Name: _____ Instructor: _____

Tracking the AIDS Epidemic in the United States

▶ ACTIVITY 1: MAPPING THE DIFFUSION OF AIDS

A. To start your activity, log onto the *Human Geography in Action* Web site or insert your CD into your computer.

B. Select this chapter from the drop-down list, and then click on *Computerized Chapter Activities.*

C. Click on *Activity 1: Mapping the Diffusion of AIDS.*

On the map of the United States, you can visualize the diffusion of the AIDS epidemic across the country by changing the year with the slider bar below the map. You will be mapping the rate of AIDS cases per 100,000 population reported from 1986 to 2003, an 18-year span. Each metropolitan area appears on the map when it exceeds the threshold of 100 cases per 100,000 people. All metro areas are highlighted with a black diamond in the first year they appear and then convert to a blue square for subsequent years. Metro area names can be identified by "mousing over" the black diamonds in the year they appear. Notice that for the first year, 1986, only the metro areas of New York and San Francisco appear. They were the only two metro areas with more than 100 AIDS cases per 100,000 people in that year.

At any time, you can click on the *Population* icon to turn on a graduated circle map of metropolitan area populations, in green. You may also click on *AIDS Rate/100,000 People* to see graduated circles in red that change from year to year as the AIDS rate of each metro area changes.

You need to consider many geographical factors as you study the maps and graphs of the spread of AIDS in the United States. First, the most vulnerable populations (homosexuals and intravenous drug users) are not equally distributed throughout the United States but tend to be more prevalent in certain kinds of locations. Second, as you saw in Chapter 2, regional cultures differ across the United States. Third, cultural differences can be related to the size of a place. Fourth, you must consider the amount and types of movement of people between the initial source regions and secondary places, keeping in mind that once AIDS has spread to a new place, the new place becomes a potential source region. Unfortunately, the data tell us only where AIDS appears, not which places infected which other places.

D. With the entire U.S. map visible, slide the bar back and forth to see the diffusion through U.S. metro areas across the 18-year time span.

E. Click on *Top 15 Metro Regions*. The boundaries of the 15 most populous metropolitan regions in the United States in 1990 (see box) are highlighted in red. See whether there is a relationship between when a metro area passes the 100-cases-per-100,000-people level and whether it is in one of the largest metropolitan regions of the urban hierarchy.

As each metro area appears, determine whether it is within one of the 15 largest metropolitan regions.

Metropolitan areas are functional regions defined and ranked by the U.S. Census Bureau. They are composed of a central "downtown" or "nucleus" county plus all surrounding nonagricultural counties that are connected to the nucleus via intercounty commuting patterns. Cities such as Atlanta that have only one central nucleus are defined as a standard metropolitan statistical area (MSA). Sometimes metropolitan areas overlap with each other and merge together. The Census Bureau recognizes these cases by defining *consolidated metropolitan statistical areas* (CMSAs) that are made up of smaller component metro areas called *primary metropolitan statistical areas* (PMSAs). For instance, the New York CMSA in 1990 was made up of 15 PMSAs stretching from the Monmouth–Ocean, NJ, PMSA to the New Haven, CT, PMSA (see Chapter 10 for more information about census-defined metropolitan areas).

The Top 15 layer shows MSA or CMSA boundaries (which we call *metropolitan regions*), and the dots that appear on the map represent the central cities of MSAs or PMSAs (which we call *metro areas*). Boundaries for 1990 are shown because they are most representative of conditions during the crucial early stages of diffusion.

1.1. How many metro areas of each population level are *added* to your map in *each* year? (The first two rows are already completed to guide you.)

Year	Number of *New* Metro Areas Appearing on Map *within* the Top 15	Number of *New* Metro Areas Appearing on Map *not within* the Top 15	Total Number of *New* Metro Areas Appearing on the Map (add the two columns to the left)
1986	2	0	2
1987	1	0	1
1988			
1989			
1990			
1991			
1992			
1993			
1994			
1995			
1996			
1997			
1998			
1999			
2000			
2001			
2002			
2003			

1.2. In the table on the previous page, does the sequence of small and large metro areas over time provide evidence for hierarchical effects in the diffusion of AIDS? Explain.

1.3. Miami, Florida, had a 1986 population of 1,769,500. Seattle, Washington, had a 1986 population of 1,751,100. Seattle crossed the 100-per-100,000 threshold in 1991; Miami did so in 1988. Why did Miami have such a high early rate of AIDS? (*Hint*: Refer to Figure 3.10.)

1.4. San Francisco, California, had a 1986 population of 1,588,000. San Jose, California, had a 1986 population of 1,401,600. Both are part of the Bay Area CMSA (ranked #5). San Jose crossed the 100-per-100,000 threshold in 1993, and San Francisco did so in 1986. Why did San Francisco have such a high early rate of AIDS?

1.5. Go back to the national map and move the time slider slowly back and forth. Do you see any particular barriers blocking AIDS diffusion or pathways promoting it?

1.6. In Question 1.1 you should have found several metro areas not within the Top 15 that appeared on the map between 1986 and 1990. Go back to the national map and identify them, and write their names here.

1.7. At first glance it might seem that these smaller metro areas with early high rates of AIDS do not fit the hierarchical diffusion pattern of big cities first and small cities later. What is it about the locations of the metro areas in Question 1.6 that might explain their earlier-than-expected AIDS outbreaks? (Going back to look at Figure 3.5 might help you.)

F. When you have finished the activity, proceed to *Activity 2* to continue. Otherwise, *exit* from the CD or *log out* from the Web page. Don't forget your CD if you are using one.

Name: _____ Instructor: _____

Tracking the AIDS Epidemic in the United States

▶ ACTIVITY 2: AIDS RATES AND DISTANCE FROM INITIAL CENTERS

AIDS diffusion prior to 1986 is not well documented, but we know that concentrations of reported AIDS cases in the early 1980s were in New York, Los Angeles, and San Francisco. Other early centers of AIDS cases included Miami, Houston, and Denver. Here we examine the relationship between the AIDS rate and distance from three regional source cities: New York, Miami, and San Francisco. Select the metro area that is closest to your college or that is assigned by your instructor and answer questions about the relationships you see.

A. To start your activity, log onto the *Human Geography in Action* Web site or insert your CD into your computer.
B. Select this chapter from the drop-down list, and then click on *Computerized Chapter Activities.*
C. Click on *Activity* 2: *AIDS Rate and the Distance from Initial Centers.*
D. Click on the metro area you wish to examine: *New York*, *San Francisco,* or *Miami.*

▶ DISTANCE FROM THE INITIAL CENTERS

You can now see a scatter diagram that plots the AIDS rate in 1986 against distance from New York City (or Miami or San Francisco, depending on your choice) for 46 nearby metropolitan areas. A *scatter diagram* depicts the relationship between two variables. One variable (distance) is measured on the *x*-axis (horizontal), and another (AIDS rate) is measured on the *y*-axis (vertical). The placement of the dots tells you the *x* and *y* values for the place in question (see Figure 3.13). As you move the cursor around, red crosshairs that move along the *x*- and *y*-axes show you the *x* and *y* values of the tip of the cursor arrow. Try "mousing over" any of the dots to see a temporary window with the name of the metro area the dot represents, the population, and the distance from the source city (*x*) and AIDS rate (*y*) for that metro area. The scatter diagram is a "scatter" of these dots, which show groupings or trends in the relationship between the two variables. Note that the source city (New York), at distance = 0, is on the *y*-axis.

A best-fitting, smoothed blue curve through this scatterplot shows the general trend in the relationship between the AIDS rate and distance. A horizontal red line shows the 100-AIDS-cases-per-100,000-population threshold above which metro areas appeared on the map in Activity 1.

E. Slowly move the slider to the right to see the graph interactively change over an 18-year time period. Pay attention to how the graph changes, particularly the line of best fit.

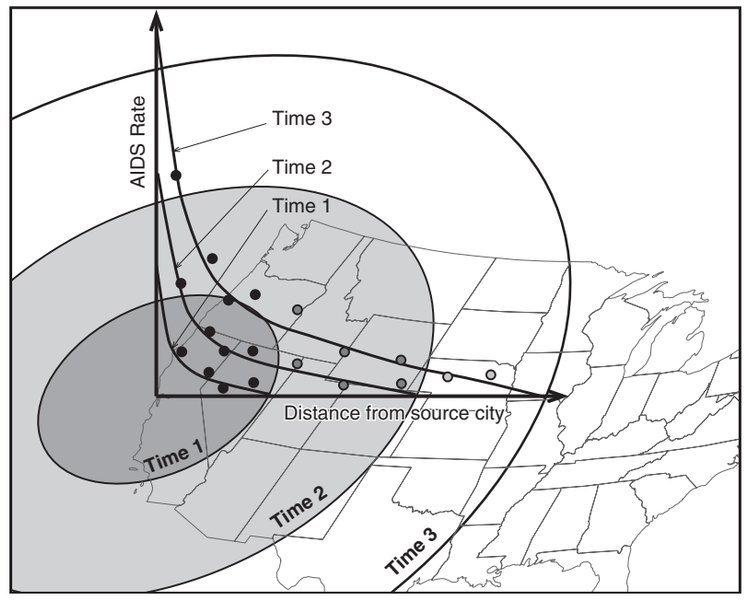


Figure 3.13 The graph shows the typical downward-sloping scatterplot of AIDS rates versus distance from a source node (in this case, San Francisco) and the associated line of best fit. The graph is superimposed over a diagram of contagious diffusion spreading like a wave (which is overlaid on a map of the United States). As time increases, more cities become adopters (or cross the threshold of AIDS rates) at farther distances.

2.1. Look at changes in the *height* of the curve. What has happened to the rate of AIDS for most of these metro areas over the 18-year interval?

2.2. Move the slider all the way to the right-hand side so that the graph stops at 2003.

(a) What is the relationship between the rate of AIDS and distance from your initial source metro area in 2003?

(b) Does the graph provide evidence of spatially contagious diffusion?

(c) How much scatter is there around your best-fitting curve?

2.3. Metro areas that fall farthest from the best-fitting curve are termed *outliers* because they deviate from the general trend. Click on the outliers in the graph to see their names and populations. What factors might explain why some metro areas have a much higher AIDS rate than expected given their distance from New York (or Miami or San Francisco) while others are far below the trend? You could go back and look at the population layer on the diffusion map in Activity 1 to help answer this question.

F. When you have finished the activity, proceed to *Activity 3* to continue. Otherwise, *exit* from the CD or *log out* from the Web page. Don't forget your CD if you are using one.

Name: _____ Instructor: _____

Tracking the AIDS Epidemic in the United States

▶ ACTIVITY 3: *S*-CURVES

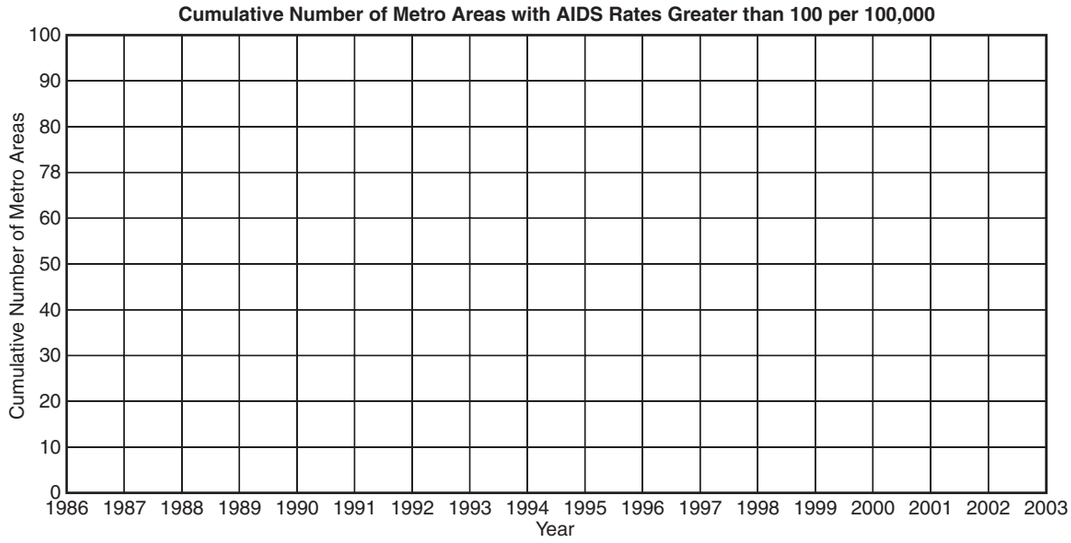
In most diffusion processes, the number of cases follows an *S*-shaped curve (Figure 3.2). Growth is usually slow at first because only a few people and places adopt the new idea or catch the new disease. Growth then accelerates as the idea or disease spreads rapidly. Finally, growth slows down again as the susceptible population approaches the saturation point. In Activity 3 you will make one *S*-curve by hand and look at others on your computer screen to see how well AIDS diffusion fits the model.

A. Return to Question 1.1 in Activity 1 and copy the last column into the middle column of the table below.

Year	Number of New Metro Areas Added Each Year	Cumulative Number of Metro Areas
1986	2	2
1987	1	3
1988		
1989		
1990		
1991		
1992		
1993		
1994		
1995		
1996		
1997		
1998		
1999		
2000		
2001		
2002		
2003		

B. In the last column, calculate the cumulative number of metro areas that have passed the 100-cases-per-100,000-persons threshold for each year. The cumulative number is the running total of the added metro areas each year. The first two entries are already filled in to get you on the right track.

C. On the following graph paper, plot the cumulative number of metro areas surpassing the AIDS threshold for each year. The *y*-axis of the graph goes to 100. Note that 98 metro areas with a population over 500,000 people were included in this study.



3.1. Figure 3.2 (page 64) shows transition points on the diffusion *S*-curve that define three stages: innovators, majority adopters, and laggards (late adopters). Based on the shape of your graph in Step C, what year marks the end of the innovator stage and beginning of the majority adopter stage?

3.2. Based on the shape of your graph in Step C, in which year (if any) did the majority adopter stage end and the laggard stage begin? Why did you pick this year (or why did you not pick any)?

D. To start your activity, log onto the *Human Geography in Action* Web site or insert your CD into your computer.

E. Select this chapter from the drop-down list, and then click on *Computerized Chapter Activities.*

F. Click on *Activity 3:* S-*Curves.*

G. A map of the United States will be visible, showing all metropolitan areas with populations over 500,000. "Mouse over" any metro area to see its name, and click on any metro area to see its *S*-curve. The variable on the *y*-axis is different than in the graph you just made by hand. The graph on the screen shows the actual AIDS rate in the metro area. As such, it is possible for the AIDS rate to go down as AIDS patients die. If the rate is seen to be increasing, it means that new cases are increasing even faster than AIDS patients are dying.

H. Click on your metro area or the one closest to where you live.

The Centers for Disease Control, which collects the data graphed here, updated the definition of AIDS several times as more was learned about the disease. The greatest change began with the 1993 data, when the 23 clinical conditions in the previous definition were extended to include HIV-infected persons with CD4+ T-lymphocyte counts of less than 200 cells/μL or a CD4+ percentage of less than 14 (a measure of a compromised immune system), and persons diagnosed with pulmonary tuberculosis, recurrent pneumonia, and invasive cervical cancer (three opportunistic diseases seen among AIDS patients). Other changes were implemented in 1987 and 1994. State reporting requirements have also varied across this time period, and the CDC estimates that reporting of AIDS cases in the United States is now more than 85 percent complete.

3.3. Based on the shape of your metro area's graph, in which year did the transition from innovator to majority adopter occur?

3.4. Has the AIDS rate for your metro area leveled off (entered into laggard stage) or even declined? If so, when?

I. Click *Print*.

J. When you have finished the activity, *exit* from the CD or *log out* from the Web page. Don't forget your CD if you are using one.