

# **PHASE- 5**

## **Project Title: Public Health Awareness**

### **Project Documentation & Submission**

- In this part you will document your project and prepare it for submission.
- Document the public health awareness campaign analysis project and prepare it for submission.

#### **Documentation**

- Outline the project's objective, design thinking process, and development phases.
- Describe the analysis objectives, data collection process, data visualisation using IBM Cognos, and derived actionable insights.
- Explain how the insights from the analysis can measure campaign effectiveness and guide future strategies.

#### **Submission**

- Share the GitHub repository link containing the project's code and files.
- Provide instructions on how to replicate the analysis and generate visualisations using IBM Cognos and perform data analysis using code.

- Include example outputs of the visualisations and code-generated insights

### **1. Project Objective:**

- The primary objective of this project is to evaluate the effectiveness of a public health awareness campaign and use the insights gained to enhance future public health campaigns. The goal is to assess the reach, engagement, and impact of the campaign on public health awareness.

### **2. Design Thinking Process:**

- **Empathise:** Understand the target audience's health-related concerns and needs.
- **Define:** Clearly define the goals and objectives of the public health awareness campaign.
- **Ideate:** Brainstorm creative campaign strategies to address the identified health concerns.
- **Prototype:** Develop and launch the public health awareness campaign.
- **Test:** Collect data and assess the campaign's performance.
- **Iterate:** Use insights to refine future public health awareness strategies.

### **3. Development Phases:**

#### **❖ Phase 1: Pre-Campaign Analysis**

- Define campaign objectives, including specific health issues to address.
- Identify the target audience and their demographics and preferences.
- Develop campaign content and select appropriate channels for outreach.

## CONCEPTS USING PUBLIC HEALTH AWARENESS:

- **Health Promotion:** The process of enabling people to increase control over their health and its determinants, and thereby improve their health.
- **Health Protection:** Activities undertaken by public health department and government agencies to protect the public from environmental hazards such as air pollution, water contamination, and foodborne illnesses.
- **Primary Prevention:** Actions taken to prevent the onset of a disease or injury before it occurs.
- **Secondary Prevention:** Actions taken to detect and treat a disease or injury early on in its course before severe.
- **Tertiary Prevention:** Action taken to manage a disease or injury after it has occurred to prevent further complications or disability.

### ❖ Phase 2: Campaign Execution

- Launch the public health awareness campaign using chosen channels.
- Monitor engagement, reach, and other relevant campaign data.

**Incorporating machine learning algorithms to predict the success of future campaigns based on historical data is a powerful approach to improving marketing and business decision-making. Here are the steps you can follow to implement such a system:**

#### 1. Data Collection:

Gather historical data on past campaigns, including details such as campaign type, target audience, messaging, timing, and outcomes (success or failure). Ensure that the data is clean, well-structured, and covers a reasonable time frame.

#### 2. Data Preprocessing:

Clean the data by handling missing values, outliers, and inconsistencies.

Encode categorical variables into numerical format using techniques like one-hot encoding or label encoding.

Normalise or scale numerical features to ensure they have similar ranges.

### **3. Feature Selection:**

Identify relevant features (variables) that can influence campaign success. You can use techniques like feature importance analysis, correlation analysis, or domain knowledge to select the most important features.

### **4. Data Split:**

Split the historical data into training and testing sets. Typically, you might use a 70-30 or 80-20 split, with the larger portion for training.

### **5. Model Selection:**

Choose appropriate machine learning algorithms for your predictive task. Common choices include logistic regression, decision trees, random forests, gradient boosting, and neural networks. The choice of algorithm depends on the nature of your data and the complexity of the problem.

### **6. Model Training:**

Train the selected machine learning models on the training data. This involves feeding the historical data into the model to learn patterns and relationships.

### **7. Hyperparameter Tuning:**

Fine-tune the hyperparameters of your models using techniques like grid search or random search to optimise their performance.

### **8. Model Evaluation:**

Evaluate the models on the testing dataset using metrics suitable for classification problems. Common metrics include accuracy, precision, recall, F1-score, and ROC AUC.

### **9. Model Interpretability:**

Ensure that your models are interpretable, especially if the results will inform important business decisions. Techniques like feature importance analysis and SHAP (SHapley Additive exPlanations) can help explain model predictions.

### **10. Deployment:**

Deploy the trained machine learning model(s) into your production environment, so they can be used to make predictions on new campaign data.

### **11. Continuous Monitoring and Updating:**

Continuously monitor the model's performance in production and update it as needed to adapt to changing campaign dynamics and data distributions.

### **12. Reporting and Visualization:**

Present the model's predictions and insights to stakeholders in a clear and actionable manner through dashboards and reports.

### **13. Iteration:**

Periodically retrain and update the model with new campaign data to ensure it remains accurate and relevant over time.

### ❖ **Phase 3: Post-Campaign Analysis**

- Collect and analyse data to evaluate the effectiveness of the campaign.
- Utilise data visualisation tools to gain insights.
- Derive actionable insights to improve future public health awareness initiatives.

**Building a public health awareness campaign analysis using IBM Cognos for visualisation involves several key steps, including defining analysis objectives, collecting campaign data, and preprocessing the data to ensure quality and accuracy. Here's a step-by-step guide on how to get started:**

#### **1. Define Analysis Objectives:**

- Clearly define the objectives of your public health awareness campaign analysis. What questions are you trying to answer? What insights are you seeking? Some possible objectives might include:

- Assessing the effectiveness of previous public health campaigns.
- Identifying target demographics for future campaigns.
- Evaluating the impact of the campaign on public health outcomes.

#### **2. Collect Campaign Data:**

- Identify and collect relevant data sources for your analysis. This data could include information about the campaigns themselves,

public health outcomes, demographic information, and other relevant data points.

- Sources of data could include government health agencies, non-profit organisations, and other public health data repositories. Ensure that the data you collect aligns with your analysis objectives.

#### **3. Process and Clean Data:**

- Data cleaning is a crucial step to ensure that your analysis is based on accurate and high-quality data. Here are some steps to

follow:

- **Data Integration:** Combine data from various sources if necessary.
- **Data Validation:** Check for missing values, outliers, and inconsistencies in the data.
- **Data Transformation:** Convert data types, standardised formats, and create derived variables if needed.
- **Data Imputation:** Address missing values through imputation methods.
- **Data Deduplication:** Remove duplicate records.
- **Data Scaling and Normalisation:** Prepare data for analysis if required.

#### 4. Load Data into IBM Cognos:

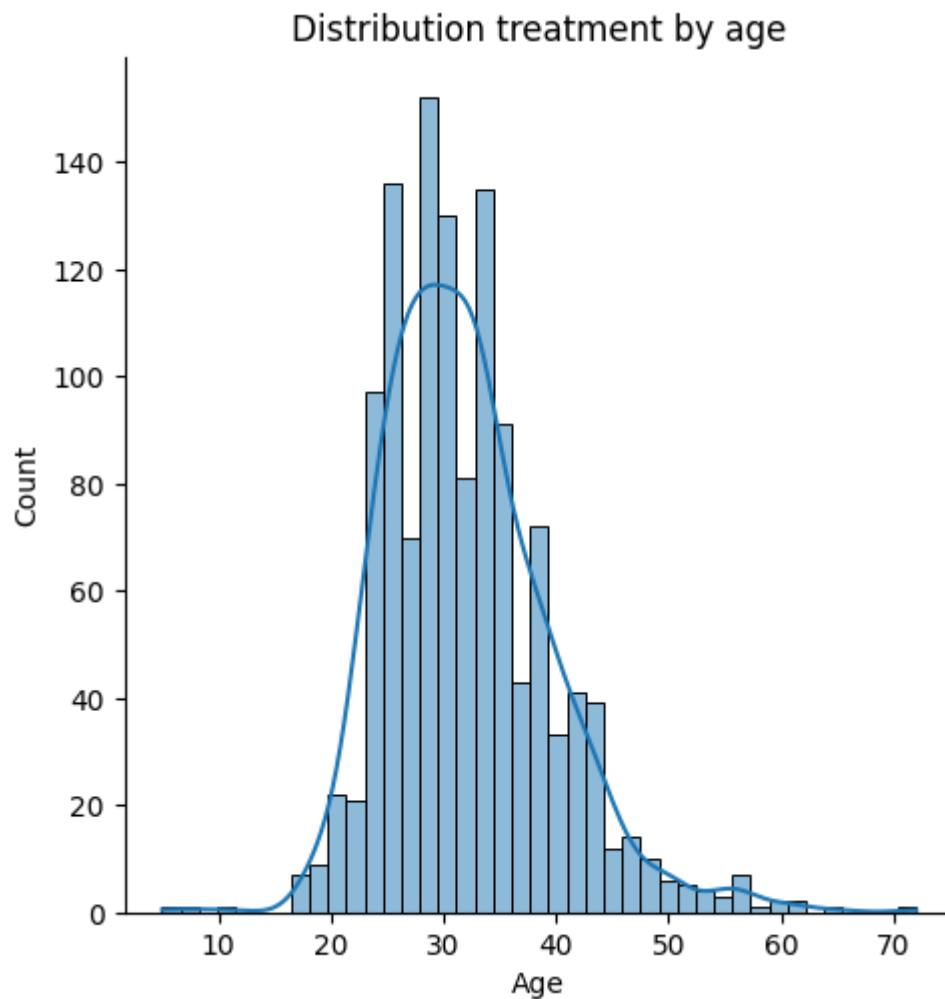
- Once your data is clean and ready, you can load it into IBM Cognos for analysis and visualisation. IBM Cognos is a robust business intelligence tool that allows you to create dashboards and reports.
- You can use various data connectors or import data in different formats (e.g., Excel, CSV, databases) into IBM Cognos.

| Timestamp | Age              | Gender | Country | state          | self employed | family history | treatment | work interfere | no employees | ...            | leave | mental health consequence |
|-----------|------------------|--------|---------|----------------|---------------|----------------|-----------|----------------|--------------|----------------|-------|---------------------------|
| 0         | 27-08-2014 11:29 | 37     | Female  | United States  | IL            | NaN            | No        | Yes            | Often        | Jun-25         | ...   | Somewhat easy             |
| 1         | 27-08-2014 11:29 | 44     | M       | United States  | IN            | NaN            | No        | No             | Rarely       | More than 1000 | ...   | Don't know                |
| 2         | 27-08-2014 11:29 | 32     | Male    | Canada         | NaN           | NaN            | No        | No             | Rarely       | Jun-25         | ...   | Somewhat difficult        |
| 3         | 27-08-2014 11:29 | 31     | Male    | United Kingdom | NaN           | NaN            | Yes       | Yes            | Often        | 26-100         | ...   | Somewhat difficult        |
| 4         | 27-08-2014 11:30 | 31     | Male    | United States  | TX            | NaN            | No        | No             | Never        | 100-500        | ...   | Don't know                |

#### 5. Data Modeling:

- Define a data model that represents your campaign data and aligns with your analysis objectives. This might include creating

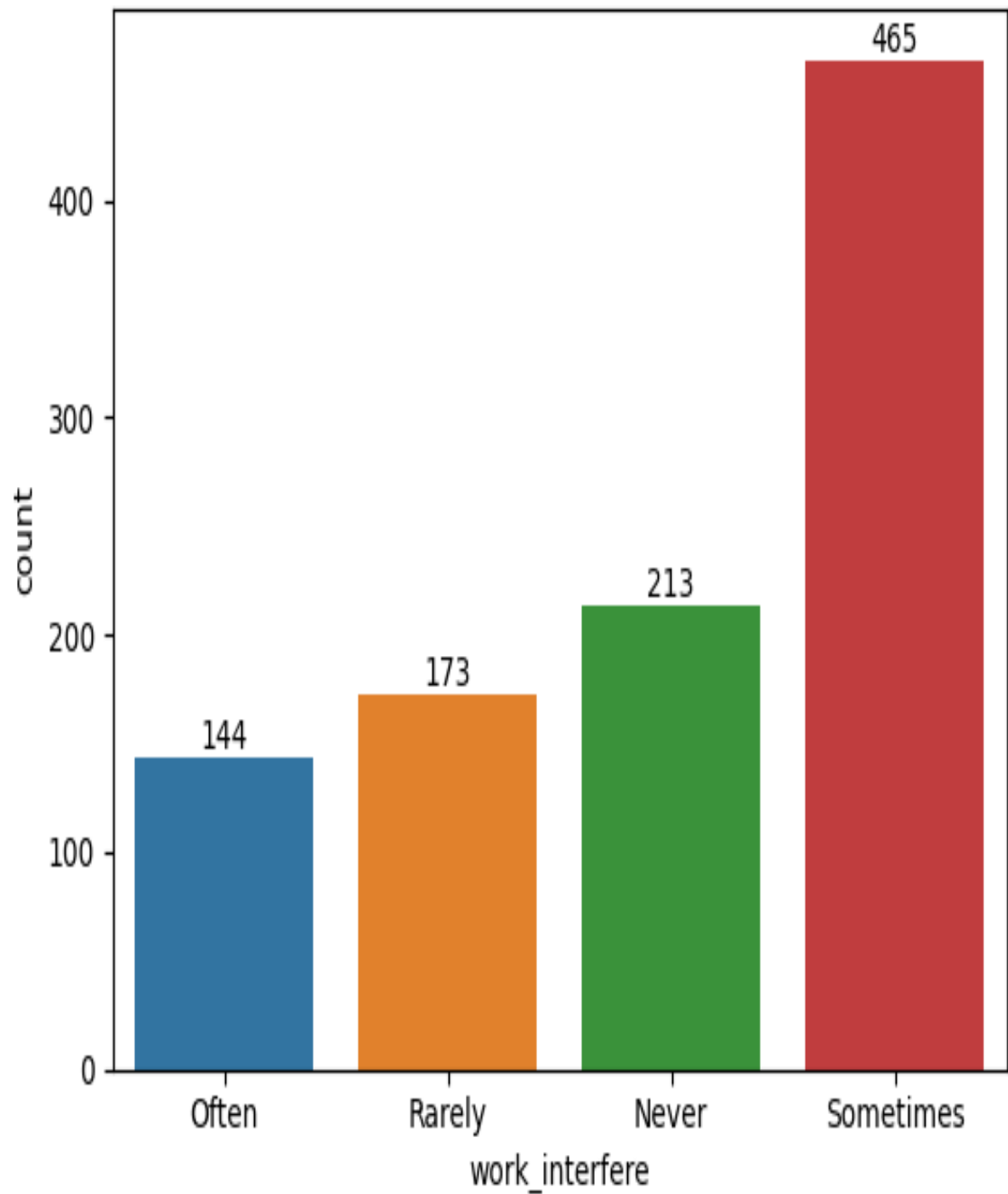
data cubes, dimensions, and measures.



## 6. Visualisation in IBM Cognos:

- Use IBM Cognos to create meaningful visualisations such as charts, graphs, and dashboards to convey the insights derived from your data.
- Consider using various visualisation types like bar charts, line charts, heat maps, and geographical maps to present your

findings effectively.

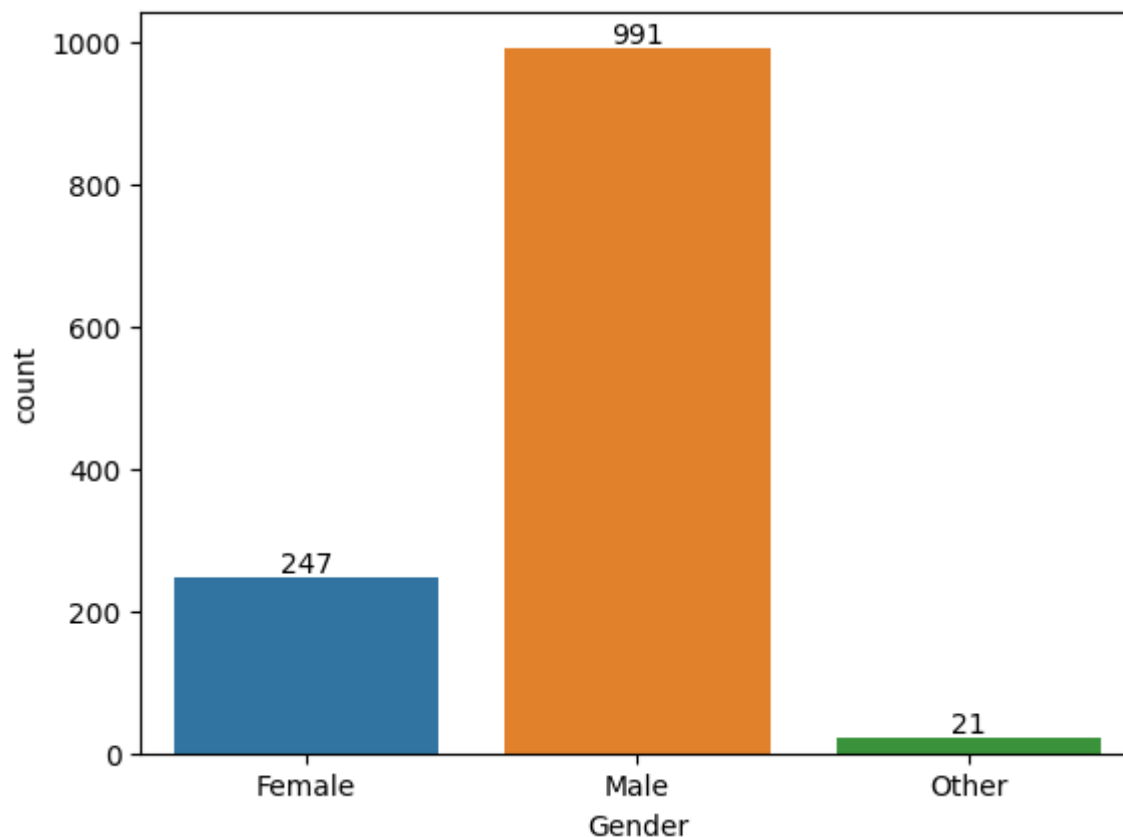


## 7. Analysis and Insights:

- Perform your analysis to address the defined objectives. This might involve statistical analysis, trend analysis, and other



techniques to extract insights. Interpret the results and derive actionable insights for future campaigns.



## 8. Report Generation:

- Create reports and presentations in IBM Cognos to communicate your findings to stakeholders, decision-makers, or the public.

## 9. Iterate and Improve:

- Public health campaigns are ongoing efforts. Continuously collect and analyse data to evaluate the impact of new campaigns, and use these insights to refine your strategies.

## 10. Share and Act:

- Share your analysis results with relevant stakeholders and take actionable steps based on the insights obtained. Implement changes or improvements to public health campaigns based on your findings.

**Remember that data security and privacy are crucial, especially when dealing with health-related data. Ensure that you follow ethical and legal guidelines for handling and analysing sensitive information. By following these steps, you can begin building your public health awareness campaign analysis using IBM Cognos for visualisation and make data-driven decisions to improve public health outcomes.**

## **❖ Phase 4: Development Part 2**

**Step 1:** Data Preparation Before creating dashboards and reports in IBM Cognos, you need to prepare your data. Ensure your data is clean, structured, and relevant to the analysis you want to perform. You might need to merge data from different sources and perform data cleaning tasks if necessary.

**Step 2:** IBM Cognos Dashboard and Report Design IBM Cognos provides a user-friendly interface for designing dashboards and reports.

**Here's a high-level overview of how to design your dashboards and reports:**

- 1. Data Source Connection:** Connect Cognos to your data source.
- 2. Data Modeling:** Create data models, define relationships, and prepare data for reporting. This might involve creating data packages, queries, and calculations.
- 3. Report Creation:** Build individual reports to represent your campaign metrics. You can use various chart types, tables, and visualisations to display the data.
- 4. Dashboard Creation:** Combine individual reports into a dashboard. This allows you to present multiple visualisations on a single page.
- 5. Filters and Parameters:** Implement filters and parameters to allow users to interact with the dashboard and reports. For example, you can add date filters to select a specific time frame for the analysis.
- 6. Layout and Formatting:** Customise the layout, fonts, and colours to make the dashboard visually appealing and easy to understand.
- 7. Scheduling and Distribution:** Set up automated report scheduling and distribution to relevant stakeholders.

**Step 3:** Code Integration for Advanced Data Analysis If you need to perform advanced data analysis that cannot be accomplished within IBM Cognos, you

can integrate Python (or other programming languages) using various methods. Here's a simplified example using Python for calculating engagement rates

**1. Install Required Libraries:** Make sure you have Python installed with the necessary libraries (e.g., pandas, numpy) for data analysis.

**2. Export Data:** Export the relevant data from IBM Cognos into a format that Python can work with, such as a CSV file.

**3. Python Scripting:** Write Python code to perform your analysis. For calculating engagement rates, you might calculate the ratio of interactions (e.g., likes, comments) to the number of impressions or reach.

**CODE in PYTHON:**

```
import pandas as pd
# Load the data
data = pd.read_csv('survey.csv')
# Calculate engagement rate
data['engagement_rate'] = (data['interactions'] / data['reach']) * 100
```

**1. Visualisation:** You can create additional visualisations using Python libraries like Matplotlib or Seaborn. For example, you can create a bar chart to display engagement rates over time.

**2. Integration:** Embed the Python-generated visualisations and analysis results within your IBM Cognos dashboard or reports.

This can be done by exporting Python plots as images and inserting them into your Cognos content.

**3. Automation:** If your analysis needs to be updated regularly, consider automating the Python analysis and data integration process

#### **4. Analysis Objectives:**

- Measure the campaign's reach, engagement, and awareness impact.
- Analyse demographic data to identify the most responsive audience segments.
- Evaluate the effectiveness of the campaign in increasing awareness of the targeted health issues.

- Identify successful and less successful campaign components.
- Assess the cost-effectiveness of the campaign.

#### **5. Data Collection Process:**

- Gather data from various sources, including website analytics, social media metrics, survey responses, and event attendance records.
- Utilise tracking tools and custom surveys to capture specific campaign-related data.
- Ensure the quality and accuracy of the data collected.

#### **6. Data Visualization Using IBM Cognos:**

- Import the collected data into IBM Cognos or similar data visualisation tools.
- Create visualisations such as charts, graphs, and dashboards to represent key campaign metrics and trends.
- Develop interactive reports to provide a comprehensive view of campaign performance.

#### **7. Derived Actionable Insights:**

- Identify the most effective channels and messaging strategies.
- Analyse the demographic data to tailor future campaigns to the most responsive audience segments.
- Measure the campaign's impact on public health awareness by comparing baseline and post-campaign data.
- Pinpoint successful elements of the campaign that can be replicated.
- Assess the cost-effectiveness of the campaign in relation to its impact.

#### **8. Measuring Campaign Effectiveness:**

- Track key performance indicators (KPIs) such as reach, engagement, and awareness metrics.
- Compare the campaign's impact against predefined objectives and benchmarks.
- Use surveys and feedback to gauge public perception and knowledge improvement.
- Monitor website and social media traffic related to the campaign.

#### **9. Guiding Future Strategies:**

- Utilise insights from the analysis to make data-driven decisions for future public health awareness campaigns.
- Allocate resources more effectively to high-performing channels and strategies.
- Adapt messaging and content to address the most critical health concerns.
- Continuously analyse and improve public health awareness strategies based on ongoing data-driven feedback.

This project is designed to provide a structured framework for evaluating the effectiveness of public health awareness campaigns, using data-driven insights to guide future strategies and ensure more impactful and targeted public health initiatives.