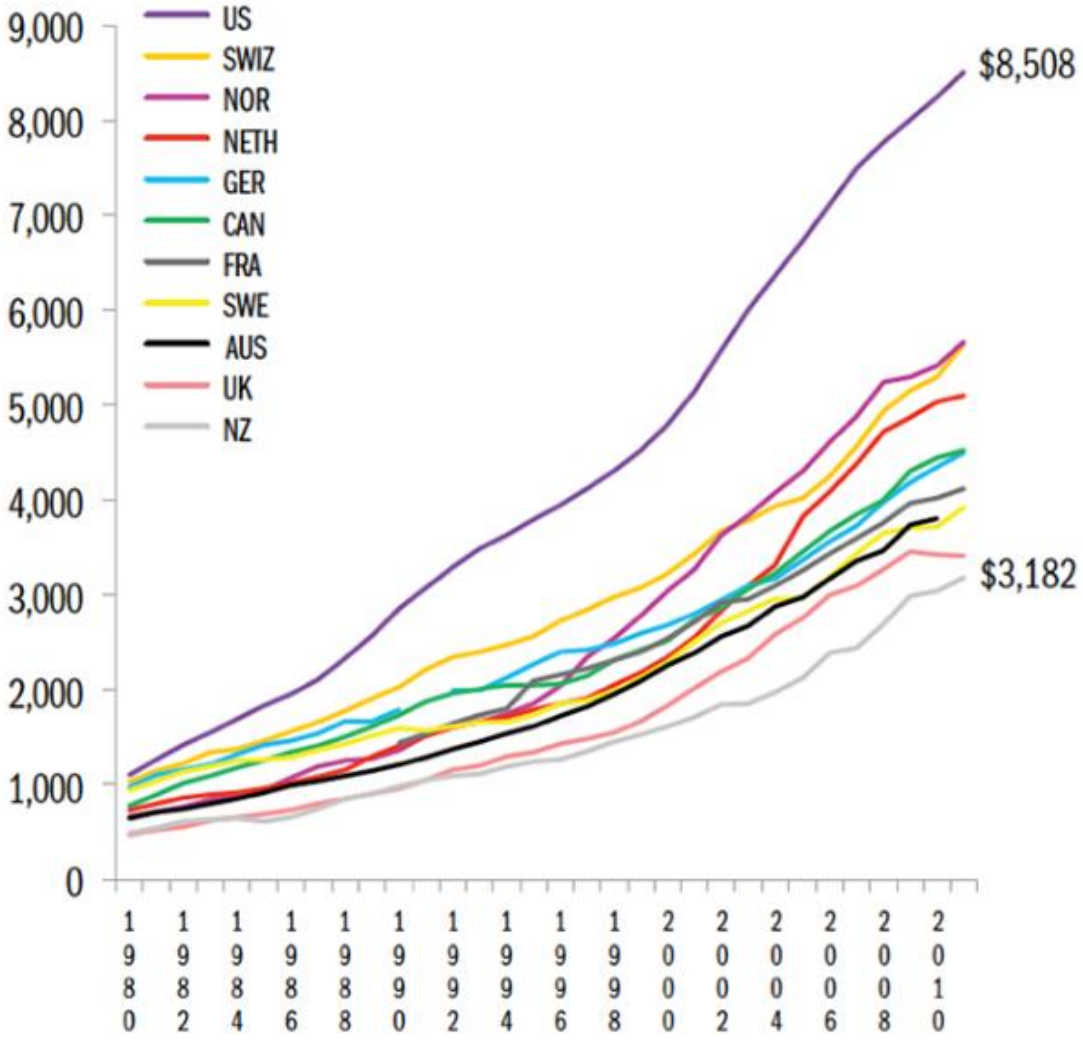



ADF Population
N=50,049
PHASE 1
SELF-REPORT
SURVEY
PHASE 1
NON-RESPONDERS
N=25,568 (51.1%)
PHASE 1
RESPONDERS
N=24,481 (48.9%)
PHASE 2 (CIDI)
NOT SELECTED
N=20,793 (84.9%)
PHASE 2 (CIDI)
SELECTED
N=3,668 (15.1%)
ADF Mental Health
and Wellbeing sample
PHASE 2
CIDI
TELEPHONE INTERVIEW
PHASE 2 (CIDI)
NON-RESPONDERS
N=1,890 (51.2%)
PHASE 2 (CIDI)
RESPONDERS
N=1,798 (48.8%)

Expected Output :



Average spending on health per capita ($US PPP)



Note: $US PPP = purchasing power parity.

Source: Organization for Economic Cooperation and Development, OECD Health Data, 2013 (Paris: OECD, Nov. 2013)