**Step 1: Data Preparation**

Before starting the integration process, it’s essential to prepare your data.

**1.1 Standardize Data Formats**

* Ensure all data sources use **consistent headers**, such as "Mother ID," "Age," "Outcome," or "Location." Avoid discrepancies like "MotherID" in one table and "Mother ID" in another.
* Ensure all dates are in the same format (e.g., MM/DD/YYYY or DD/MM/YYYY), and that numbers like ages, totals, and outcomes are formatted correctly.

**1.2 Clean the Data**

* **Remove duplicates**: Check each data source for duplicate entries (e.g., duplicate rows for mothers or facilities) and clean up where necessary.
* **Handle missing data**: Fill in missing values where possible or flag them to be addressed later.

**1.3 Create a Backup**

* Before importing and merging the data, create backups of the original datasets to preserve the raw data.

**Step 2: Importing Data into Excel**

**2.1 Import CSV Files**

If some of your data is stored in CSV format, use this method:

1. Open **Excel** and go to the **Data** tab.
2. Select **Get Data** > **From File** > **From Text/CSV**.
3. Choose your CSV file and click **Import**.
4. Review the preview and confirm that the data columns are correctly identified.
5. Click **Load** to import the CSV data into a new sheet.

**2.2 Import MYSQL Data**

If your data resides in a MySQL database:

1. Go to **Data** > **Get Data** > **From Database** > **From MySQL Database**.
2. Enter your MySQL server connection details (e.g., host, port, database name).
3. Choose the required table from the database and click **Load** to import the data into Excel.

**2.3 Import Google Sheets Data**

For Google Sheets integration:

1. Download the Google Sheets file as a CSV: **File** > **Download** > **Comma-separated values (.csv)**.
2. Follow the same steps as in **2.1** to import the CSV into Excel.

**Step 3: Merging Data in Excel**

Once data is imported into Excel, we need to combine it from different sources (CSV, MySQL, and Google Sheets) into a single, unified dataset.

**3.1 Merge Data using VLOOKUP or XLOOKUP**

* **LOOKUP** or **XLOOKUP** can be used to join tables based on common fields (e.g., "Mother ID"). This will allow you to pull data from different tables into one.
* Example formula using VLOOKUP to retrieve a mother’s age from the **Mothers** table:

=VLOOKUP(A2, Mothers!A:D, 3, FALSE)

Here:

* **A2** is the common field (Mother ID) in the current table.
* **Mothers!A**

is the range in the **Mothers** table.

* **3** refers to the third column (which contains the age).
* **FALSE** ensures an exact match is returned.

**3.2 Merge Data from Multiple Tables**

* If you have data in multiple tables (e.g., **Pregnancies**, **Mothers**, and **HealthcareFacilities**), use multiple **VLOOKUP** or **XLOOKUP** functions to pull data from each.
* Example: You could match **Mother ID** to pull in data like age and location from the Mothers and HealthcareFacilities tables.

**Step 4 Testing for Data Consistency**

After merging the data, it’s important to check that the data has been correctly integrated. Testing ensures that all values are correct, complete, and consistent across your datasets.

**4.1 Check for Missing values**

 To identify missing data, apply **Conditional Formatting** to highlight any empty cells:

* Select the data range.
* Go to **Home** > **Conditional Formatting** > **Highlight Cells Rules** > **Blanks**.

 Review the highlighted cells and determine how to handle them (e.g., fill in, ignore, or flag for further review).

**4.2 Check for duplicates**

It’s crucial to ensure that there are no duplicate entries, especially for key identifiers like Mother ID.

* Select the data range.
* Go to **Data** > **Remove Duplicates**.
* Choose the key fields (e.g., Mother ID, Location) to check for duplicates.
* Click **OK** and review the results.

**4.3 Check for Data Consistency**

Ensure that the merged data aligns with the original datasets. For example:

* The age from the **Mothers** table should match the age for each mother in the **Pregnancies** table.
* Verify that pregnancy outcomes correspond correctly to the facility and location.

**Step 5: Grouping Data for Analysis**

To make the data easier to analyze, you can group similar data points into buckets.

**5.1 Group Ages into Buckets**

* For example, group mothers into age ranges (e.g., 20-25, 26-30, 31-35).
* Use a formula to group ages.

=IF (B2<=25,"20-25", IF (B2<=30,"26-30", IF (B2<=35,"31-35", "36+")))

* This will place each mother in an age group based on their age.

**5.2 Group Locations**

Group healthcare facilities by region (e.g., Rural Area 1, Urban Area 1) for location-based analysis.

**Step 6: Creating Pivot Tables for Analysis**

Once the data is clean, consistent, and grouped, use pivot tables to summarize the data for analysis.

**6.1 Create a Pivot Table**

1. Select the data range and go to **Insert** > **Pivot Table**.
2. Drag relevant fields (e.g., **Mother ID**, **Age Group**, **Pregnancy Outcome**) into the appropriate sections (Rows, Columns, Values).
3. Group and analyze the data as needed.

**6.2 Test the Pivot Table**

* Ensure that the pivot table is counting or summarizing data correctly. For example, verify that the total number of pregnancies or outcomes matches the raw data.

**Step 7: Visualization and Dashboard setup**

With the pivot tables set up, you can create charts and build an interactive dashboard for analysis.

**7.1 Create Charts**

1. Select the pivot table or data range.
2. Go to **Insert** > **Chart**.
3. Choose a chart type (e.g., Bar Chart, Pie Chart) to visualize trends such as pregnancy outcomes by age group or location.

**7.2 Setup Filters for Interactivity**

* Add filters for categories like **Age Group**, **Location**, and **Pregnancy Outcome** by going to **Data** > **Filter**.
* This allows users to interact with the dashboard, filtering data to view specific trends.

**Step 8: Final Review and Testing**

**8.1 Test and Final Integration**

* Double-check that all formulas, pivot tables, and charts are functioning as expected.
* Test each filter and review the data displayed to ensure accuracy.