Population Pyramids

Introduction

A **population pyramid** is a way to graphically illustrate the **age and sex distribution** of a population. This graphic representation then makes it very easy to see and understand the characteristics of that population in terms of its future growth potential.

Population pyramids are usually constructed using the percent of the population by gender in various age categories. A vertical axis represents 0% of the population and data for females is placed to the right of this axis and data for males is placed to the left of this axis. The age categories can be 1) narrow ranges of ages (such as 4 year increments), 2) broad ranges of age (such as 10 year increments), or 3) broad, general groupings such as "pre-reproductive age", "reproductive age", or "post-reproductive age".

Population pyramids that have a **broad base** are characteristic of a population that is growing rapidly and will continue to do so for some time because there are so many members of the population that have not yet entered their reproductive years. A population pyramid with a broad top and narrow base (inverted pyramid) is characteristic of a population the is declining in size and will probably continue to do so for some time because the vast majority of the population is beyond their reproductive years. A population pyramid with sides that are nearly **parallel** is characteristic of a population that is stable and undergoing little change in size because of the even distribution of the population amongst the age categories and reproductive stages of life.

To see examples of the three basic types of pyramids go to http://www.prb.org/pdf/threepatterns.pdf.

In this lab exercise, you will prepare population pyramids for three countries using Excel® software.

Materials

- Computer with printer
- Excel® software
- Internet access

Procedure

1. Go to http://www.prb.org/Content/NavigationMenu/PRB/Educators/LessonPlans/Pyramid_Building_Data_Table_Key1.htm

2. At this site you will find the age and sex distribution data for many countries, given as a percent of the population in four age categories (0-19, 20-39, 40-59, and 60+ years of age).

3. From this site, record in Table 1 the age and sex distribution data for Italy, the Democratic Republic of Congo, and Hungary. Please note that the countries are not listed in alphabetical order in this table (Italy is #4, Democratic Republic of Congo is #23, and Hungary is #36).

4. Open Excel® to a blank worksheet.

5. Enter cell labels as follows:
   a. cell A1 = Age Category
   b. cell B1 = % Male
   c. cell C1 = % Female
   d. cell A2 = 0-19 years
   e. cell A3 = 20-39 years
   f. cell A4 = 40 - 59 years
   g. cell A5 = 60+ years

6. rename this sheet "Italy"
   a. go to "Format"
   b. go to "Sheet"
   c. go to "Rename"
   d. type in "Italy"

7. copy this format to two additional sheets within the same spreadsheet
   a. highlight columns A through C on the Italy sheet
   b. click on "copy"

c. click on "Sheet 2" at bottom of screen
d. highlight columns A through C on the blank Sheet 2
e. click on "paste"
f. rename this sheet "Congo"
g. click on "Sheet 3" at bottom of screen
h. highlight columns A through C on the blank sheet 3
i. click on "paste
j. rename this sheet "Hungary"

8. Enter the data from Table 1 into your Excel® spreadsheet
   a. **IMPORTANT NOTE:** Enter the data for the **males** as **negative numbers**

9. You will now prepare three separate graphs, each of which will represent a population pyramid for one of the countries.

10. Preparing a population pyramid graph for **Italy**.
   a. highlight the data for males and females as well as the cell labels on the Italy sheet (highlight cell A1 through cell C5).
   b. Click on "insert"
   c. Click on "chart"
   d. Select "bar" from "chart type"
   e. Select "clustered bar" from "Chart sub-types"
   f. Click on "next"

g. The window "Chart Wizard - Step 2 of 4..." will appear, click "next" at the bottom

h. The window "Chart Wizard - Step 3 of 4..." will appear. Enter the following:
   - Chart title: enter "**Figure 1. Population Pyramid for Italy**"
   - Category (x) axis: enter "**Age Category**"
   - Value (y) axis: enter "**% Population**"
   - Click "next" at the bottom of the screen

i. The window "Chart Wizard - Step 4 of 4..." will appear.
   - Click on "As new sheet"
   - In the box to the right, type "**Italy Pyramid**"
   - Click "finish" at bottom of screen and a new screen with the graph will appear

11. Final formatting of the graph.

   a. **right click** on the central vertical axis and then select "format axis"

   b. click on the "Patterns" tab
      - under "Major tick mark type" select "none"
      - under "Minor tick mark type" select "none"
      - under "Tick mark labels" select "low"
      - click "ok" at bottom of screen

c. click on one of the bars on the female side of the graph and then select "format data series"
   - click on the "options" tab
   - to the right of "Overlap", type in "100"
   - to the right of "Gap width", type in "0"
   - click "ok" at the bottom of the screen

d. **right click** on the horizontal axis and then select "format axis"
   - click on the "Number" tab
   - under "Category", select "Custom"
   - under "Type", delete anything that appeared there automatically and then type in "0;0" (that is zero, semicolon, zero, without the quote signs)
   - click "ok" at the bottom of the screen

e. **right click** on the background of the graph and select "format plot area"
   - under "area" select the "white" square (lower right corner)
   - click "ok" at the bottom of the screen

12. Preparing a population pyramid graph for **Congo**.

   j. highlight the data for males and females as well as the

cell labels on the Congo sheet (highlight cell A1 through cell C5).

k. Click on "insert"

l. Click on "chart"

m. Select "bar" from "chart type"

n. Select "clustered bar" from "Chart sub-types"

o. Click on "next"

p. The window "Chart Wizard - Step 2 of 4..." will appear, click "next" at the bottom

q. The window "Chart Wizard - Step 3 of 4..." will appear. Enter the following:
    - Chart title: enter "**Figure 2. Population Pyramid for the Democratic Republic of Congo**"
    - Category (x) axis: enter "**Age Category**"
    - Value (y) axis: enter "**% Population**"
    - Click "next" at the bottom of the screen

r. The window "Chart Wizard - Step 4 of 4..." will appear.
    - Click on "As new sheet"
    - In the box to the right, type "**Congo Pyramid**"
    - Click "finish" at bottom of screen and a new screen with the graph will appear

13. Final formatting of the graph.

f. **right click** on the central vertical axis and then select "format axis"

g. click on the "Patterns" tab
    - under "Major tick mark type" select "none"
    - under "Minor tick mark type" select "none"
    - under "Tick mark labels" select "low"
    - click "ok" at bottom of screen

h. click on one of the bars on the female side of the graph and then select "format data series"
    - click on the "options" tab
    - to the right of "Overlap", type in "100"
    - to the right of "Gap width", type in "0"
    - click "ok" at the bottom of the screen

i. **right click** on the horizontal axis and then select "format axis"
    - click on the "Number" tab
    - under "Category", select "Custom"
    - under "Type", delete anything that appeared there automatically and then type in "0;0" (that is zero, semicolon, zero, without the quote signs)
    - click "ok" at the bottom of the screen

j. **right click** on the background of the graph and select "format plot area"
- under "area" select the "white" square (lower right corner)
- click "ok" at the bottom of the screen

14. Preparing a population pyramid graph for **Hungary**.

s. highlight the data for males and females as well as the cell labels on the Hungary sheet (highlight cell A1 through cell C5).

t. Click on "insert"

u. Click on "chart"

v. Select "bar" from "chart type"

w. Select "clustered bar" from "Chart sub-types"

x. Click on "next"

y. The window "Chart Wizard - Step 2 of 4..." will appear, click "next" at the bottom

z. The window "Chart Wizard - Step 3 of 4..." will appear. Enter the following:
- Chart title: enter "**Figure 3. Population Pyramid for Hungary**"
- Category (x) axis: enter "**Age Category**"
- Value (y) axis: enter **"% Population**"
- Click "next" at the bottom of the screen

aa. The window "Chart Wizard - Step 4 of 4..." will appear.
- Click on "As new sheet"
- In the box to the right, type "**Hungary Pyramid**"
- Click "finish" at bottom of screen and a new screen with the graph will appear

15. Final formatting of the graph.

k. **right click** on the central vertical axis and then select "format axis"

l. click on the "Patterns" tab
- under "Major tick mark type" select "none"
- under "Minor tick mark type" select "none"
- under "Tick mark labels" select "low"
- click "ok" at bottom of screen

m. click on one of the bars on the female side of the graph and then select "format data series"
- click on the "options" tab
- to the right of "Overlap", type in "100"
- to the right of "Gap width", type in "0"
- click "ok" at the bottom of the screen

n. **right click** on the horizontal axis and then select "format axis"
- click on the "Number" tab

- under "Category", select "Custom"
- under "Type", delete anything that appeared there automatically and then type in "0:0" (that is zero, semicolon, zero, without the quote signs)
- click "ok" at the bottom of the screen

o. **right click** on the background of the graph and select "format plot area"
  - under "area" select the "white" square (lower right corner)
  - click "ok" at the bottom of the screen

16. Printout each of the three population pyramids you have constructed and attach them to your lab write-up. **NOTE**: You **do not** have to do the printout in color. Black and white printouts are fine.

17. **IMPORTANT NOTE**: You must also **email your entire Excel® spreadsheet** to your lab instructor who may check your work in the spreadsheet as well.

Population Pyramids LAB WRITE-UP: Submit pages 7-8

Student Name: **Lab Date:**

Lab Instructor: **Section #:**

Results (Data)

Table 1. Male and female population as percent of total population by four age categories for Italy, the Democratic Republic of Congo and Hungary.

	Population							
	% Male				% Female			
Age Category (years) ® Country ⁻	0 to 19	20 to 39	40 to 59	60+	0 to 19	20 to 39	40 to 59	60+
Italy								
Dem. Rep. of the Congo								
Hungary								

Table 2. Excel® spreadsheet of male and female population as percent of total population by four age categories for Italy, the Democratic Republic of Congo and Hungary.

Email your ExcelÒ spreadsheet (containing data and graphs) to your lab instructor

Figure 1. Population pyramid for Italy.

Attach printout of ExcelÒ graph

Figure 2. Population pyramid for the Democratic Republic of Congo.

Attach printout of ExcelÒ graph

Figure 3. Population pyramid for Hungary.

Attach printout of ExcelÒ graph

Conclusions (Questions): *For full credit, these questions should be answered thoroughly, in complete sentences, in legible handwriting.*

1. Describe the shape of your population pyramid for Italy. What does this shape tell you about the current and future growth of the population of Italy and how does this growth potential relate to the age and sex distribution?

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2. Describe the shape of your population pyramid for the Democratic Republic of Congo. What does this shape tell you about the current and future growth of the population of the Democratic Republic of Congo and how does this growth potential relate to the age and sex distribution?

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3. Describe the shape of your population pyramid for Hungary. What does this shape tell you about the current and future growth of the population of Hungary and how does this growth potential relate to the age and sex distribution?

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