Visualizations for Effective Program Performance Tracking: How to Choose the Right Visuals to Achieve Targets

March 9, 2023
Andres Montaner
M&E – Right To Care
Rapidly prepare Local Partners to have the capabilities and resources to serve as Prime Partners for USAID/PEPFAR programming, in compliance with USAID and PEPFAR procedures, for PEPFAR program implementation in FY 2022 and 2023.

**70% of USAID PEPFAR funding to local prime partners.**

**STRATEGIC OBJECTIVES**

1. Strengthen Local Partners as they transition to receive PEPFAR funding as a USAID Prime Partner to comply with regulations.

2. Prepare Local Partners to directly manage, implement, and monitor PEPFAR programs, and maintain consistent PEPFAR program achievement and quality.
<table>
<thead>
<tr>
<th>Angola</th>
<th>Malawi</th>
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<tbody>
<tr>
<td>Cameroon</td>
<td>Namibia</td>
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<tr>
<td>Côte d’Ivoire</td>
<td>Nigeria</td>
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<tr>
<td>DRC</td>
<td>South Sudan</td>
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<td>Uganda</td>
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<td>Ethiopia</td>
<td>Zimbabwe</td>
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<tr>
<td>Lesotho</td>
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</tbody>
</table>
ASAP has supported 112 local organizations in 18 countries

101 local partner organizations

11 local government partners
USAID/ASAP has broadcasted 85 webinars for more than 19,000+ attendees.

Find past webinars on ASAP’s web page www.intrahealth.org/asap-resources
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- Data Processing Overview & a Demonstration in PowerBi – Mar 23
- Advanced Analytics for Data Driven Decision Making & Action – Apr 13
- Practical Application GIS Methods & Tools to Guide Spatial Targeting & Micro-Planning – Apr 20

**Portuguese-language**

- Desenvolver Conselhos de Administração Extremamente Eficazes – Mar 30

[https://www.intrahealth.org/upcoming-asap-webinars](https://www.intrahealth.org/upcoming-asap-webinars)
Andres Montaner
Senior Monitoring & Evaluation Manager
Right to Care, a South Africa-based USAID Local Partner and ASAP II Consortium Partner

Q&A Support
Aart De Zeeuw
Subject Matter Expert on Results Based Management
Part 1: Data Demand and User Requirements Specifications
Data Demand and Use Defined

- **Data Demand** – *What kind of information is needed* to inform program action:
  - Decision makers define what data is required of a program

- **Data Use** – *How data is reviewed and applied* for program action:
  - Reporting for funder, government, or internal to organization
  - Monitoring the project
  - Allocating resources
  - Creating or revising an intervention

- New data demands can lead to development of new data processing systems and visualizations
The Role of a Data Processing System

• What is a Data Processing System?
  – People vs. computers
  – Policy
  – Technical
  – Examples: Monthly, annual, and Excel-based reports; DATIM; DHIS2

• How to create a Data Processing System:
  – Define a procedure with inputs and outputs based on data demand and required data use
User Requirement Specifications (URS) Document

- The URS describes what is required from the new Data Processing System:
  - Report generation, dashboards, data extracts, visuals…

- User specifications are written:
  - Before the new system is created
  - By the system owner, with input from users

- Process of developing a data system
- Benefits of URS
User Requirements Specifications (URS)
Gathering and Documenting

• What is required of the Data Processing System?
  - Input - data source (submission, database)
  - Output - dashboard, visuals, extract, integrated online system...

• Building on the current program structure
  - Data dictionary
  - Software compatibility

• Clarity and detailed documentation at the foundation of building are critical
### Pediatric

- Ped VL Suppression
- Ped VL Coverage
- % of TX_CURR who are Ped
- Ped Linkage
- Ped Yield

### Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Required/ Optional</th>
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<th>Multi/ Single</th>
<th>Dependency</th>
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### Values & Calculation

<table>
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<th>DataSource</th>
<th>Format</th>
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<tr>
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<td>HTS_POS / HTS_TST (Only for age group 0-14)</td>
<td>Weekly Template</td>
<td>Percentage</td>
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<td>Ped Linkage</td>
<td>TX_NEW / HTS_POS (Only for age group 0-14)</td>
<td>Weekly Template</td>
<td>Percentage</td>
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<tr>
<td>% of TX_CURR who are Ped</td>
<td>TX_CURR Only for age group 0-14 / TX_CURR All age groups</td>
<td>Weekly Template</td>
<td>Percentage</td>
</tr>
<tr>
<td>Ped VL Coverage</td>
<td>PVL5(0D) / VL_ExistingOnly eligible (Only for age group 0-14)</td>
<td>Weekly Template</td>
<td>Percentage</td>
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<tr>
<td>Ped VL Suppression</td>
<td>PVL5(0D) / PVL5(0D겼 (Only for age group 0-14)</td>
<td>Weekly Template</td>
<td>Percentage</td>
</tr>
</tbody>
</table>

**Note:**
- The default daily report will display only priority facilities at a regional level.
Deployment is based on User Requirement Specifications
User Acceptance Testing (UAT)

- **WHAT?** A process of verifying data product against user requirement specifications (URS)
- **WHY?** To assess if the data product will support program operations as required
- **HOW?** Product testing/review against the URS and documenting feedback

**UAT Cycle**

- **WHO?** UAT Team (staff knowledgeable about URS and relevant data demand and use)

**Plan UAT**
- Define scope of UAT

**Identify UAT Scenarios**
- Review Business req’s, use cases and UI design
- Document UAT test scenarios

**Execute UAT Tests**
- Execute and document results
- Log UAT defects

**Verify UAT defect fixes**
- Rerun impacted UAT scenarios

**Report UAT results**
- Go / No go call

**UAT Signoff**
- Product deployed for live use

- If a UAT has not passed, feedback will be sent for correction and redeployment for another UAT
- Finally, UAT passes and is signed off by business
Poll 1

1. What is the outlined process for new system development?
   a. UAT > URS > Final Deployment  
   b. URS > UAT > Final Deployment  
   c. URS > Final Deployment > UAT  
   d. UAT > Final Deployment > URS

2. Is it possible to fail UAT after a deployment based on a URS?
   a. Yes  
   b. No
Questions on the process of URS to deployment?

Identify **Data Demand**

Define **Data Use**

**URS**

**Deployment**

**UAT**

**Feedback**

**Corrections**

**Sign off for Live Deployment**
Questions?
Part 2: Selecting the Correct Data Visualization to Match Data Demand
Why Data Visualization?

All projects generate performance data. But not everyone knows how to read or use it.

When data is presented in a solely textual manner (Excel, CSVs), it can be difficult to interpret and not see the patterns that live within the data.

This is where the data visualization comes to the rescue. Let’s look at an example before going into some of the most widely used graphs.
The table (1) below gives an easy and quick overview of the exact number of road accidents incurred by pedestrians between 45 and 54 years old.

But how does this compare to cyclists or motor bikers? Simple column/bar graphs can highlight the proportions. Column graph (2) clearly shows that car accidents are more numerous than accidents of other transportation modes.

But a graph can do much more! This radar chart (3) highlights risk profiles: 15-24 and 25-34 years old are clearly at risk for car accidents; 25-34 years old for motorbiking accidents, and more than 75 years old for pedestrians.
### Attitudes and Behaviours of Healthcare Professionals toward HIV Patients

<table>
<thead>
<tr>
<th>Stigma and Discrimination</th>
<th>Health Care Professionals (HCPs)</th>
<th>Doctor N=50</th>
<th>Nurse N=50</th>
<th>Scientists N=50</th>
<th>Orderlies N=50</th>
<th>Pharmacists N=50</th>
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<tbody>
<tr>
<td>HIV is a serious threat to health workers</td>
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<td>44</td>
<td>48</td>
<td>02</td>
<td>46</td>
<td>04</td>
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<tr>
<td>Treating PLWHIV is increased risk of contracting HIV</td>
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<td>45</td>
<td>48</td>
<td>02</td>
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<td>HIV patients poses a great danger to HCPs</td>
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<td>05</td>
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<td>HIV/AIDS patients deserve to die</td>
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<td>30</td>
<td>02</td>
<td>48</td>
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<td>HIV patients should not be given best treatment</td>
<td></td>
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<td>30</td>
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<td>HCPs should retain their friendship with PLWHAN</td>
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<td>30</td>
<td>-</td>
<td>30</td>
<td>-</td>
<td>45</td>
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<tr>
<td>HCPs should not share office with HIV patients</td>
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<td>30</td>
<td>01</td>
<td>49</td>
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<td>HCPs should visit HIV patients</td>
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<td>30</td>
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<td>-</td>
<td>45</td>
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<tr>
<td>HCPs should allow relation to marry HIV patients</td>
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<td>20</td>
<td>30</td>
<td>13</td>
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<td>12</td>
</tr>
</tbody>
</table>

#### Attitude of Health Workers towards Treatment of HIV/AIDS Patients

| I want to be removed from caring for PLWHIV                                              |                                  | 05          | 48         | 07              | 43             | 03               |
| HIV testing for patients without consent                                                 |                                  | 04          | 46         | 10              | 40             | 05               |
| HCPs with HIV should be disengaged                                                        |                                  | -           | 50         | -               | 50             | -                |
| Refusing to hug/touch HIV patient                                                         |                                  | 04          | 46         | 10              | 40             | 05               |
| Refusal of admission to a hospital                                                        |                                  | -           | 50         | -               | 50             | -                |
| Refusal to operate/assist in clinical procedures                                           |                                  | -           | 50         | -               | 50             | -                |
| Cessation of ongoing treatment                                                            |                                  | 04          | 46         | 10              | 40             | 05               |
| Early discharge from hospital                                                             |                                  | 07          | 43         | 04              | 46             | 01               |
| Bad facial expression when treating HIV patient                                           |                                  | 01          | 49         | 04              | 46             | -                |
| Physical isolation in the ward                                                            |                                  | 03          | 47         | 06              | 44             | 04               |
| Restrictions of movement around the ward                                                 |                                  | 02          | 48         | 05              | 43             | 01               |
| Restricted access to shared facilities                                                    |                                  | 04          | 46         | 10              | 40             | 05               |
| Double-gloving when taking pulse/ giving patients medication of HIV patient               |                                  | 03          | 47         | 10              | 38             | 06               |

Source: “Attitudes and Behaviors of Healthcare Professionals toward HIV Positive Patients in a Tertiary Hospital”, (Federal Teaching Hospital, Ido-Ekiti, Nigeria); Esan A Jacob, Osime E. O, F Kolawole and Oyedele E Titilayo. (2022)
Main Questions to Ask for Choosing the Right Visualization

1) Who will be the audience for the project data?
2) What insights behind the data do the users want the graphs to highlight?
3) What is the most impactful way to show the project’s achievements or challenges to date?

• Determine which one or more of the four main properties of data presentation fit these requirements:

  • How data is composed (Composition)
  • How variables relate to each other (Relationship)
  • How a variable behaves in comparison to others (Comparison)
  • How data is distributed across dimensions (Distribution)

• To choose the right visualizations to show/report a project’s performance against MER indicator targets, a “visualization decision tree” can be a very helpful tool.
**Chart Visualization Decision Tree: the Four Main Properties**

**Property 1: Comparison**
Comparisons are used to evaluate the magnitude of values to each other and to easily identify the lowest or highest values in the data. If you want to compare values over time, line or bar charts are often the best option; which you choose depends on the number of periods you would like to analyze. However, bar or column charts are better for comparisons among items. Line charts provide a sense of continuity that might not be meaningful for categories.

**Property 2: Composition**
Composition charts are used to see how a part of your data compares to the whole, and can show relative and absolute values. They can accurately represent both static and time-series data. For static data, a pie chart can do the job. However, there also other options that can tell the same story, such as a stacked bar chart, a waterfall chart, or a tree map. For time-based data, the number of periods is again a decisive factor in choosing your chart. You can visualize composition over many periods with area charts, which are very similar to line charts and stacked bar or column charts when you have a reduced amount of periods.
Chart Visualization Decision Tree: the Four Main Properties (cont’d)

**Property 3: Distribution**
When studying how quantitative values are located along a range, distribution charts are the way to go. By looking at the shape of the data, the user can identify features such as value range, central tendency, and outliers.

**Property 4: Relationship**
Relationship charts are used to find correlations, outliers, and clusters in your data. While the human eye can only appreciate three dimensions together, you can visualize additional variables by mapping them to the size, color, or shape of your data points. They have a constrained set of options, as scatter plots are usually the adequate way of presenting the data.
Chart Visualization Decision Tree

Source: Andrew V. Abela, ExtremePresentation.com, 2009
Which property is being demonstrated in this data visualization?

a. Composition  
b. Comparison  
c. Relation  
d. Distribution
Comparison among few items: Column Chart

Column charts use vertical bars to show comparisons between categories. They present categorical data with rectangular bars, with heights or lengths proportional to the values that they represent and are effective for showing the value at a point in time.

The bars can be plotted vertically (column chart) or horizontally (bar chart, especially useful with long/many descriptions). 3QY745FQ9HY

Source: RTC/EQUIP, Zambia, SAPR FY’21
Comparison among multiple items: Grouped Column/Bar Chart

The grouped bar chart (also called: multi-set bar chart; clustered bar chart) is used when two or more data sets are displayed side-by-side and grouped together under specific categories on the same axis. Basically, it’s the most simple bar chart with two or more graphs.
**COMPARISON: Line Chart Over time**

Daily confirmed new COVID-19 cases in 10 countries. Note the congestion, with all trend lines overlapping.

**DAILY CONFIRMED NEW CASES (7-DAY MOVING AVERAGE)**

Outbreak evolution for the current most affected countries

When you have a continuous data set, line charts are recommended. They are best suited to trend-based visualizations of only a few categories over a period of time.

It can be beneficial to filter out for just 1 or 2 trendlines for easier interpretations and comparisons. See below when filtering for Brazil only.

Source John Hopkins Corona Virus Resource Center (https://coronavirus.jhu.edu/data/new-cases)
Columns allow for data to be compared easily between categories. Adding a line to the columns allows for another related category (potentially on a different scale) to be included in the same visual.

Be careful not to overfill a visual.
Tornado (or butterfly) charts are essentially bar charts comparing two differing metrics. Data categories are listed vertically, with the bars of differing metrics extending horizontally, on both ends of the listed categories.

These charts come in handy for comparing two data sets or metrics that are contrasting in nature, such as male-female, positive-negative, and the like.

Source: Right to Care/QodeInside, 2020
Percentage column charts are similar to stacked charts but show values as a percentage—meaning that all the bars are the same length. You can use them the same way as stacked charts, and they are particularly useful when comparing relative differences.

Stacked column charts use vertical bars, divided into sub-parts, that show the cumulative values of a data item and compare the parts to the whole. Items stacked on top of one another are differentiated by color.

Note the difference in the examples, though they consist of the same numbers.
A pie chart is used to visualize the relationship of a part to the whole, and typically represents numbers in percentages. Example:

Level of food insecurity of respondents among people living with HIV/AIDS during follow-up at public hospitals of western Ethiopia
Poll 3
Which Pie Chart has the Smallest section of Green?
Poll 3

*Be cautious with use of pie charts when bar charts will suffice.
Scatter plot charts are primarily used to analyze correlations and distribution, and facilitate showing the correlation (or not) between two different variables. Correlation of Infant Mortality Rate and Total Fertility Rate.

A bubble chart allows one to add at least another dimension to a scatter chart (e.g., you can add bubble size as the third variable and thus enable comparison).


Map charts are great for giving numbers a geographical context to quickly spot trends, best and worst performing areas, and outliers.

Location data such as coordinates, names of provinces, districts, or community spots allow plotting related data on a map.

Data Visualizations: Some Style Do’s and Don’ts

**Sorting**: For column and bar charts, to enable easier comparison, sort your data in ascending or descending order by the value, not alphabetically.

**Data-Ink Ratio**: Remove any information, lines, colors, and text from a chart that do not add value.

**Labels**: To avoid misinterpretation, use labels directly on the line, column, bar, pie, etc., whenever possible.

**Colors**: (a) Do not use more than six colors in any one chart.

(b) To compare the same value at different time periods, use the same color in a different intensity (from light to dark).

(c) For different categories, use different colors. The most widely used colors are black, white, red, green, blue, and yellow.

(d) Keep the same color palette or style for all charts in the series, and the same axes and labels for similar charts, to make your charts consistent and easy to compare.
Data visualization is not a goal in its own right. It is meant to facilitate data use to cultivate a results-focused decision-making environment.
Questions?
Thank you for your time.