Graphs in Radiology

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Outline

- When to use a graph
- Types of graphs
- Tips and tricks
Outline: When to use a graph
Text
Will be explicit
Might make manuscript long

Table
Will provide much detail
Might be cumbersome to read

Graph
Will provide “illustrative” summary
Might lack “granularity”
Use graph to show an “illustrative” summary of a finding, and when showing ALL data is not necessarily required.
Outline: Types of graphs
Types of graphs

- Line graph
- Pie graph
- Bar graph
- Scatter/dot plot
Pie graph

Shows subgroups as part of a 360° pie

Multiple issues related to readability and comparability of displayed dimensions

Use of pie graphs is discouraged by Radiology
Bar graph

Shows subgroups as bars

*Application*: comparison of *static* quantities - means

Do not use for *dynamic* changes - trends
Bar graph versus line graph

**Bar graph**
- Application: static quantities

**Line graph**
- Application: dynamic changes
Line graph

Lines connect data points. Magnitude changes, often over time.

Application: *dynamic* changes, trends. Do not use for comparison of *static* parameters.
Scatter/dot plot

Shows individual datapoints

*Application:* distributions

Do not use for anything else
Bar graph versus scatter plot

Application: static quantities

Application: distributions
Types of graphs

- **Pie graph**
  Shows subgroups as part of a 360° pie – *Discouraged***!!*

- **Bar graph**
  Shows subgroups as bars
  Application: comparing *static* quantities

- **Line graph**
  Shows changes among or between subgroups
  Application: *dynamic* changes, trends

- **Scatter plot**
  Shows individual datapoints
  Application: *distributions*
Outline: Tips and tricks
Make your point

Detection rate (# of lesions)

Detection rate (# of lesions)
Make your point
Make your point
Be careful with color
Be careful with color

Use color only if it adds to the message of your graph.
DETECTION RATE OF LESIONS USING THE TWO WONDERFUL NEW RADIOLOGICAL MACHINES RECENTLY PURCHASED BY OUR HOSPITAL

Detection rate (# of lesions)
Keep it simple
Keep it intuitive
Keep it intuitive
Be careful with error bars

- Standard deviation
- Standard error
- Range
- 95% CI
- Make sure to indicate in the caption what the error bars represent

Both upper and lower end of error bar should be shown
Follow PIA

Graphs/Illustrations: Graphs, illustrations, and drawings rendered in professional graphics programs should be submitted in Photoshop (.psd), TIFF (.tif), or encapsulated Postscript (.eps) format at 1200 dpi. Layers should be retained (i.e., do not “flatten” the image). If the graph or illustration was created in Excel or Word, we recommend that you submit the original file in the native format (.xls for Excel, .doc for Word), which can be rendered as high-resolution images by RSNA.

Color is acceptable for charts and graphs (see following illustrations). Owing to some printing constraints, however, colors may be altered at the discretion of our production staff. When applicable, color will be added to any chart or graph that has been submitted in black and white. Do not use patterns or textures; use of three-dimensional graphs is discouraged unless all three axes are needed to depict data. The following color palette (derived from Word and Excel) should be used:

- Lime
- Teal
- Indigo
- Plum
- Red
- Light Orange

Note that these are color names provided by Microsoft. In figure captions, more common names may be used (e.g., green rather than lime, blue rather than indigo). Symbols (e.g., circles, triangles, squares), letters (e.g., words, abbreviations), and numbers should be large enough to be legible on reduction to Radiology’s column widths. All symbols must be defined in the figure caption. If the symbols are too complex to appear in the caption, they should appear on the illustration itself, within the area of the graph or diagram, not to the side (samples below).
Follow PIA

- Every component must be defined in the caption
- Limit different types of symbols
- Indicate meaning of error bars
- No “patterns” or “texture”
- Use of 3D graphs discouraged
Bad example

- Unlabeled elements
- Different y-axes
- Cropped error bars
- Texture columns
- Unexplained intervals
- Missing units
Tips and tricks

- Make your point
- Be careful with color
- Keep it simple
- Keep it intuitive
- Be careful with error bars
- Follow PIA
Summary

- Graph: powerful element of manuscript
- Best used to show an illustrative summary of a finding, when showing ALL data is not necessarily required
- Requires same care than text and tables
- Following the PIAs will provide authors with guidance for creating high quality graphs
Publishing in Radiology: What You Always Wanted to Know and Never Asked