# Clear Communication

## Communication Overview

When preparing any type of report or presentation, clear communication is essential. This section focuses on communicating data through community health assessments. Community health assessments serve a variety of purposes, some of which involve persuading others to take a certain course of action. For example, a community health assessment can be used to "advocate for more resources" or "inform policy and program development."[1] Furthermore, assessment is one of the core public health functions. However, most of the recommendations presented in this course are applicable to any form of communication, including grants, newsletters, pamphlets, press releases, and presentations, among others. Whatever form is used, these clear communication strategies will make it easier for the intended message to reach the appropriate audience.

The audience must be the first consideration when preparing a community health assessment. Although a written report may be required by the Department of Health and Senior Services, the information contained in the assessment is also intended to be used internally by local public health agencies as well as by community organizations, decision makers, and local residents. This information may need to be presented differently to each of these separate groups. For example, a presentation to the general public should not include as many technical terms or advanced statistics as a presentation to medical practitioners or researchers.

Data presentation also depends on the type of data to be presented. Data can generally be described as either quantitative or qualitative. Quantitative data involve measurements, or numbers, whereas qualitative data involve non-numerical descriptions. Both types of data are important. For example, when studying diabetes in a community, an analyst might first want to use the Community Data Profiles or MICA to find numerical, or quantitative, data about diabetes. These data could include death, hospitalization, and ER visit rates related to diabetes. Quantitative data could also include data from other sources, such as the number of physicians who specialize in diabetes treatment.

However, the analyst would also want to consider qualitative data. These data could be gathered by interviewing diabetes patients to evaluate their treatment experiences or collect their suggestions for ways to improve diabetes education and prevention methods. Most of the examples in this course will deal with quantitative data, but qualitative data can be equally important. While quantitative data can help an analyst understand the extent of a problem, qualitative data are often necessary for understanding the reasons a problem exists and for finding ways to address the issue.

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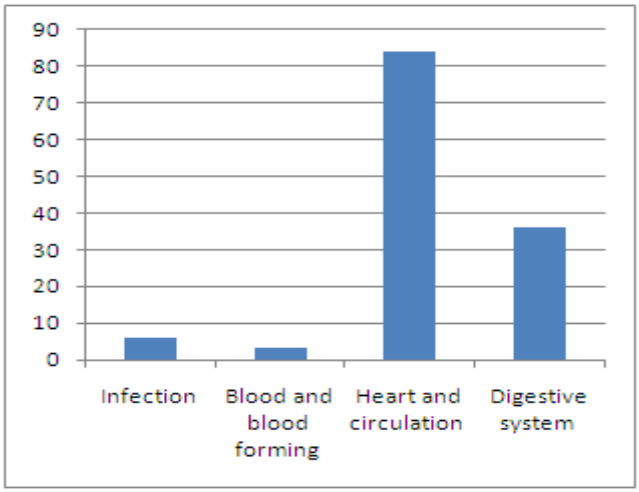
[1] Ballard J. *Basic concepts of data analysis for community health assessment: Analysis and interpretation of public health data, part I* [Online presentation]. Northwest Center for Public Health Practice; 2009. http://www.nwcphp.org/training/opportunities/online-courses/part-2-basic-concepts-in-data-analysis-for-community-health-assessment. Accessed October 27, 2017.

## Context

Both types of data require that context be provided so readers can fully understand the information. Otherwise, readers will be confused about the author's message. Consider the following examples:

| | |
|---|---|
| Infection | 6 |
| Blood and blood forming | 3 |
| Heart and circulation | 84 |
| Digestive system | 36 |




A reader can determine that the data in both the table and the chart are quantitative and relate to some type of health issue. Beyond that, readers have no idea what type of information the author is trying to convey. What do these data mean?

- Do these data represent causes of death, hospitalizations, emergency room visits, incidence, prevalence, or some other health issue?
- Do the numbers represent actual cases or some type of rate?
- What geographic area do the data cover?
- What time period is covered?
- Where did the author obtain this information?

Likewise, the following sentence, although it is a bit more specific, omits some critical information.

The rate of death from Alzheimer's disease is 21.2.

Although this sentence states that the number reported is a rate, it does not answer the following questions:

- What geographic area and time period does this rate cover?
- What is the constant for the rate – does the rate represent 21.2 deaths per 100 residents, per 1,000 residents, per 100,000 residents?
- Is the rate age-adjusted?

In addition to providing basic descriptive information, analysts must place data in the context of other data. For example, knowledge of Missouri's premature birth rate is only useful if that rate can be compared to the national rate, rates from other states, or rates for other conditions. Context can even require an understanding of data limitations. For instance, in the 2004-2008 time period, diabetes was listed as the underlying, or primary, cause of death for 7,273 persons in Missouri. It was listed as a contributing, or secondary, factor for 24,940 additional deaths. However, death data, such as those contained in the **Death MICA**, usually represent only the underlying, or primary, cause of death. Thus, statistics on deaths alone will not accurately reflect the extent (or prevalence) of a health condition. Data from a variety of other sources, such as hospitalization and emergency room records and surveys like the BRFSS (Behavioral Risk Factor Surveillance System), are needed in order to determine the full impact of a health condition in a community.

Without this contextual information, data are essentially meaningless. Readers cannot draw accurate conclusions or compare the data to data from other areas unless appropriate context is provided.

NOTE: The earlier table and chart use 2007 data for Clark County. These data were obtained from the **Inpatient Hospitalization MICA**. The numbers represent rates per 10,000 population. The page's narrative is fictional.

## Data Presentation

Data, particularly quantitative data, can be presented in several different formats. These formats include tables, charts, maps, and narrative. Each of these formats has strengths and weaknesses. When selecting the most appropriate format to use, an author must consider the needs of the audience as well as the message to be conveyed. Throughout this section, data from the MICA system will be used to illustrate the different presentation formats. Note that much of this data has been exported from MOPHIMS and customized in Excel.

**Tables** – Much of the information available in the Profiles and MICAs is presented in tabular form. Tables are useful for showing large amounts of numerical data "when precise values are needed."[2] For example, if the purpose is to provide the exact number of births for several different years and risk factor indicators, a table should be used. However, especially with large tables such as this one from **Birth MICA**, isolating patterns can be difficult.

**Missouri Resident Births**

| **Indicator:** | Birth Spacing: Less Than 18 Months | Birth Spacing: Less Than 18 Months | Prenatal Care Adequacy (Missouri Index): Inadequate | Prenatal Care Adequacy (Missouri Index): Inadequate | Smoked During Pregnancy: Yes | Smoked During Pregnancy: Yes | Weight for Height: Mother Overweight 20% or More | Weight for Height: Mother Overweight 20% or More |
|---|---|---|---|---|---|---|---|---|
| **Statistics:** | Count | Rate | Count | Rate | Count | Rate | Count | Rate |
| Year | | | | | | | | |
| 1990 | 6,303 | 13.76 | 13,750 | 17.76 | 19,540 | 24.81 | 16,709 | 22.04 |
| 1991 | 6,480 | 14.27 | 13,517 | 17.70 | 18,903 | 24.20 | 17,757 | 23.77 |
| 1992 | 6,188 | 14.00 | 12,494 | 16.88 | 17,725 | 23.42 | 18,272 | 25.35 |
| 1993 | 5,677 | 13.22 | 11,484 | 15.56 | 16,556 | 22.13 | 19,076 | 26.42 |
| 1994 | 4,921 | 12.02 | 9,646 | 13.43 | 15,111 | 20.71 | 19,463 | 27.66 |
| 1995 | 4,301 | 10.62 | 8,704 | 12.30 | 14,577 | 20.15 | 19,991 | 28.79 |
| 1996 | 4,413 | 10.67 | 8,517 | 11.92 | 14,409 | 19.66 | 21,416 | 30.44 |
| 1997 | 4,510 | 10.80 | 8,094 | 11.34 | 14,409 | 19.60 | 22,353 | 31.97 |
| 1998 | 4,476 | 10.51 | 8,041 | 10.92 | 14,309 | 19.09 | 23,644 | 32.82 |
| 1999 | 4,558 | 10.79 | 7,584 | 10.36 | 13,766 | 18.33 | 24,481 | 33.90 |
| 2000 | 4,657 | 10.77 | 7,596 | 10.31 | 13,955 | 18.34 | 25,735 | 35.19 |
| 2001 | 4,725 | 11.04 | 7,734 | 10.69 | 13,761 | 18.35 | 25,926 | 36.01 |
| 2002 | 4,566 | 10.72 | 7,705 | 10.69 | 13,607 | 18.19 | 26,417 | 36.89 |
| 2003 | 4,632 | 10.79 | 7,383 | 10.09 | 13,895 | 18.14 | 27,012 | 36.91 |
| 2004 | 4,877 | 11.24 | 7,490 | 10.08 | 14,083 | 18.21 | 28,155 | 38.22 |
| 2005 | 5,194 | 11.74 | 7,674 | 10.17 | 14,317 | 18.31 | 28,637 | 38.45 |
| 2006 | 5,497 | 12.10 | 8,201 | 10.61 | 14,946 | 18.44 | 29,832 | 38.96 |
| 2007 | 5,837 | 12.78 | 9,242 | 11.87 | 14,534 | 17.85 | 30,220 | 39.27 |
| 2008 | 5,742 | 12.75 | 9,150 | 11.90 | 14,212 | 17.63 | 30,334 | 39.91 |
| 2009 | 5,182 | 11.87 | 8,729 | 11.52 | 13,233 | 16.86 | 30,015 | 40.61 |
| 2010 | 5,258 | 12.64 | 11,895 | 16.83 | 14,335 | 18.86 | 30,280 | 40.24 |
| 2011 | 4,880 | 11.93 | 12,181 | 17.78 | 13,803 | 18.31 | 30,150 | 40.60 |
| 2012 | 4,922 | 11.92 | 12,507 | 18.39 | 13,507 | 18.05 | 30,427 | 41.10 |
| 2013 | 5,057 | 11.96 | 12,982 | 18.56 | 13,155 | 17.61 | 30,783 | 41.61 |
| 2014 | 5,203 | 12.06 | 14,204 | 20.16 | 12,454 | 16.71 | 31,212 | 42.11 |

[2] Miller, slide 8

Thus, the "zeal to convey all data in great detail needs to be tempered by the understanding that many readers have neither the interest nor the tolerance required to read and extract meaning from data presented in dense tables. Moving detailed tables to appendices or technical reports, for example, and keeping summary tables in the body of a report help to balance the competing demands for simplicity and detail."[3] The following example uses data from **Population MICA**.

## Appendix Version:

| | |
|---|---|
| **Data selected in addition to rows and columns below:** | None |
| **Year:** | 2015 |
| **Statistics:** | Count |
| **Age** | |
| Under 1 | 75,042 |
| 1 - 4 | 299,318 |
| 5 - 9 | 387,978 |
| 10 - 14 | 389,347 |
| 15 - 17 | 239,791 |
| 18 - 19 | 157,230 |
| 20 - 24 | 430,169 |
| 25 - 29 | 405,591 |
| 30 - 34 | 401,176 |
| 35 - 39 | 371,574 |
| 40 - 44 | 361,101 |
| 45 - 49 | 374,058 |
| 50 - 54 | 431,233 |
| 55 - 59 | 430,236 |
| 60 - 64 | 374,906 |
| 65 - 69 | 312,664 |
| 70 - 74 | 230,298 |
| 75 - 79 | 165,083 |
| 80 - 84 | 120,147 |
| 85 and Over | 126,730 |
| Total for selection | 6,083,672 |

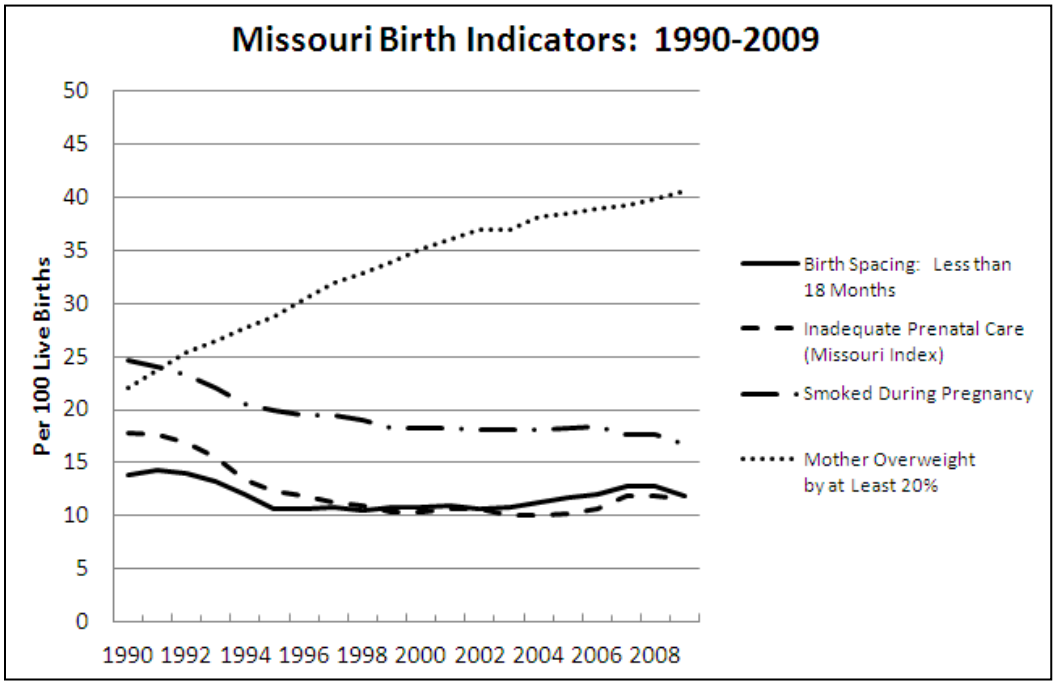
## Main Document Version:

| | |
|---|---|
| **Title:** | **Missouri Resident Estimated Population** |
| **Data selected in addition to rows and columns below:** | None |
| **Year:** | 2015 |
| **Statistics:** | Count |
| **Age** | |
| Under 15 | 1,151,685 |
| 15 - 24 | 827,190 |
| 25 - 44 | 1,539,442 |
| 45 - 64 | 1,610,433 |
| 65 and Over | 954,922 |
| Total for selection | 6,083,672 |

[3] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

**Charts** – Charts provide graphical representations of data. They can be used to illustrate patterns, although they may not always be able to present specific numbers. For example, if an author wanted readers to gain a general sense of which birth indicators are increasing or decreasing over time and how quickly those changes are occurring, they could present the data from the birth table in a line chart.

***Line Charts*** – Line charts are "useful for showing a long series of data and for comparing several data series."[4] They can be used to illustrate the direction and acceleration of change over time. "No more than five to six lines should be contained on a single graph."[5] A different color or line style must be used for each line.[6] Include a legend so that readers know what each line represents. The major drawback to using a line chart is that readers may not be able to determine the exact number or rate portrayed. For example, in the following line chart, derived using data from **Birth MICA**, readers can see general trends but cannot determine the exact number of births impacted by each of the risk factors.



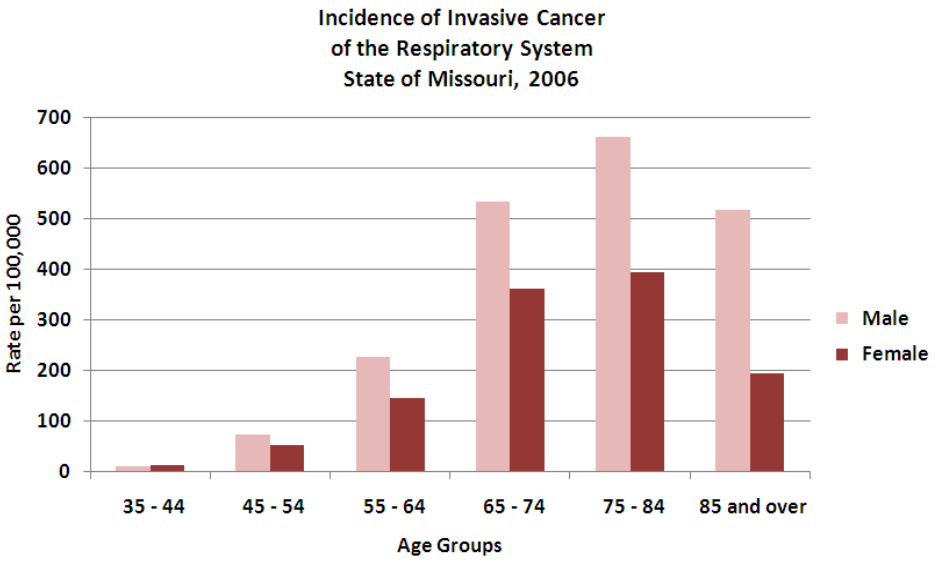

[4] Ballard J. *Basic concepts of data analysis for community health assessment: Presenting public health data* [Online presentation]. Northwest Center for Public Health Practice site; 2009. http://www.nwcphp.org/training/opportunities/online-courses/presenting-public-health-data. Accessed October 27, 2017.

[5] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

[6] Ballard J. *Basic concepts of data analysis for community health assessment: Presenting public health data* [Online presentation]. Northwest Center for Public Health Practice site; 2009. http://www.nwcphp.org/training/opportunities/online-courses/presenting-public-health-data. Accessed October 27, 2017.

***Bar Charts*** – Bar charts are "especially valuable for grouping multiple variables for easy comparison."[7] An important consideration when creating bar charts is to use colors or patterns that can be easily distinguished from one another.

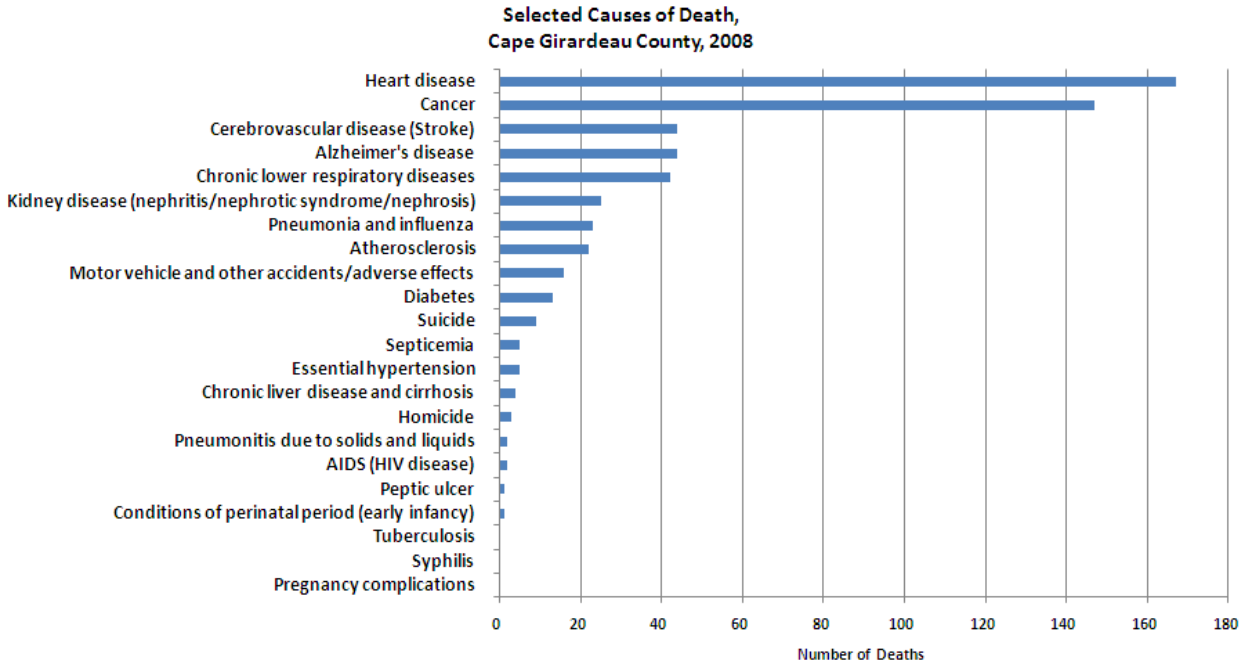
Vertical bar charts are sometimes called column charts. "The audience naturally associates left-to-right with the movement of time, [so] vertical bars work better than horizontal bars for time series data."[8] This principle also applies to other ordered variables, such as the age categories from **Cancer Incidence MICA**.




[7] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

[8] Strategic Communications. *Using charts*. https://web.archive.org/web/20130310125403/http://www.strategiccomm.com/usecharts.html. 1998. Accessed November 16, 2017.

"The horizontal format is useful when . . . many categories [are shown] because there is more room for the category labels."[9] Horizontal bar charts should also be used if categories have long labels, as many of the Causes from **Death MICA** do.[10] They are most effective when "comparing items at one point in time," and for "[ranking] variables from largest to smallest."[11]



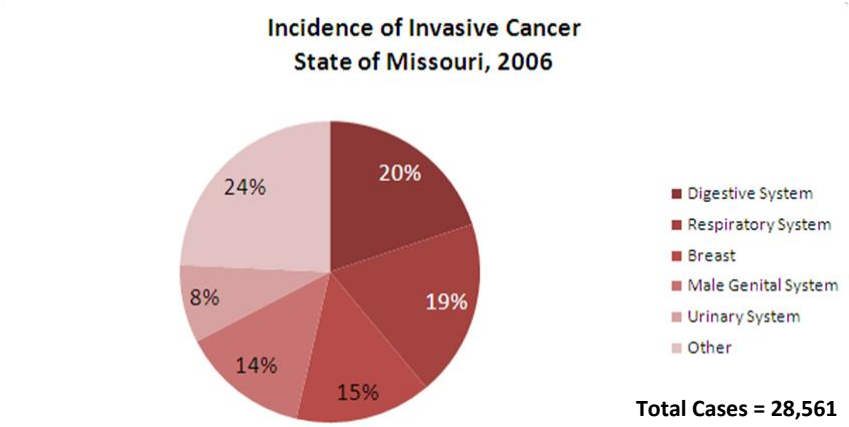

[9] Lane D. (Edited, Wang L.). *Graphing qualitative variables*. Rice University Openstax CNX. http://cnx.org/content/m10927/latest/. Last edited June 27, 2003. Accessed October 27, 2017.

[10] Ballard J. *Basic concepts of data analysis for community health assessment: Presenting public health data* [Online presentation]. Northwest Center for Public Health Practice site; 2009. http://www.nwcphp.org/training/opportunities/online-courses/presenting-public-health-data. Accessed October 27, 2017.

[11] Strategic Communications. *Using charts*. https://web.archive.org/web/20130310125403/http://www.strategiccomm.com/usecharts.html. 1998. Accessed November 16, 2017.

***Pie Charts*** – "Pie charts show proportional relationships. To be effective, pie charts should not have more than six slices, unless the key point to convey is fragmentation of the whole into numerous small segments."[12] "The 'slices' of the pie are percentages that add up to 100%."[13] The pie slices should always follow the same order used in the legend. This helps readers more easily determine which slice corresponds to which indicator.

In most cases, the largest slice should start at the "noon" position with each smaller slice following in clockwise fashion, as shown below using data from **Cancer Incidence MICA.** However, some data may require that the slices and legend follow a different order. For example, if a pie chart depicts income or age groups, both the legend and the slices should be placed in ascending order based on the group labels, as this order will be more logical to readers. In other words, the Under 1 age group should always appear before the 1-4 age group, even if the 1-4 age group comprises a larger slice of the pie. Regardless of the type of data portrayed, if an "other" category is used, it should always be the last piece of the pie.




Source: Adapted from MODHSS, Cancer MICA

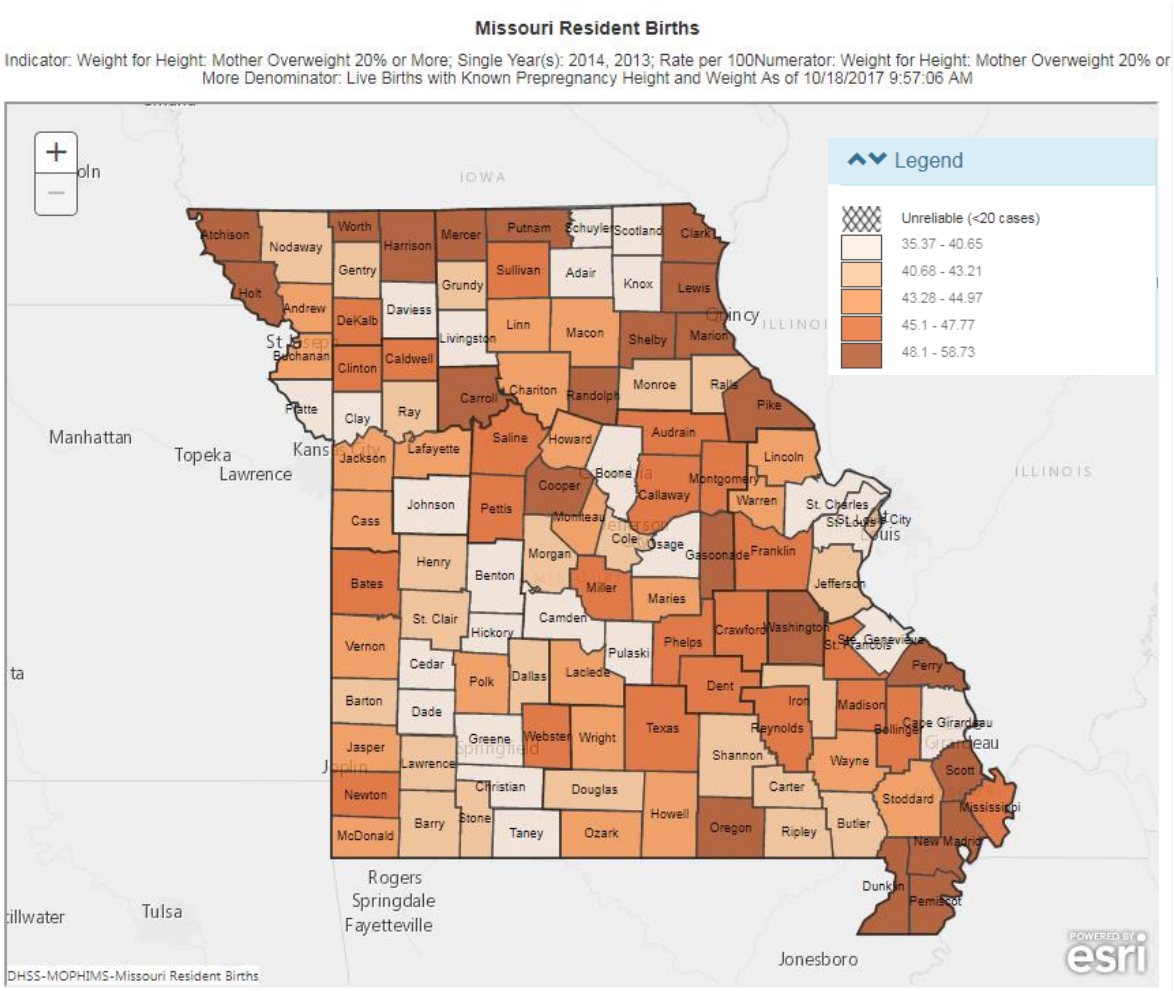
**NOTE: The total number of cases does not automatically appear on Excel pie charts. If needed, the Total Cases label must be added using a text box.**

[12] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

[13] Ballard J. *Basic concepts of data analysis for community health assessment: Presenting public health data* [Online presentation]. Northwest Center for Public Health Practice site; 2009. http://www.nwcphp.org/training/opportunities/online-courses/presenting-public-health-data. Accessed October 27, 2017.

**Maps –** Maps can also be used to display quantitative data graphically. In fact, some sources consider maps to be just another type of chart, a "geographic coordinate chart."[14] They are a "form of visual display of geographical or spatial patterns," as well as a "powerful tool for looking at clusters of diseases."[15] Different types of maps can be used to portray various kinds of data.

Many of the MICAs offer a mapping feature. MICA mapping options include quartile or quintile maps, in which the rates for all 115 counties in Missouri are sorted from highest to lowest and divided into four or five groups, respectively, and significance maps, which show whether each county's rate is statistically significantly different from the state rate. A quintile map using data from **Birth MICA** for the 2013-2014 time period follows.




[14] MODHSS (Missouri Department of Health and Senior Services). *Module V – Displaying and interpreting epidemiologic variables. Principles of infectious disease epidemiology* [Online course – outline]. http://www.health.mo.gov/training/epi/Mod5StudentOutline.pdf. Accessed October 27, 2017.

[15] Ballard J. *Basic concepts of data analysis for community health assessment: Presenting public health data* [Online presentation]. Northwest Center for Public Health Practice site; 2009. http://www.nwcphp.org/training/opportunities/online-courses/presenting-public-health-data. Accessed October 27, 2017.

Maps are useful for illustrating patterns based on location, but attempting to show too much information on a single map can obscure patterns rather than reveal them. Maps require many of the same considerations as charts, including the use of titles, legends, and distinguishable colors or patterns. The convention when creating shaded maps, such as the MICA map on the previous page, is to use a limited number of colors. "If you have fewer than five or six classes, use one color and vary the shade. Remember that most people can only distinguish up to seven colors. Most people also interpret [higher intensity shades] to mean 'more' or 'greater,' so assign the [most intense] shade to the highest class. . . If you have more than seven or eight classes, you may want to use a combination of colors and shades, using two or even three colors (blue to orange, or blue to green to yellow) to help distinguish the classes. Warm colors (red, orange, or yellow) are a good choice for the classes representing higher values since they highlight these values; cool colors (green, blue, or purple) can be used for lower values."[16] **Using a limited number of colors allows readers to determine at a glance which areas have the highest and lowest rates.** If multiple colors are used, readers will have to refer more frequently to the legend, and patterns may not be as obvious.

***Narrative* –** Viewing tables, charts, or maps allows readers to gain a general sense of data values and possibly data trends. However, none of these presentation formats explain why the data events occurred, and authors may wish to communicate messages that are not apparent at first glance. **Narrative**, or **text**, is the "easiest way to *explain* patterns."[17] The narrative portion of the community health assessment or other report provides the chance to interpret the data from a community.

**Example:** Following the trend of increased obesity in the state population as a whole, the percentage of births to Missouri resident mothers who are overweight by more than 20% nearly doubled (22.04% to 42.11%) from 1990 to 2014 (MODHSS, Birth MICA).

**Narrative, tables, charts, and maps can be used to accentuate each other and provide a more complete understanding of the data.** They should strategically reinforce the message being conveyed. Suppose a county wants to use an assessment report to advocate for additional funding to continue a successful health intervention program. A table or a graph could be used to show the prevalence of a particular condition or risk factor compared to other conditions or risk factors, illustrating the necessity of the program. Alternatively, a map could be used to compare the county's prevalence rate for the condition or risk factor to the rates in other counties. The narrative portion of the report could explain strategies used by the program, while another chart could graphically show a decline in the incidence or prevalence of the condition or risk factor since the program's inception. Each format reinforces the messages provided by the

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[16] Mitchell A. *The ESRI® guide to GIS analysis, volume 1: Geographic patterns & relationships*. Redlands, CA: Environmental Systems Research Institute, Inc.; 1999.

[17] Miller J. *Organizing data in tables and charts: Criteria for effective presentations* [PowerPoint slides and notes]. National Association for Public Health Statistics and Information Systems (NAPHSIS): https://naphsis-web.sharepoint.com/Pages/OrganizingdataintablesandchartsCriteriaforeffectivepresentation.aspx. Accessed October 27, 2017.

others. Furthermore, this "technique permits readers who rely on text and those who rely more on numbers [or graphics] to [all] have access to the material."[18]

## Citations

Whenever data are presented in a table, on a chart, or in narrative, the source must be cited. These citations are necessary for several reasons. First of all, citations can be extremely useful to the author of a report or presentation. They allow the author to document exactly when and where a source was accessed so that he or she can check for updates to the data at a later time. Furthermore, community health assessments and grants tend to be long-term projects. If the main author must be out of the office or moves on to a different position, citations can guide other staff members to appropriate source material.

Citations are also useful to readers. They allow readers to verify data that they may doubt. For instance, a concerned citizen may question the agency about a statistic that does not appear to match data from another source. With a citation, that reader and/or the author can locate the original source material to research possible differences in the collection, analysis, or interpretation of the data and determine the differences between the two sources. Thus, the use of citations can enhance readers' perceptions of the validity and reliability of a report. Citations can also lead readers to more in-depth information on specific topics that may interest them. For example, readers of this handbook can refer to the footnotes and the References section if interested in a particular topic covered in this course.

Perhaps most importantly, citations can help writers avoid charges of plagiarism. Plagiarism is "the uncredited use (both intentional and unintentional) of somebody else's words or ideas. . . A charge of plagiarism can have severe consequences, including . . . loss of a job, not to mention a writer's loss of credibility and professional standing."[19] A citation is necessary if another person's idea is used, even if it is restated and not directly quoted.

Several different style sheets exist, but BHCADD analysts use the American Medical Association (AMA) style to cite works published by our unit. Major peer reviewed public health journals require this style be used when submitting abstracts for potential publication. The AMA publishes manuals explaining AMA style and offers free brief tutorials and quizzes on its website, located at http://www.amamanualofstyle.com/.

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[18] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

[19] Stolley K., Brizee A., and Paiz J. M. *Overview and contradictions*. *Purdue University Online Writing Lab (OWL)*. http://owl.english.purdue.edu/owl/resource/589/01/. Last edited October 10, 2014. Accessed November 16, 2017.

BHCADD recommends that in-text citations of the Profiles and MICAs list the specific MICA or Profile as the specific item cited, followed by MOPHIMS as the name of the website. Bibliography entries should include the tool used as the specific item cited, MOPHIMS as the website used, the appropriate URL, and the date accessed.

***Profile in-text citation:***

A total of 95,514 Missouri children under the age of 6 were tested for lead poisoning in 2010.[1]

1. DHSS, Child Health Profile.

***Profile bibliography entry:***

Missouri Department of Health and Senior Services (DHSS). Child Health Profile. MOPHIMS (Missouri Public Health Information Management System). https://webapp01.dhss.mo.gov/MOPHIMS/ProfileBuilder?pc=1. Accessed October 11, 2017.

***MICA in-text citation:***

The death rate for Barry County residents decreased from 992.7 (per 100,000 residents) in 2008 to 800.1 in 2009.[2]

2. DHSS, Death MICA.

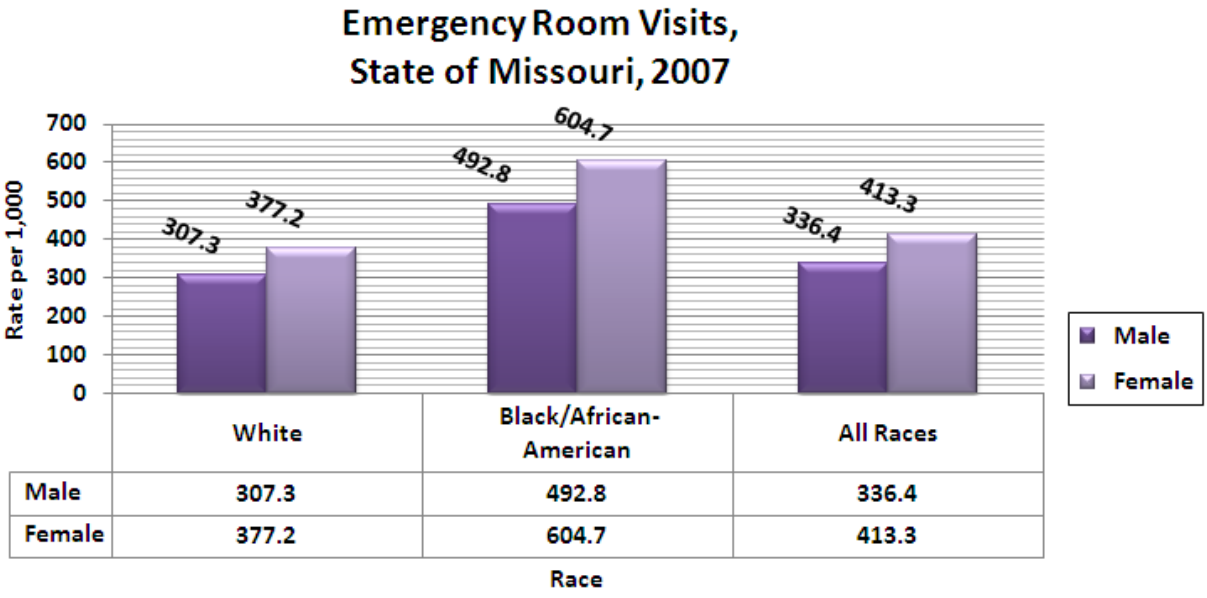
***MICA bibliography entry:***

Missouri Department of Health and Senior Services (DHSS). Death MICA. MOPHIMS (Missouri Public Health Information Management System). https://webapp01.dhss.mo.gov/MOPHIMS/QueryBuilder?qbc=DM&q=1&m=1. Accessed October 11, 2017.

## Formatting Tips

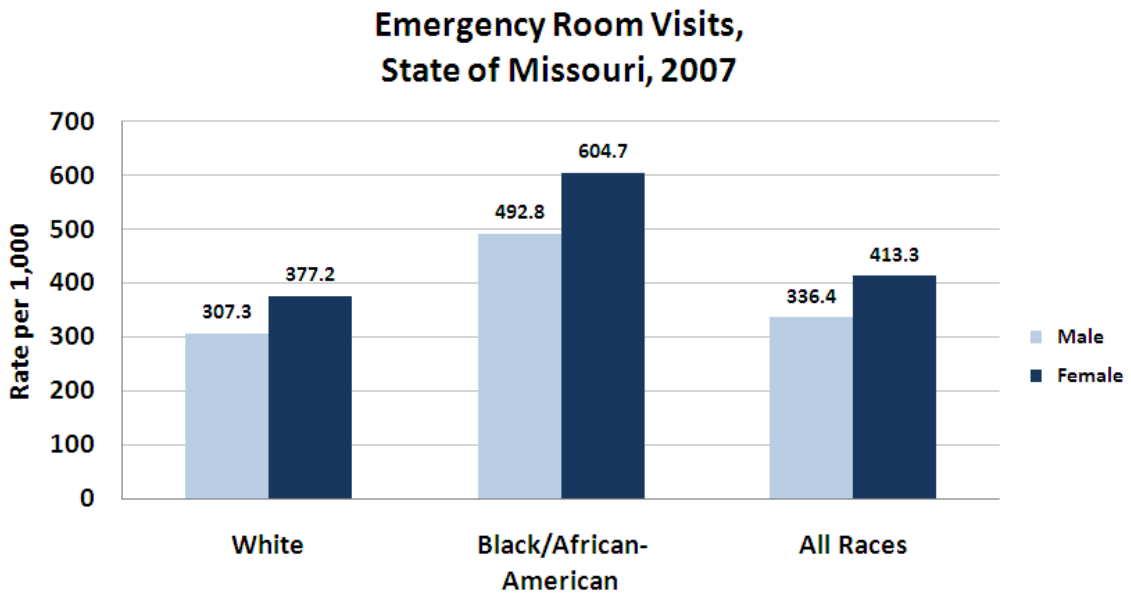
When using a chart, table, or map, "attempt to embed [it] within the text after, not before, the pertinent narrative. If this is not possible, place [it] on the next page following the narrative . . ."[20] At the very least, include a few lines of text introducing the item. Also, be sure to "choose the right format to display data."[21] When trying to show changes over time, a line graph may be more useful than a bar or a pie graph. Furthermore, "maximize ink devoted to the data themselves. In other words, focus on the information being conveyed, and not on elements such as labels, frames, gridlines, ticks, or other symbols. Minimize ink that does not depict the data."[22] For example, compare the following two charts and how well they convey the same **Emergency Room MICA** data.

*Formatting Example #1*




[20] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.
[21] Ballard J. *Basic concepts of data analysis for community health assessment: Presenting public health data* [Online presentation]. Northwest Center for Public Health Practice site; 2009. http://www.nwcphp.org/training/opportunities/online-courses/presenting-public-health-data. Accessed October 27, 2017.
[22] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

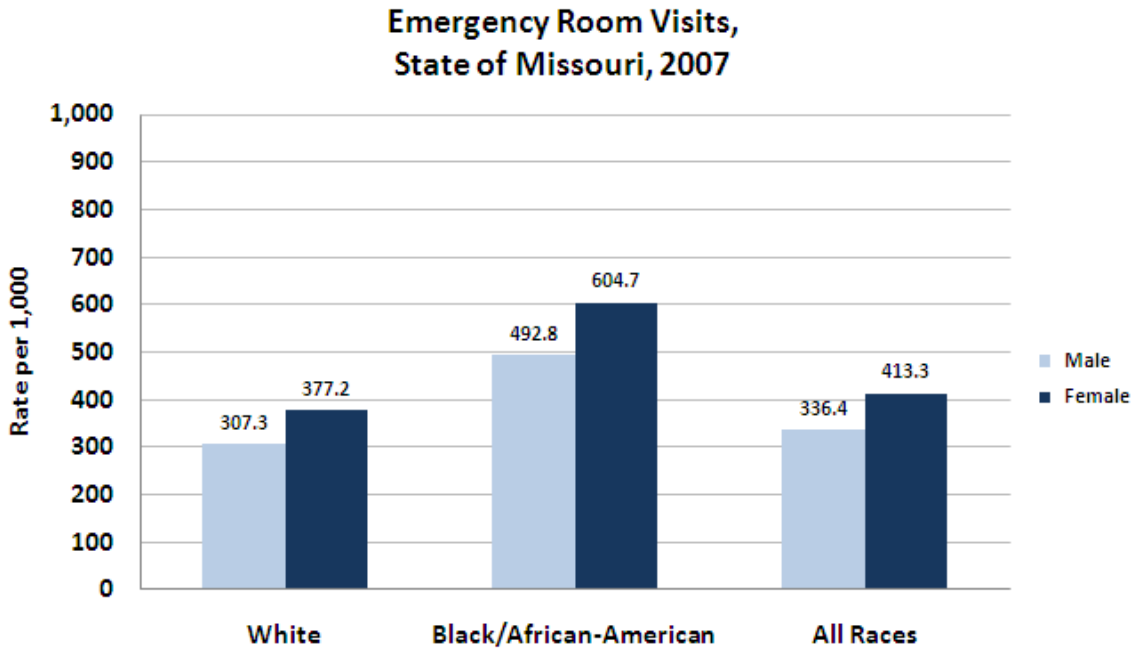
*Formatting Example #2*




The extra lines and labels on the first chart make it appear very busy. The second chart uses a much simpler design but instantly draws the reader's attention to the data being displayed. Furthermore, the table included in the first example is unnecessary. All of the data on the table are shown in the chart, and the point of using a chart is to graphically portray the data. However, both examples use data labels above the bars so that readers can determine exact rates. If the exact rates are listed in accompanying text, the data labels could be removed as well.

One of the most important aspects of a chart in terms of reader perceptions is the scale. Both the analyst and the reader must be aware that the scale used can have a major impact on the appearance of the graph. For example, in the two bar charts above, the horizontal axis scale ranges from 0 to 700. However, the horizontal axis label indicates that the constant used for these rates is 1,000. Although the chart accurately shows that there are differences between the racial groups portrayed, the scale may exaggerate the true prevalence of ER visits for all groups because the rates are graphically shown on a scale (0 to 700) that is smaller than the constant (1,000) actually used to calculate the rates. Compare Example #2 above to the chart on the next page, which uses a horizontal axis scale from 0 to 1,000.

*Formatting Example #3*

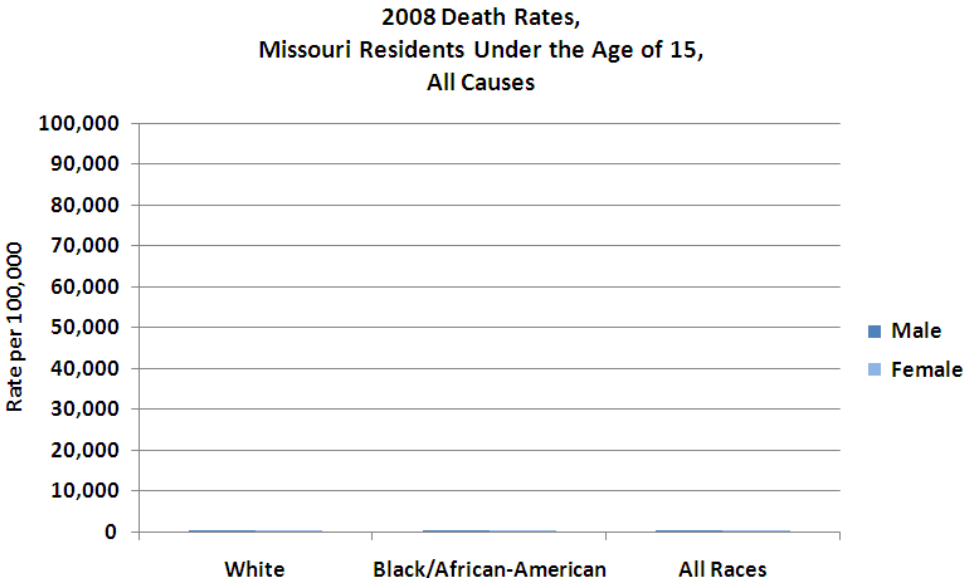



Here the differences between the racial groups are still clearly shown, but readers can more easily visually discern the prevalence of ER visits for each racial group. Many software programs, including Microsoft Excel, automatically set the scale based on the highest and lowest values entered in a table. Users may wish to manually adjust the horizontal axis scale to the appropriate constant.

**NOTE: If a series of charts is included in a document for comparison purposes, all charts in the series must use the same scale so that readers can make meaningful comparisons.**

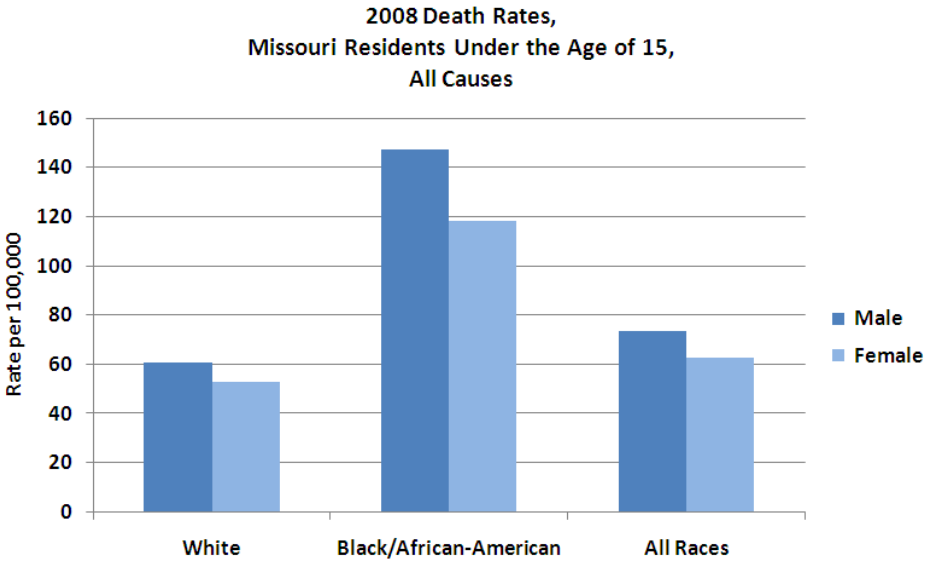
In many instances the use of the full constant on the scale may not be possible. For example, 100,000 is generally used as the constant for death rates, but the death rates for some causes of death and some populations are very small. Example #4 depicts death rates taken from **Death MICA** for Missouri residents under the age of 15. Even though all causes of death are included, the rates are still so small that, when shown on a scale of 0 to 100,000, the chart appears distorted and the reader learns little.

*Formatting Example #4*



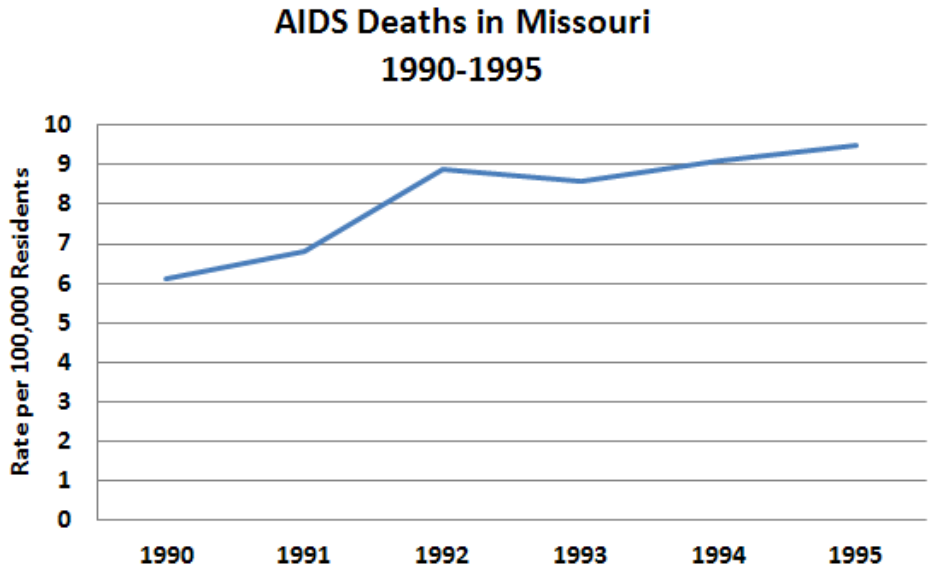

Thus, sometimes use of a maximum axis value that is less than the full constant will be most appropriate. Example #5 shows the same data as Example #4, but #5 uses a more reasonable scale, which allows readers to analyze the differences between the demographic groups. **These examples illustrate why appropriate axis labels, which must include the constant for rates, are critical.** Even though the maximum axis value does not equal the constant used in calculating the rates, readers can still determine the incidence because appropriate axis labels are used.

*Formatting Example #5*

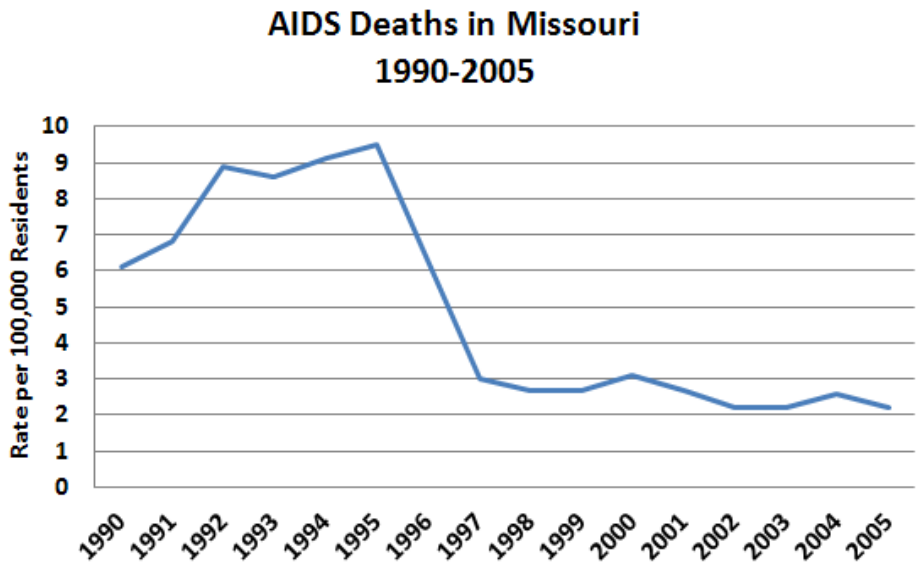


When gathering any type of data for analysis, an element that must be given careful consideration is the number of years of data to be used. This decision may have important ramifications for the interpretation of the data. For example, consider the different messages portrayed by the following two line charts displaying data from **Death MICA**.

*Formatting Example #6*




*Formatting Example #7*



The two charts depict the same data from the same source, but the use of only six years of data presents a different trend than the use of sixteen years of data. Thus, a writer must analyze the available data and make a fair assessment of which data should be included. Some knowledge of the data (i.e., collection, modification, or reporting issues) is often important in making this choice. **An author should not selectively include or exclude data to support a particular position.**

***Please note that the suggestions presented in this section are general guidelines only and that authors should always consider audience needs when preparing any form of communication.***

## Color

Color can be used to enhance tables, charts, maps, and even narrative but requires some additional thought. "The color wheel is the structured arrangement and relationship of hues, ranging in clockwise order—red, orange, yellow, green, blue and violet. Colors opposite each other—red and green, orange and blue, yellow and violet—are most complementary."[23] They are very effective at illustrating contrast. Colors adjacent to each other are analogous and are useful for illustrating unity.[24]

Source: Color Matters, http://www.colormatters.com/colortheory.html

However, keep in mind that many readers may suffer from some degree of color blindness, particularly red-green color blindness. To ensure that those readers can still understand the meaning of your reports and presentations, take the following steps: "Use high contrast colors; Code colors to support color blind users; Don't rely on hue differences alone, also use intensity differences."[25] If using patterns instead of colors, make sure that the pattern combinations do not cause "visual irritation."[26]

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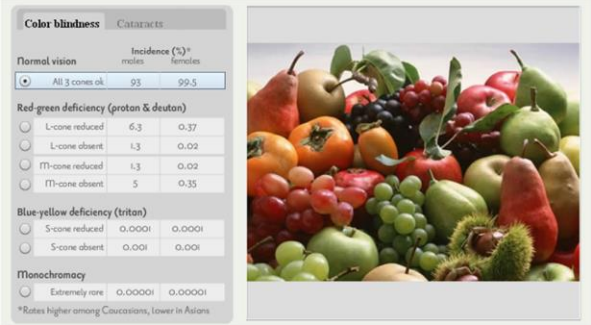
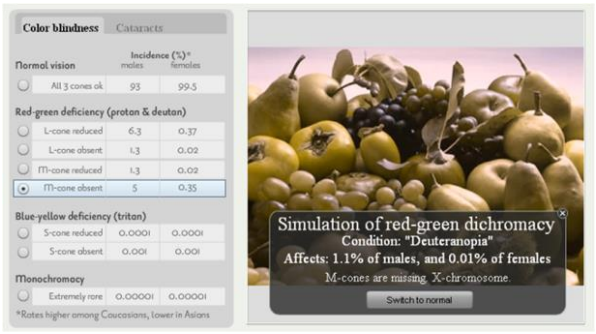
[23] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.
[24] Color Matters. (n.d.) *Color theory*. http://www.colormatters.com/colortheory.html. Accessed October 27, 2017.
[25] Ballard J. *Basic concepts of data analysis for community health assessment: Presenting public health data* [Online presentation]. Northwest Center for Public Health Practice site; 2009. http://www.nwcphp.org/training/opportunities/online-courses/presenting-public-health-data. Accessed October 27, 2017.
[26] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

Non-Color Blind Vision

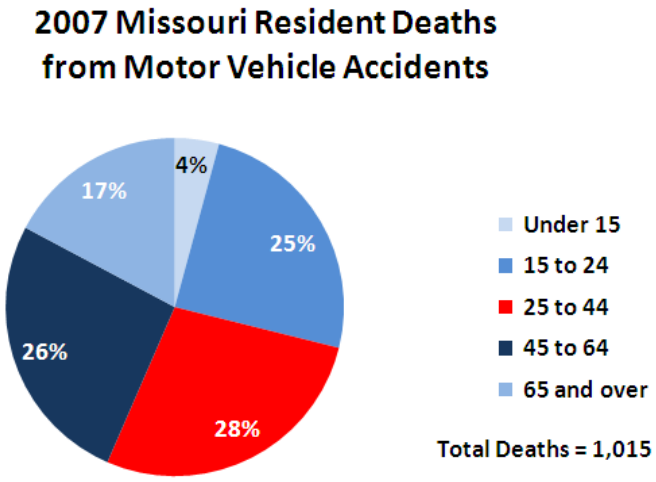



Color Blind Perspective




Source: Web Exhibits, http://www.webexhibits.org/causesofcolor/2.html

"Colors can be used very effectively to emphasize or convey meaning, as long as the use of color is compatible with convention. For example, the color red is associated with . . . monetary losses; conversely, the color green is associated with . . . monetary gains."[27] Use darker or bolder colors to indicate problem areas. For instance, on the following pie chart illustrating motor vehicle deaths by age group (taken from **Death MICA**), the largest slice is red. The remaining slices are all blue, but the largest of those slices is the darkest shade of blue, while the smallest slice is the lightest shade of blue.



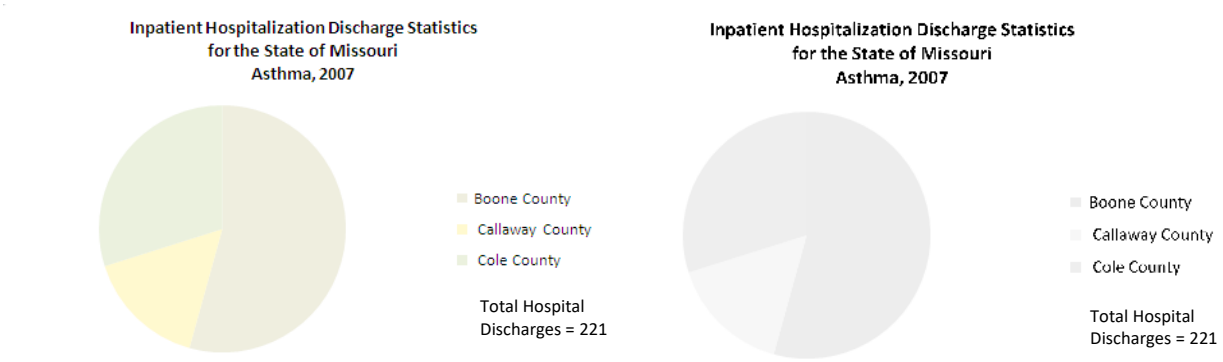

Color should almost always be used in presentations, especially now that presentation software such as Microsoft PowerPoint is readily available in most offices. "For many audiences, black and white presentations suggest a lack of professionalism and seem old fashioned, even if the

[27] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

content itself is exemplary."[28] When preparing printed reports, the cost of color printing must be weighed against the benefits gained by using color.

The 2010 and later versions of Microsoft Excel allow users to choose from several different color themes. Users can also create custom color themes and save them. This feature can be very useful if an organization wishes to match the colors of its logo or if a set of colors is determined to work well for usage in presentations and reports. Using "the same color scheme in all charts and tables in a set" makes publications look more professional.[29]

**When color is used, keep in mind that members of the audience may choose to print or copy the information using a black and white printer or copy machine.** "Confirm [that all] charts will be legible when printed in black ink."[30] Furthermore, color settings are not always consistent from monitor to monitor or from monitor to printer. Early in a project, before much time is spent designing a color scheme, print a few test pages in both black and white AND color and email the document to other users to see how the images appear when printed and when viewed on other computers. For example, if readers reprint the following pie chart in black and white, they will not be able to determine which slice of the pie corresponds to which county, and they may not even be able to distinguish between the different slices. The low intensity colors also may not appear clearly on all monitors, as evidenced by data from **Inpatient Hospitalizations MICA**.




[28] Bers T. H., with Seybert, J. A. *Effective reporting*. Tallahassee, FL: The Association for Institutional Research. 1999.

[29] Ballard J. *Basic concepts of data analysis for community health assessment: Analysis and interpretation of public health data, part I* [Online presentation]. Northwest Center for Public Health Practice; 2009. http://www.nwcphp.org/training/opportunities/online-courses/part-2-basic-concepts-in-data-analysis-for-community-health-assessment. Accessed October 27, 2017.

[30] Ballard J. *Basic concepts of data analysis for community health assessment: Analysis and interpretation of public health data, part I* [Online presentation]. Northwest Center for Public Health Practice; 2009. http://www.nwcphp.org/training/opportunities/online-courses/part-2-basic-concepts-in-data-analysis-for-community-health-assessment. Accessed October 27, 2017.

## Clear Communication Summary

The following checklist may be useful for preparing presentations and reports.

Basic Concepts of Data Analysis for Community Health Assessment

### Module 4: Presenting Public Health Data

# Best Practices Checklist

**Basic Design Concepts**

- ☐ Chart is legible when printed in black ink.
- ☐ Only one type face is used.
- ☐ No irrelevant data.
- ☐ No red/green combinations.
- ☐ No 3-D or perspective effects.
- ☐ Colored text and backgrounds have sufficient contrast.
- ☐ Colors emphasize data appropriately.

**Tables**

- ☐ Categories are sorted by size.
- ☐ Like items are clustered together.
- ☐ Row/column spacing is consistent.
- ☐ Extra information is placed in footer.
- ☐ Only necessary data is displayed.
- ☐ Same units are used for comparable data.
- ☐ Labels show exact values.
- ☐ No gridlines.

**Charts**

- ☐ Only necessary data is included.
- ☐ Same units are used for comparable data.
- ☐ Labels show exact values when necessary.
- ☐ No unnecessary gridlines.

**Line Charts**

- ☐ Only a few data lines are included.
- ☐ Intervals are consistent.
- ☐ Different color or pattern is used for each data line.
- ☐ Thin data lines are used where possible.

**Bar Charts**

- ☐ Bars/columns are labeled with the same kinds of terms.
- ☐ Column chart labels are short or text is rotated.
- ☐ Bar chart labels are right-aligned.
- ☐ Colors, shades, and patterns are used to distinguish categories.
- ☐ Grouped columns use darkest shading for the latest or most important data.
- ☐ Bar/column shading has enough contrast to distinguish categories from each other.
- ☐ No perspective or 3-D effects.

**Pie Charts**

- ☐ Slices are ordered large to small, starting at 12 o'clock.
- ☐ Small slices are combined into an "other" category.
- ☐ Slices are labeled and include their value.
- ☐ No perspective or 3-D effects.
- ☐ Colors, shades, and patterns are can be distinguished between adjacent slides.

**Maps**

- ☐ Colors, patterns, and shades are distinguish-able.
- ☐ A legend or key is included.
- ☐ Different colors/patterns are used for different categories.

Washington State Department of Health

Northwest Center for Public Health Practice

Source: Ballard J. *Basic concepts of data analysis for community health assessment: Analysis and interpretation of public health data, part*