

# Human Population—Changes in Survival

## Objectives

1. Understand differences in human mortality and survivorship between historic and modern times.
2. Understand how changes in human mortality and survivorship have influenced population growth.

*Safety considerations:* There are no specific safety considerations in this exercise.

## Introduction

The survival rate of humans in North America has increased significantly in the past 100 years. Improved nutrition, preventive medicine, life-style changes, and new technologies are a few of the reasons for this improved life expectancy. Increasing life expectancies have had impact on population growth rates. Put simply, there are more of us and we are living longer. In Rome during the first to fourth centuries the expectation of life was about 22 years at birth. Today the expectation is approximately 75 years at birth in North America. Of particular note is the decline in infant and youth mortality in North America during the past 100 years.

## Procedures

1. Record the age at death for males and females in your community who died before the year 1900.
2. Using the obituary page from your local newspaper, record the age at death for males and females in your community who died during the past five years.
3. Enter the data on the data sheet.
4. Plot the data on a graph (survival curve) for both males and females for the two time periods.
5. Analyze the data and the reasons for change.

## Directions

You will obtain two sets of data giving numbers of deaths in your community by age. The first set, representing vital statistics of your region in pre-1900 historic times, will be obtained from one or more graveyards. The second set, representing current mortality figures, will be obtained from the obituary section of your local newspaper.

In order to prevent duplication of data, discuss in class what cemeteries are to be included in your study. Try to prevent the same cemetery (or section of a cemetery) from being counted more than once. Each student should record as many gravestones as necessary to give a total class sample of at least 100 males and 100 females. If you wish to do this exercise on an individual basis you need not have such a large sample. Using the pre-1900 data sheet, record your entries for both males and females.

Use the data sheet and obtain information on the deaths of 100 males and 100 females representing current deaths from the obituary page of your local newspaper over the past five years.

To determine a survival curve use the following method. Since you have data on 100 pre-1900 males, 100 pre-1900 females, 100 current males, and 100 current females, you can determine the number surviving to each age for each of the four groups by using the following technique.

### EXAMPLE

Age at death (years)	Number dying	Number surviving
0	0	$100 - 0 = \underline{100}$
0-0.99	10	$100 - 10 = \underline{90}$
1-4.99	15	$90 - 15 = \underline{75}$
5-9.99	12	$75 - 12 = \underline{63}$

Plot the underlined numbers on the graph.

Use these data to graph a survival curve for each of the four groups:

pre-1900 females

pre- 1900 males

current females

current males

Use different-colored pens or pencils to record each of the sets of data on the graph on the data sheet.

Name \_\_\_\_\_

Section \_\_\_\_\_

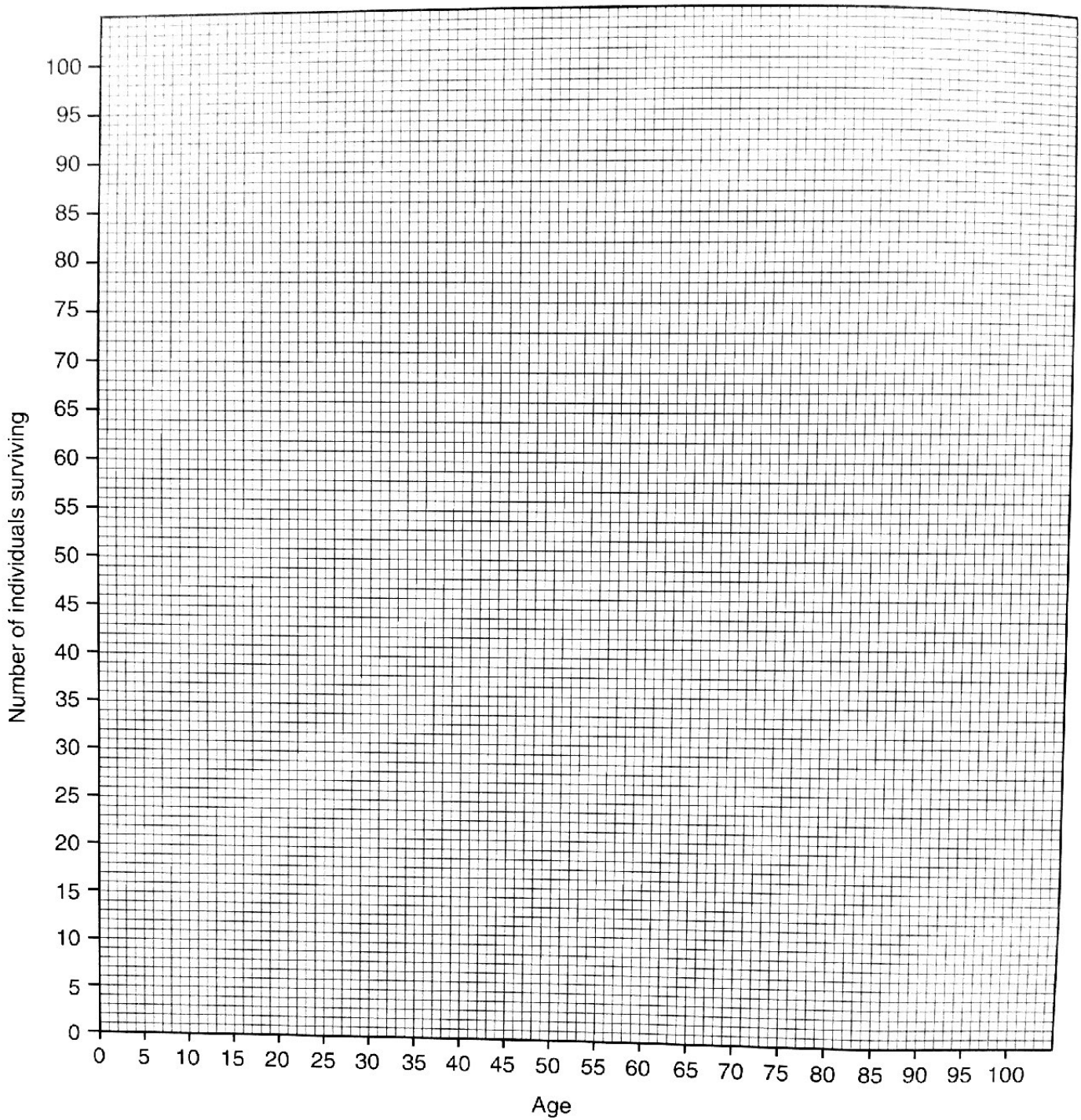
## Human Population—Changes in Survival Data Sheet

### Cemetery:

Age at death (years)	Male	Female
0- 0.99		
1- 4.99		
5- 9.99		
10-14.99		
14-19.99		
20-24.99		
25-29.99		
30-34.99		
35-39.99		
40-44.99		
45-49.99		
50-54.99		
55-59.99		
60-64.99		
65-69.99		
70-74.99		
75-79.99		
80-84.99		
85-89.99		
90-94.99		
95-99.99		
100+		

### Obituary:

Age at death (years)	Male	Female
0- 0.99		
1- 4.99		
5- 9.99		
10-14.99		
14-19.99		
20-24.99		
25-29.99		
30-34.99		
35-39.99		
40-44.99		
45-49.99		
50-54.99		
55-59.99		
60-64.99		
65-69.99		
70-74.99		
75-79.99		
80-84.99		
85-89.99		
90-94.99		
95-99.99		
100+		



1. What accounts for the difference in the four curves?
  
2. What do you think the curves would look like in the next century? What factors could influence the curves?