**QA Framework for Data Visualizations**

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# Scope

* Objectives for producing a quality assurance plan for data visualizations is to ensure accurate, effective, and meaningful communication of data insights for all users and to avoid bias, misinterpretation, and misleading conclusions.
* This document lists thoughts that are unique to data visualizations and attempts to not repeat best practices and processes that overlap with other sections in the [QA framework](https://doimspp.sharepoint.com/:w:/r/sites/IIDDStaff/Shared%20Documents/IPDS%20and%20FSP/ITRP%20-%20Internal%20Technical%20Review%20Procedures/Draft%20QA%20Framework%20for%20Review.docx?d=w40b8bc63e4e542e4829e7237d6ec15cb&csf=1&web=1&e=k9Imwj) like version control, peer review, user feedback and testing etc.

# The Data Visualizations Commandments

Sometimes rules are meant to be broken, especially when doing something creative. But for times when they are not meant to be broken, here are some guidelines:

* Verify Data Integrity. Ensure that the data used for visualizations is accurate, complete, and free from errors. Justify discarding data points if you must discard.
* Clearly document data sources and processing steps including any transformations or calculations performed on the data. This promotes transparency/trust and allows others to reproduce or validate the visualizations.
* When possible, let the data speak for itself. Consider the simplest way of telling the story before adding a trendline, subjective analysis, or going to other sources to bolster messaging.
* Adhere to standards set forth in Section 508 of the Rehabilitation Act of 1973, which requires federal agencies make their electronic and information technology (EIT) accessible to individuals with disabilities.
  + Use color blind **palettes** and maintain sufficient color contrast between elements to ensure readability.
    - Key contrast ratios that Vizlab uses are 3:1 for large elements (larger graphic elements, large text) and 5:1 for smaller text and important elements.
  + Provide **captions** for videos to assist users with hearing impairments.
  + Provide text equivalents like **alternative text** descriptions for images, audio descriptions for videos, and text transcripts for multimedia content.
  + Ensure that all functionalities can be accessed and operated through a **keyboard** alone, without requiring a mouse.
  + Ensure that websites and applications have logical structures, clear headings, and navigational mechanisms that can be easily understood and used by **assistive technologies**.
* Fonts
  + Size
  + Number of different fonts
* Color
  + Make it work in black and white first then add color
* Data privacy and sharing:
  + Anonymization and Aggregation: When dealing with sensitive or personal data, ensure that appropriate anonymization and aggregation techniques are applied to protect individual privacy.
  + Access Controls: Implement access controls and data governance measures to restrict access to sensitive or confidential data. Regularly review and update these controls to maintain data security.
  + Never include full (non-relative) computer pathways in code or on repositories. Use project-based file management (e.g., RStudio .rproj or Markdown documents) to ensure that file location pathways are relative and reproducible.
* User-Friendly Interactivity: If the visualization is interactive, ensure that the interactions are intuitive and user-friendly. Provide clear instructions or tooltips to guide users on how to interact with the visualization.
* Responsiveness: Test the visualization on different devices and screen sizes to ensure it remains functional and visually appealing. Consider responsive design principles to adapt the visualization to different screen resolutions.
* Use arrows sparingly and when you want to indicate movement. To call out text, use lines or just text proximity.
* Use a welcoming gesture when topics are complex and/or intimidating given the right context. For example, use a picture or drawing of fish species when plotting the data associated with it.