



Understanding Telephone Penetration in Pennsylvania



A Report Prepared for
the Council for Utility Choice

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Table of Contents

List of Tables..... ii

List of Figures..... ii

Executive Summary..... ES-1

Introduction..... 1

 The Telephone is an Essential Service..... 3

 The Absence of Telephone Service in Low-Income Households..... 4

 Factors that Appear to be Related to the Absence of Telephone Service..... 5

 Data Sources for this Study..... 6

Overview of Telephone Penetration in Pennsylvania 8

 State-Level Summary 8

 County-Level Summary..... 11

 The Role of Religion in the Use of Telephone Service in Pennsylvania..... 13

 County-Level Data Adjusted for Religion..... 13

 Areas in Pennsylvania with Low Telephone Penetration Rates..... 14

Identifying Who Doesn't Have Telephone Service in Pennsylvania..... 18

 Comparing Low-Penetration Areas to Other Areas 18

 Regression Analysis..... 20

Focus on Philadelphia..... 24

 Comparing Low-Penetration Neighborhoods to Other Neighborhoods 24

 Regression Analysis..... 26

Conclusions..... 28

References 30

List of Tables

Table 1: Telephone Penetration Rates in Pennsylvania Counties..... 12

Table 2: Counties with 1 Percent or More of Population Old Order Amish
and/or Old Order Mennonite..... 15

Table 3: Concentration of Households Without Telephone Service..... 16

Table 4: Factors that Explain Level of Telephone Penetration in Census Tracts
in Non-Amish/Mennonite Counties, Excluding Philadelphia..... 22

Table 5: Factors that Explain Level of Telephone Penetration in Census Tracts
in Philadelphia 26

List of Figures

Figure 1: Percentage of Households with Telephone Service in March of Each Year 1

Figure 2: Telephone Penetration Rates in Pennsylvania in March 2000, FCC/
Current Population Survey vs. Census 2000 2

Figure 3: Percent of U.S. Population Experiencing Selected Hardships in 1995..... 3

Figure 4: Telephone Penetration Rates in U.S. by Selected Characteristics,
November 2001 5

Figure 5: Characteristics of Pennsylvania Households Without Telephone Service 8

Figure 6: Telephone Penetration Rates in Pennsylvania, by Race / Hispanic Origin 9

Figure 7: Telephone Penetration Rates in Pennsylvania, by Age of Householder..... 10

Figure 8: Telephone Penetration Rates in Pennsylvania, by Tenure and Poverty..... 10

Figure 9: Telephone Penetration Rates in Pennsylvania Counties 11

Figure 10: Telephone Penetration Rates in Pennsylvania Counties, Adjusted for
Old Order Amish and Old Order Mennonite 14

Figure 11: Number of Census Tracts with Telephone Penetration Rates Under 95%..... 17

Figure 12: Comparison of Low-Penetration Census Tracts in Philadelphia with
Low-Penetration Census Tracts in Non-Amish/Mennonite Counties..... 25

Executive Summary

The purpose of this study is to better identify and understand those households in Pennsylvania that lack telephone service. Data from the 2000 census are analyzed to locate the portions of Pennsylvania that are likely to contain households without telephone service, and to determine if such areas have common characteristics.

In April 2000, Pennsylvania had 4.78 million households, of which 65,680 did not have telephone service at the time of the census, or 1.4% of all households. More specific analysis of the census data reveals:

- ◆ Households headed by a person **age 15-24** are **3 times** more likely than the average household to lack telephone service
- ◆ **African-American** households are **3 times** more likely than white, non-Hispanic households to lack telephone service
- ◆ **Renters** are **4 times** more likely than owners to lack telephone service
- ◆ **Hispanic** households are **5 times** more likely than white, non-Hispanic households to lack telephone service
- ◆ Households in **poverty** are **6 times** more likely than households not in poverty to lack telephone service
- ◆ **Renters in poverty** are **13 times** more likely than owners not in poverty to lack telephone service

The level of telephone penetration varies by county – ranging from 99.5% of households in Bucks County to 96.5% in Mifflin County. Overall, 15 counties in Pennsylvania have telephone service in at least 99% of their households. Four counties – Crawford, Juniata, Mifflin, and Snyder – have telephone service in fewer than 97% of their households.

To understand the reasons why households lack telephone service in Pennsylvania, it is necessary to account for households that lack telephone service for religious reasons, particularly the Old Order Amish and Old Order Mennonite sects. According to a nationwide survey of religious organizations, in 2000 Pennsylvania had more than 25,000 people who were identified as Old Order Amish, and another 12,000 who are Old Order Mennonite. Using data from a study of the presence of telephone service in such households, it can be estimated that between 6,500 and 9,000 Pennsylvania households lack telephone service for religious reasons.

As a result, it is necessary to adjust the telephone penetration data from the 2000 census to account for religion. All of the counties that had telephone penetration rates below 97% before the adjustment have religion-adjusted rates in excess of 97%. The resulting rates range from 97.3% in Snyder County to 100.0% in Lancaster County.

There are between 55,000 and 60,000 households across Pennsylvania that lack telephone

Understanding Telephone Penetration in Pennsylvania

service for non-religious reasons. Those households tend to be concentrated in certain communities. In order to understand the geographic distribution of households without telephone service – and to try to focus on certain characteristics that might explain the lack of telephone service – data were analyzed for each census tract in Pennsylvania.

One analysis focuses on 90 census tracts, located outside of Philadelphia, which are all of the census tracts that have telephone penetration rates below 95%. These census tracts represent 3.6% of the census tracts in these portions of Pennsylvania, and they account for just 2.6% of the population, but they contain 17% of the households that do not have telephone service. In these 90 census tracts, 7.3% of the households lack telephone service, while in all other census tracts only 0.9% of the households did not have telephone service.

These 90 low-penetration census tracts are very different from the remainder of Pennsylvania, as shown in the following comparisons:

- ◆ **Poverty rate** in low-penetration areas is **3 times higher** than the poverty rate in the remainder of Pennsylvania
- ◆ Percentage of households receiving **Supplemental Security Income** is **3 times higher**
- ◆ Percentage of households receiving **public assistance** is **4 times higher**
- ◆ **Unemployment rate** is **2 times higher**
- ◆ Percentage of **renters** is **2 times higher**
- ◆ Percentage of **young householders** (age 15-24) is **2 times higher**
- ◆ Percentage of **African-American householders** is **6 times higher**
- ◆ Percentage of **Hispanic householders** is **10 times higher**

Regression analyses were performed to determine if there is a statistically significant correlation between various household characteristics and the telephone penetration rate in the census tract. The analysis found that the following characteristics showed a statistically significant relationship to the level of telephone penetration in a census tract:

- ◆ Percent of people in households with incomes below the poverty level
- ◆ Percent of households receiving Supplemental Security Income
- ◆ Percent of households receiving public assistance
- ◆ Percent of households occupied by renters
- ◆ Percent of householders age 15-24
- ◆ Percent of householders age 65 or older
- ◆ Percent of Hispanic householders

The insignificance of the race of the householder is noteworthy. Several studies, including the FCC's periodic reports on telephone penetration rates, highlight the differences between African-American and white households. Statistical analysis of the 2000 census data for Pennsylvania, however, indicate that this relationship is not "real" in a statistical sense. Rather, the data are showing that race isolated from other household characteristics is not related to telephone penetration rates. That is, African-American households are no more or less likely to have telephone service than white households, when other factors (such as poverty status, age, and tenancy) are held constant. It appears, therefore, that data showing that African Americans are less likely to have telephone service are really measuring differences in poverty and tenancy between African-American and white households. When those factors are measured directly, race does not appear to be a factor in the presence of telephone service.

A similar analysis for Philadelphia also was conducted. Approximately 15,000 Philadelphia households lack telephone service, which is 2.5% of all households in the city. This compares with just 1.1% of households in the other non-Amish-Mennonite counties that lack telephone service.

Philadelphia has 368 census tracts, of which 66 (18%) have telephone penetration rates below 95%. In comparison, only 3.6% of census tracts in the non-Amish-Mennonite counties had penetration rates below 95%. In fact, Philadelphia has roughly the same percentage of census tracts with low penetration rates as is found in the Amish-Mennonite counties (which have about 17% of census tracts with penetration rates below 95%).

Philadelphia census tracts with low penetration rates have very similar characteristics to low-penetration census tracts in the remainder of Pennsylvania. One potentially important difference is that the percentage of Hispanic households is not a statistically significant indicator of telephone penetration in Philadelphia, while it was in the rest of the state. This result is particularly surprising because of the concentration of Hispanic households in the low-penetration census tracts in the city. This may call into question the hypothesis that there are cultural differences that make Hispanic households less likely to have telephone service than other households, all else being equal.

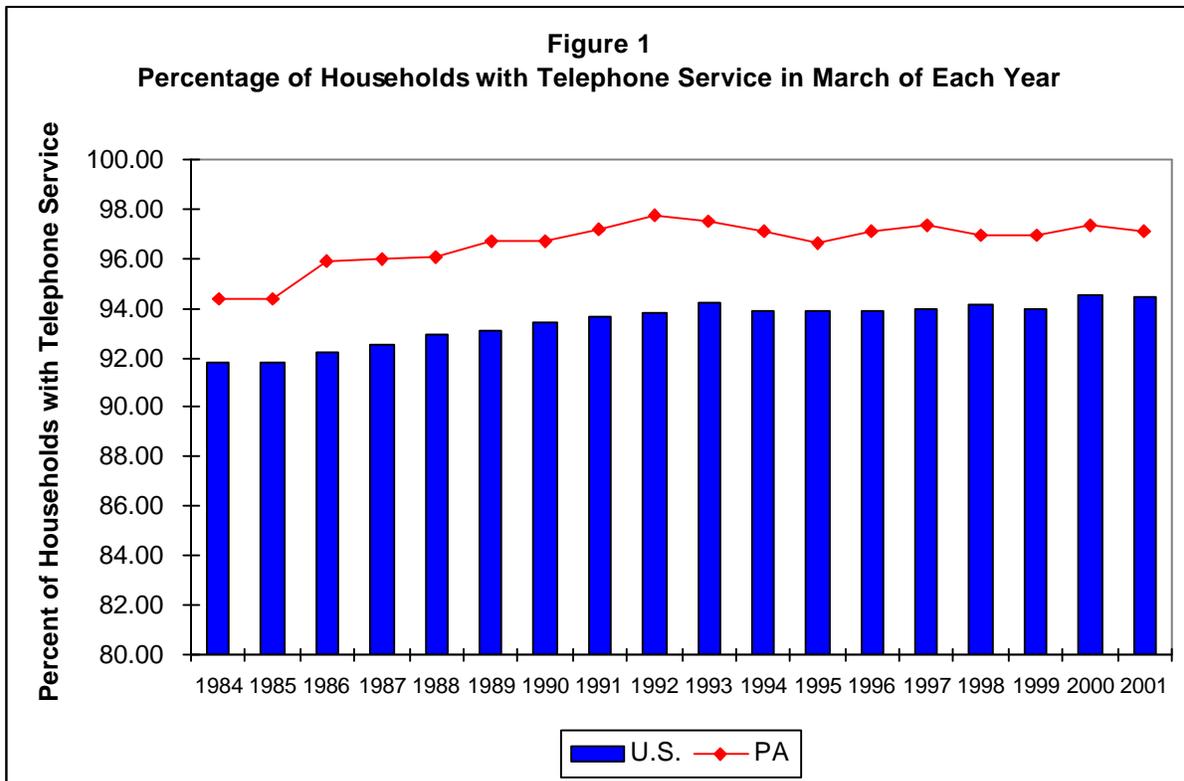
Among the conclusions reached in this report are some cautions for Pennsylvania's policy analysts and decision makers. They should be wary of relying on the FCC's periodic telephone penetration reports. The FCC data are derived from a survey that has only about 2,000 respondents in Pennsylvania; in contrast, the census data analyzed here are based on a survey of approximately 800,000 Pennsylvania households. Comparing the FCC data for March 2000 with the data from the 2000 census collected in April 2000 shows that the FCC data understate the level of telephone penetration in the state by approximately 1.25 percentage points. That is, rather than having over 120,000 Pennsylvania households without telephone service, as one might infer from the FCC's reports, the census shows that the number is only one-half as large – less than 66,000 Pennsylvania households without telephone service. Moreover, the analysis of religious survey data shows that approximately 10-15% of those households lack telephones for religious reasons.

Introduction

One of a family's most basic needs is telephone service. In fact, telephone service is becoming so essential that many low-income families are cutting back on food and medical care in order to keep the telephone connected.

Even after cutting back on other essential services, though, not every low-income family succeeds in keeping telephone service. The Federal Communications Commission (FCC) reports that, as of November 2001, 5.1% of households in the United States did not have telephone service. Low-income households are far more likely than higher-income households to lose their telephone service. The FCC reports that more than 20% of households with incomes below \$5,000 per year lacked telephone service.

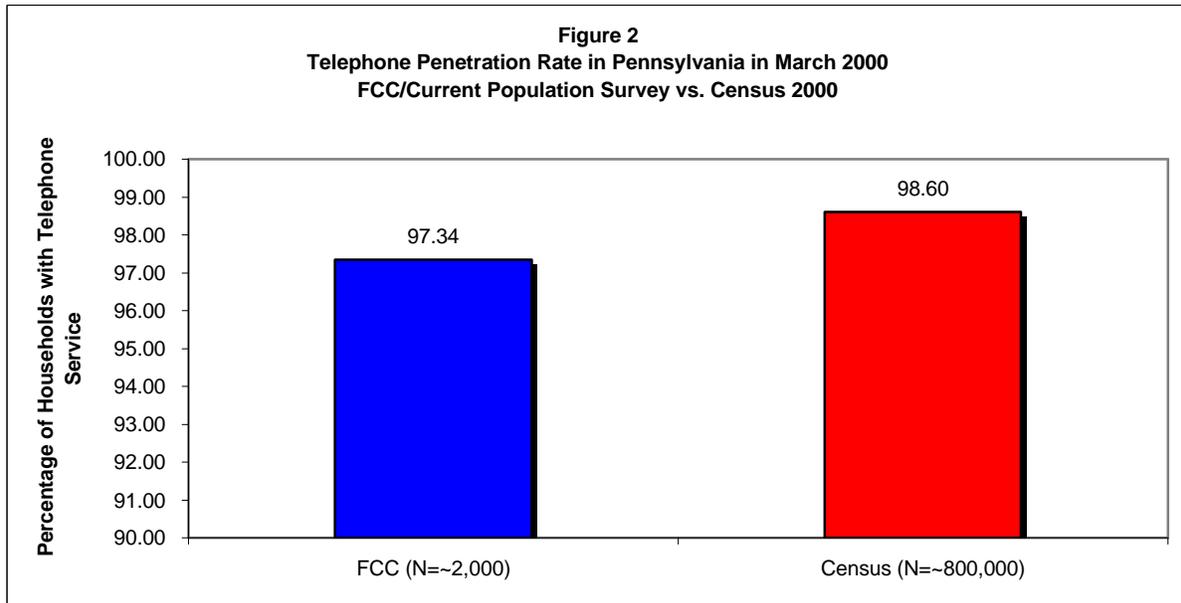
The FCC also reports that 97.0% of Pennsylvania households had telephone service in 2001. This is the sixth-highest level of telephone penetration in the country. It also represents an improvement from 1984 (when the FCC began collecting these data) when only 94.4% of Pennsylvania households had telephone service (which ranked ninth-best in the country). See Figure 1.



The FCC's data, though, are based on a relatively small, statistical sample. In Pennsylvania, only 2,000 households are questioned in the FCC's survey. Thus, there is some uncertainty about the appropriateness of relying on the FCC's survey, particularly at the state level, to make

Understanding Telephone Penetration in Pennsylvania

policy decisions. Indeed, data collected during the 2000 census, from approximately one out of every six households in the United States, indicate that Pennsylvania's telephone penetration rate is 98.6% - more than 1.25 percentage points higher than the FCC's estimate. See Figure 2.



Moreover, because of the relatively small size of the FCC's survey, no reliable data are available from that survey at the county or municipal level. With Pennsylvania's mix of urban and rural areas, and the very different characteristics of its urban areas – ranging from Philadelphia to much smaller cities like Allentown, Erie, and Scranton – statewide statistics are of limited use to policymakers and to those who are attempting to assist families that lack telephone service.

The 2000 census provides a much more comprehensive survey of household characteristics, including whether they have telephone service. The “long form” of the 2000 census asked households to provide a significant amount of information about the household, including sources of income, various expenses, language skills, employment status, and housing information. Importantly, the “long form” survey also asks the household if it has telephone service. The long form was received by one out of every six households in the country, so the sample for Pennsylvania is nearly 800,000 households.

The purpose of this report is to analyze this detailed data from the 2000 census to attempt to better determine the existence of telephone hardships in Pennsylvania – not just statewide, but also at the county level.

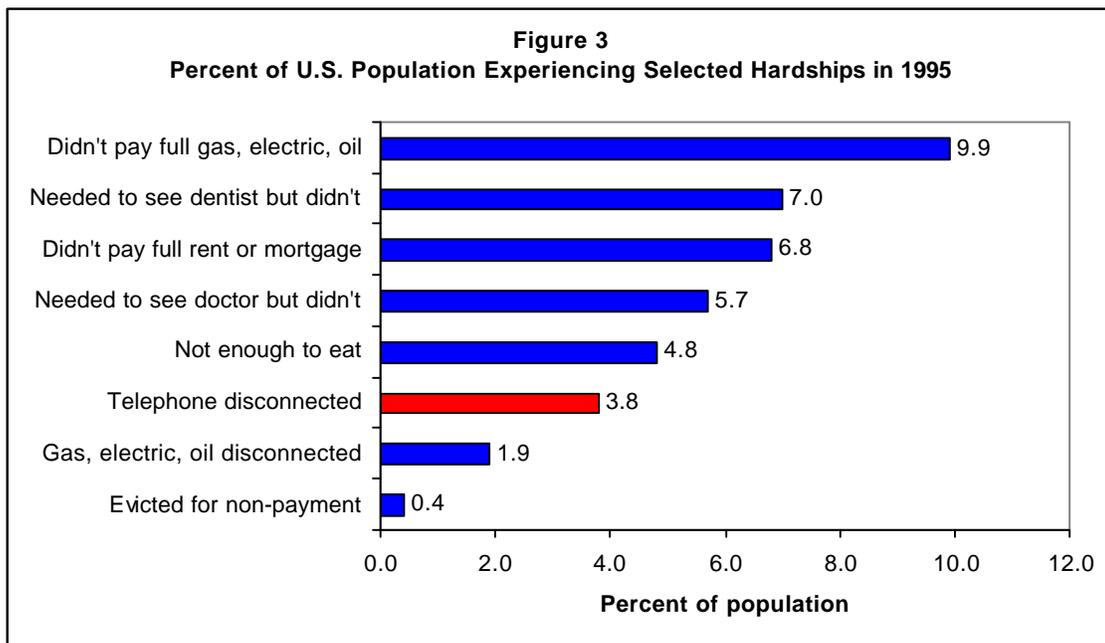
Information presented in this report will be used to support the Council for Utility Choice consumer-education program. The data specifically focuses on the consumer-education objective outlined in the Global Telecommunications Proceeding (Global Order) that calls for the program to “conduct special programs to address the consumer-education needs of all constitu-

encies, including those with limited incomes; people with disabilities; people in rural and urban areas; seniors; and, people of diverse ethnic and cultural backgrounds.”

The findings could be used to develop consumer-education programs that target constituencies of limited income in rural or urban settings, or individuals who may require assistance in paying for telephone connection and service.

The Telephone is an Essential Service

A comprehensive analysis of 1995 data from the Census Bureau’s Survey of Income and Program Participation concludes that 5.7% of households in the United States did not have enough money to see a doctor when necessary and 4.8% did not get have enough money for food (that is, someone in the household sometimes went hungry). But the number of households who had telephone service disconnected for non-payment was 3.8%. That is, before a low-income family loses its telephone service, it will cut back on necessary food and medical care. (Bauman 1998) See Figure 3.



While households will struggle to keep the telephone connected, it appears that the telephone will be the first utility service to be lost. The same study showed that households were twice as likely to lose their telephone service as they were to have their gas or electricity disconnected (1.9% of households had their gas, fuel oil, or electricity service disconnected, compared with 3.8% that lost telephone service).

Why is telephone service so important, particularly to low-income households? A study of single mothers receiving public assistance provides important insight into this question. The authors state:

Mothers did not rank these hardships in immediately obvious ways. For example, many of us would assume that sufficient food is more important than telephone service (this is why we have food stamps and not phone stamps), but some mothers from our sample who had children with asthma saw the lack of a phone as potentially life threatening and considered a few missed meals at the end of the month as less serious. Other mothers were willing to risk having a utility shut off or a food hardship in order to maintain a telephone so that a prospective employer could reach them to schedule an interview. Telephone service was also crucial for mothers who had to leave their children home alone while they worked ... so that they could check on their children or be reached in an emergency. (Edin 1997)

Similarly, a recent study of families with incomes below 200% of the federal poverty level found that losing telephone service was a “serious hardship.” The only hardships that were considered more important were losing other utility services (electricity, gas, and water) or being evicted from the home. The authors found the loss of telephone service to be so important because it is “necessary for finding and keeping a job.” (Boushey 2001)

The Absence of Telephone Service in Low-Income Households

During 1983, the Census Bureau and the FCC began collecting data on the percentage of households that have telephone service. Data are collected three times per year through the Census Bureau’s Current Population Survey (CPS). The FCC’s first report, with data for November 1983, found that 91.4% of households in the United States had telephone service. That figure has increased, steadily but slowly, during the past two decades, so that by November 2001 94.9% of households had telephone service. (FCC 2002) See Figure 1.

Among low-income households, though, the figures are far more discouraging and progress has been harder to achieve. For example, in November 1983, the FCC reported that 88.2% of households with incomes between \$7,500 and \$10,000 had telephone service. After 18 years of federal and state policies designed to help low-income households afford telephone service, households in this income range had made no progress, with 88.1% of households (a statistically insignificant difference) having telephone service in November 2001. (FCC 2002)

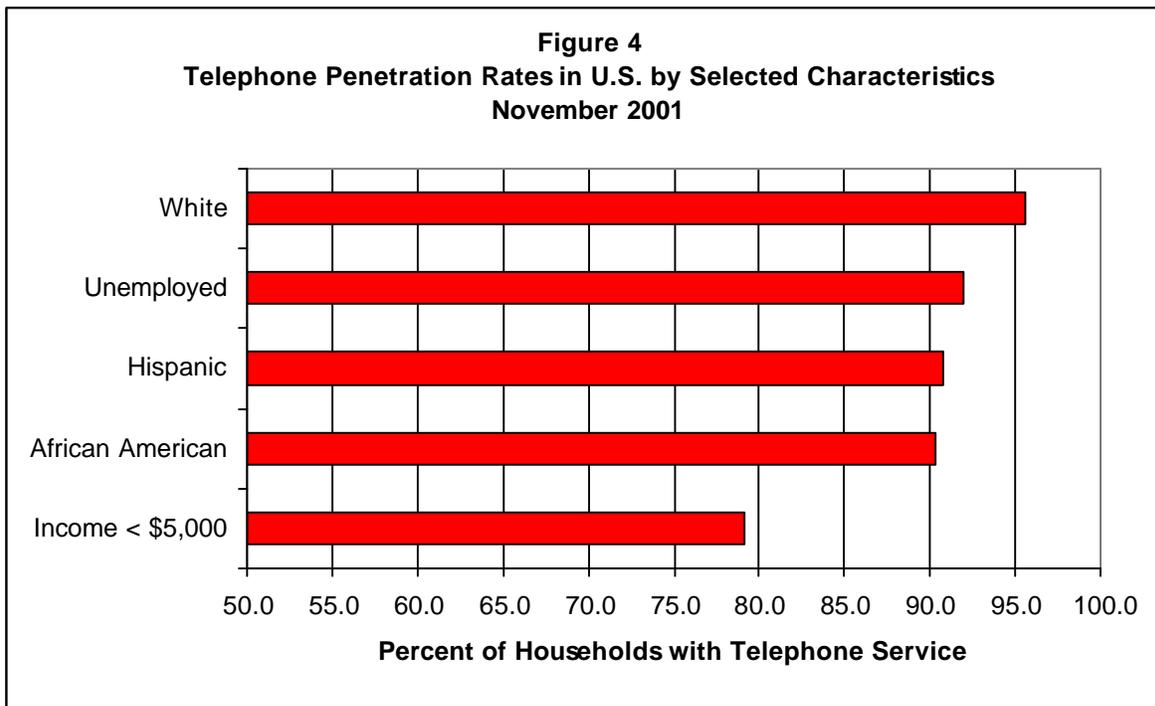
Other studies confirm the widespread absence of telephone service among low-income households. A study of single mothers reliant on public assistance found that 34% of them had gone without telephone service during the previous year. (Edin 1997) In fact, that study concluded that the absence of telephone service was highly correlated with the level of public assistance benefits in various states (“more than any other hardship, lack of telephone service mirrors welfare benefit levels”).

A study of families with incomes below 200% of the federal poverty level found that 10.4% of the families had their telephone service disconnected for non-payment during the previous year. (Boushey 2001) That figure increased to 16.6% for families that were headed by a single parent.

There is an important difference between the FCC data, collected through the CPS, and these other studies. The FCC data rely on a snapshot; that is, they ask whether the household currently has telephone service. (Census Bureau 1997) In contrast, the studies by Bauman, Edin, and Boushey each asked whether the household had been without telephone service at any time during the previous 12 months. The studies that ask about the absence of telephone service at any time during the previous 12 months would be expected to provide a more accurate picture of the inability of low-income households to maintain telephone service on a consistent and reliable basis.

Factors that Appear to be Related to the Absence of Telephone Service

The FCC's reports and other studies identify several factors that appear to be related to the lack of telephone service among certain households. Figure 4 shows the telephone penetration rates for households with various characteristics, as of November 2001.



In addition to income, unemployment status, race, and Hispanic origin, other studies indicate that households with the following characteristics are less likely to have telephone service than other households, all else being equal:

- ◆ Single-parent households (Boushey 2001)
- ◆ Households with children (Bauman 1998)
- ◆ Households where someone is disabled (Bauman 1998)
- ◆ Renters (Rubin 1993, Bauman 1998)

In contrast, Bauman's analysis shows that households headed by a person age 65 or older are much more likely to have telephone service than other households with similar characteristics but a younger head of household. (Bauman 1998)

Most of these factors are directly related to the lack of funds necessary to pay for telephone service, while others may reflect cultural differences that make in-home telephone service less important for low-income people. For example, one reporter notes that heavily Hispanic neighborhoods in New York City have "telephone parlors" where people can pay for telephone access by the minute. This type of service proved to be particularly popular with recent immigrants who were living with unrelated roommates. (Gonzalez 1993)

Data Sources for this Study

Most of the data for this study are provided by the U.S. Census Bureau in Summary File 3 for the 2000 census. This data set includes data from the 100 percent count of population and from the "long form" survey that was conducted as part of the 2000 census. The census "long form" was received by approximately one out of every six households in the United States, representing a statistically selected cross-section of the population. (Census Bureau 2002) In Pennsylvania, this translates into almost 800,000 households that received the long form.

It should be emphasized, however, that the census data represent a snapshot of Pennsylvania, and the United States, at a particular point in time. Information on various household characteristics, including the presence of telephone service, are valid as of April 2000, the date of the census data collection. Information on household income, poverty status, and the household's receipt of various types of government assistance are collected for calendar year 1999. As the economy, unemployment rates, income levels, and other factors change, it can be expected that many of these characteristics also will change.

Moreover, the census form asks a household "Is there telephone service available in this house, apartment, or mobile home from which you can both make and receive calls?" It does not ask about the continuing access of the household to telephone service, for example by asking whether there was any time in the previous 12 months when telephone service had been disconnected for non-payment. Other studies, that asked about the continuing availability of telephone service, show lower rates of telephone access than the census data "snapshot" would indicate. (Boushey 2001, Bauman 1998, Edin 1997)

In addition to information about the presence of telephone service, the census data also correlate that information by:

- ◆ Housing tenure – whether the housing unit is occupied by the owner or by a tenant
- ◆ Poverty status – whether the household's annual income is above or below the federal poverty level
- ◆ The combination of tenure and poverty status

Understanding Telephone Penetration in Pennsylvania

- ◆ Age of the householder
- ◆ Race or ethnicity of the householder

Thus, for each of these characteristics, it is possible to say with great precision what percentage of households had telephone service in April 2000.

The census data also provide information on dozens of other socio-economic and housing characteristics. The Census Bureau does not specifically correlate these other characteristics with the presence of telephone service. In particular, based on a review of the FCC's reports and other literature, the following characteristics may provide further insight into the types of households that do not have telephone service:

- ◆ Household income
- ◆ Detailed poverty status, ranging from income less than 50% of the poverty level to income of 150% of the poverty level or above, in increments of 25%
- ◆ Household participation in government assistance programs, including Social Security, Supplemental Security Income (SSI), and public assistance
- ◆ Unemployment rate
- ◆ Presence of households with children headed by a single woman
- ◆ Ability of people in the household to speak English "well" or "very well"

By analyzing this information at the census tract level, a high degree of precision can be provided in attempting to determine whether there are correlations between these characteristics and the absence of telephone service in the household. Pennsylvania is divided into 3,135 census tracts, of which 3,118 have at least one household. The average census tract has a population of 3,938, with a range of 15 to 12,136 and a median of 3,718. Ninety percent of the census tracts have a population of fewer than 6,500 people, with 99 percent of them having a population of fewer than 9,000 people. Analysis at the census tract level, therefore, provides the ability to analyze data for relatively small groups of people throughout Pennsylvania.

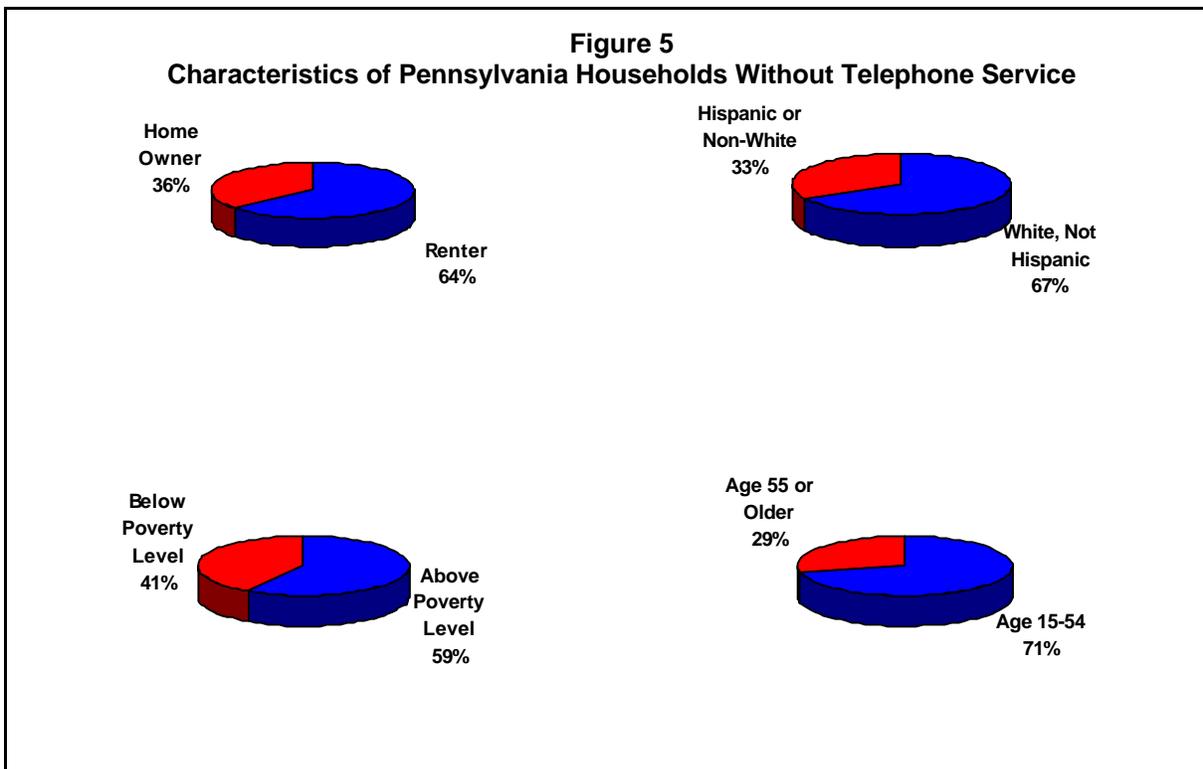
One potentially meaningful piece of information that is not available from the census is religion. This is particularly important in Pennsylvania with its significant presence of Old Order Amish and Old Order Mennonite communities, many of which discourage or even prohibit their members from having telephone service in their homes. (See the following section for a more specific discussion of the impact of religion on telephone penetration rates in Pennsylvania.) Data on religious affiliation in 2000 are available at the national, state, and county levels, but not at the census tract or municipal level. (ASARB 2002) Consequently, while the relationship between religion and telephone penetration will be discussed, the data are somewhat less precise than the census-tract level analyses that are possible with the other characteristics.

Overview of Telephone Penetration in Pennsylvania

State-Level Summary

In April 2000, the census measured Pennsylvania's population to be approximately 12.28 million people. Approximately 433,000 Pennsylvanians lived in group quarters (retirement homes, prisons, college dormitories, etc.), leaving approximately 11.85 million people living in a total of 4.78 million households, or an average of 2.48 people per household.

Out of Pennsylvania's 4.78 million households, 65,680 did not have telephone service at the time of the census, or 1.4% of all households. The majority of households without telephone service are rental properties (63.9% of all households without telephone service), headed by a person who is white and not of Hispanic or Latino origin (67.1%) with an income above the poverty level (58.7%) and younger than age 55 (71.3%). See Figure 5.



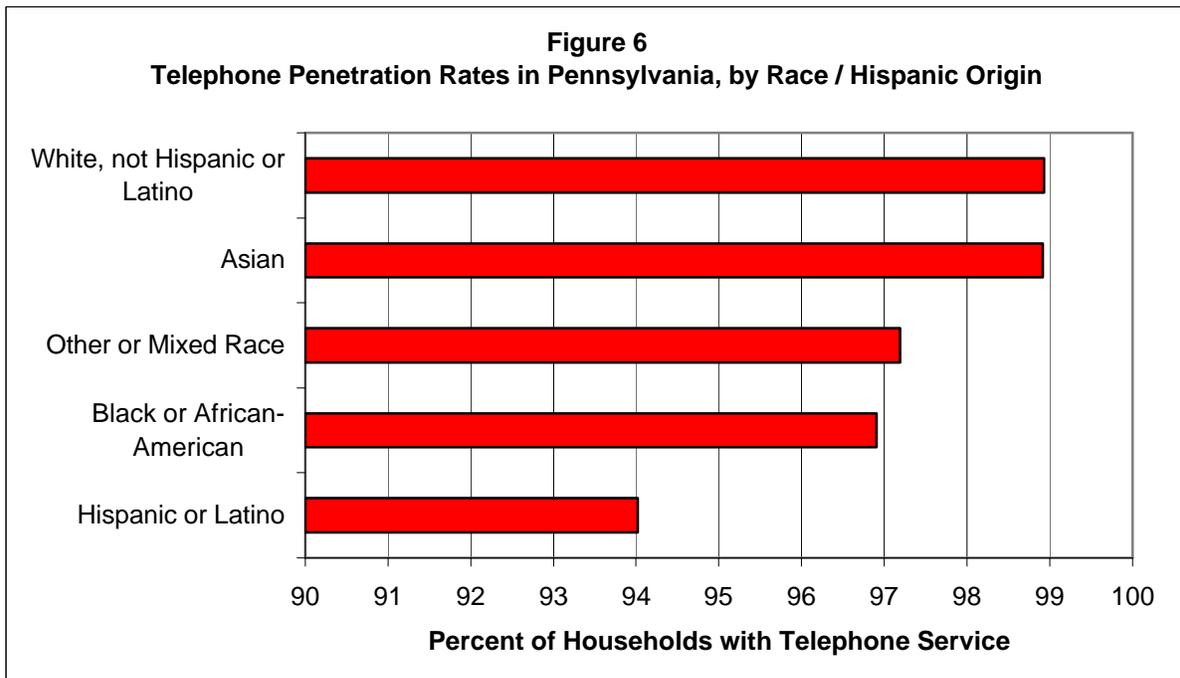
By themselves, however, those figures do not begin to describe the characteristics of households without telephone service. For example, the fact that 67% of households without telephone service have a white, non-Hispanic householder becomes interesting only when compared to the total universe of households in Pennsylvania, 86.5% of which have a white, non-Hispanic householder. In other words, households headed by a white, non-Hispanic person are less likely to lack telephone service than other households.

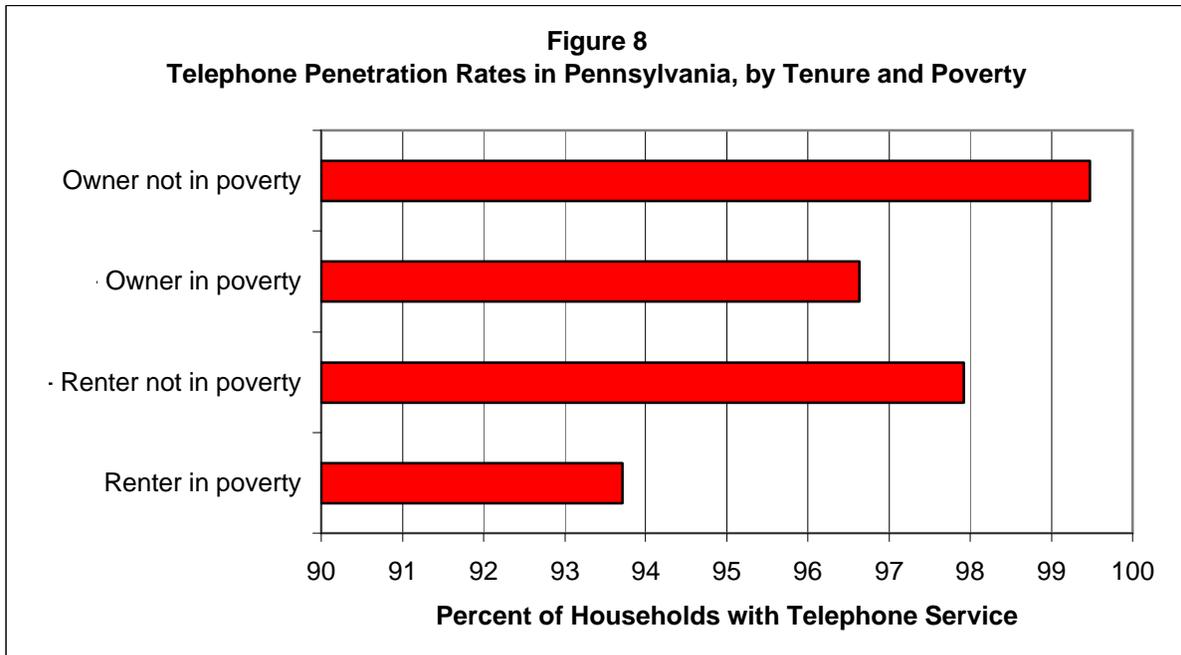
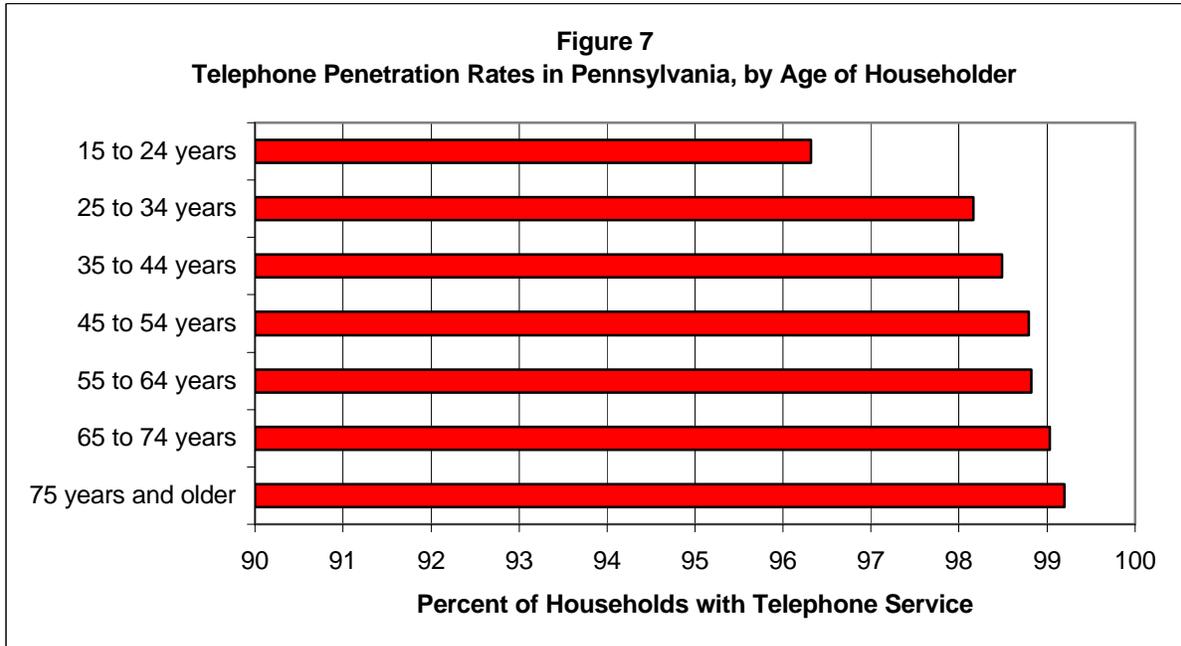
Understanding Telephone Penetration in Pennsylvania

Conducting this type of comparison for several characteristics reveals:

- ◆ Households headed by a person **age 15-24** are **3 times** more likely than the average household to lack telephone service (3.6% of households headed by a person age 15-24 lack telephone service, compared to 1.4% of all households)
- ◆ African-American households are **3 times** more likely than white, non-Hispanic households to lack telephone service (3.1% vs. 1.1%)
- ◆ **Renters** are **4 times** more likely than owners to lack telephone service (3.0% vs. 0.7%)
- ◆ **Hispanic** households are **5 times** more likely than white, non-Hispanic households to lack telephone service (6.0% vs. 1.1%)
- ◆ Households in **poverty** are **6 times** more likely than households not in poverty to lack telephone service (5.1% vs. 0.9%)
- ◆ **Renters in poverty** are **13 times** more likely than owners not in poverty to lack telephone service (6.3% vs. 0.5%)

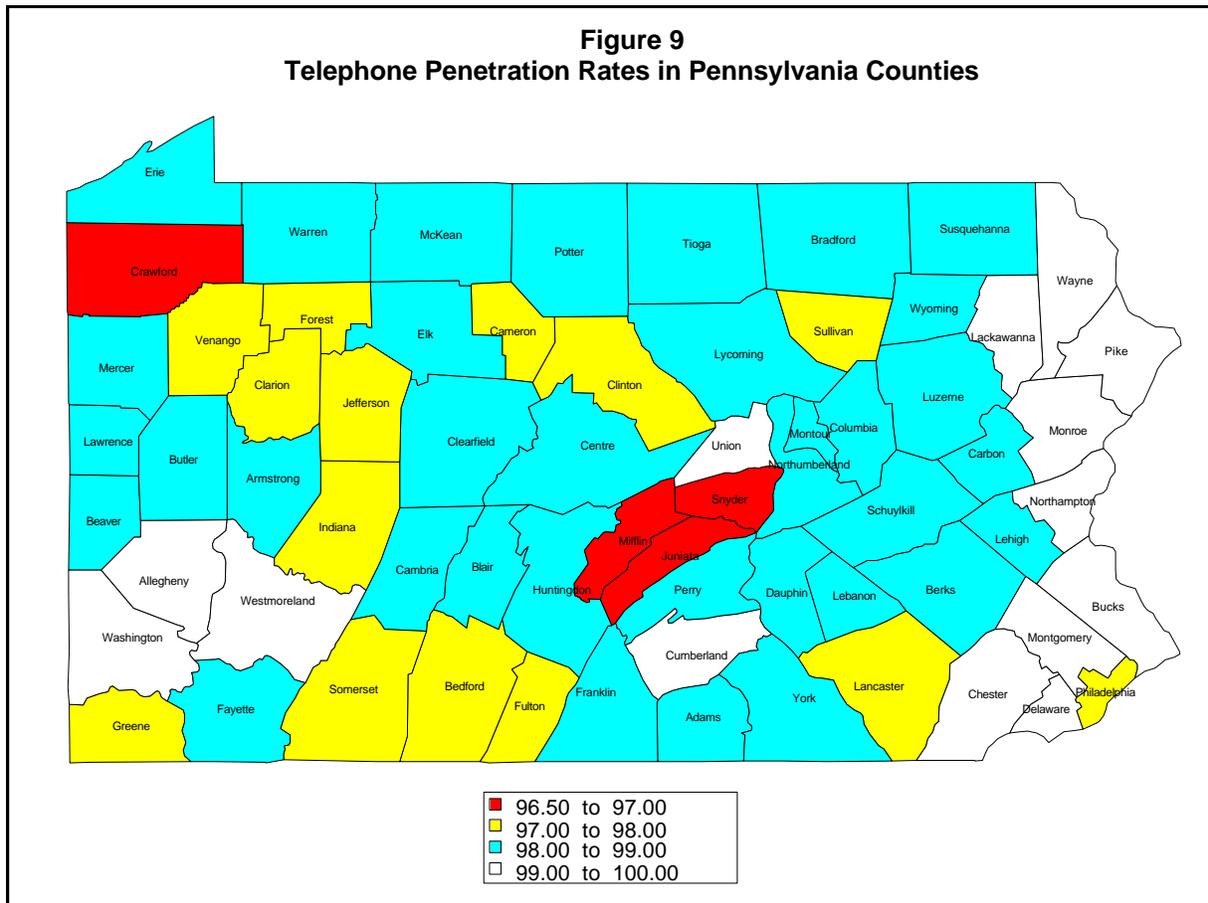
See Figures 6 through 8.





County-Level Summary

The level of telephone penetration varies by county – ranging from 99.5% of households in Bucks County to 96.5% in Mifflin County. Overall, 14 counties in Pennsylvania have telephone service in at least 99% of their households. Four counties – Crawford, Juniata, Mifflin, and Snyder – have telephone service in fewer than 97% of their households. See Figure 9 and Table 1.



Those who are generally familiar with Pennsylvania would find these results surprising. If the characteristics that tend to identify those without telephone service are accurate – renters, poverty, African American, Hispanic, and young age – then the four counties with the lowest telephone penetration rates should not be at the bottom of the list. All four counties are predominantly rural and do not have significant populations that match the characteristics listed above.

For example, the four counties combined have a population of about 200,000 people. Less than 1% of that population is African American, compared to 10% statewide. Another 1% of the population in the four counties is Hispanic, compared to 3.2% of Pennsylvania’s population. Only 4% of the households in these counties are headed by a person age 15-24, which is the

Understanding Telephone Penetration in Pennsylvania

**Table 1
Telephone Penetration Rates in Pennsylvania Counties**

County	Percent of Households with Telephone Service	County	Percent of Households with Telephone Service
Adams	98.80%	Lackawanna	99.01%
Allegheny	99.14	Lancaster	97.29
Armstrong	98.88	Lawrence	98.31
Beaver	98.77	Lebanon	98.52
Bedford	97.78	Lehigh	99.00
Berks	98.72	Luzerne	98.91
Blair	98.96	Lycoming	98.61
Bradford	98.07	McKean	98.54
Bucks	99.54	Mercer	98.05
Butler	98.99	Mifflin	96.51
Cambria	98.48	Monroe	99.41
Cameron	97.77	Montgomery	99.45
Carbon	98.46	Montour	98.19
Centre	98.96	Northampton	99.07
Chester	99.22	Northumberland	98.56
Clarion	97.65	Perry	98.34
Clearfield	98.36	Philadelphia	97.48
Clinton	97.76	Pike	99.45
Columbia	98.61	Potter	98.23
Crawford	96.82	Schuylkill	98.64
Cumberland	99.17	Snyder	96.55
Dauphin	98.73	Somerset	97.96
Delaware	99.14	Sullivan	97.52
Elk	98.78	Susquehanna	98.28
Erie	98.12	Tioga	98.10
Fayette	98.32	Union	99.17
Forest	97.65	Venango	97.39
Franklin	98.32	Warren	98.27
Fulton	97.33	Washington	99.12
Greene	97.62	Wayne	99.36
Huntingdon	98.37	Westmoreland	99.15
Indiana	97.68	Wyoming	98.86
Jefferson	97.95	York	98.65
Juniata	96.89		

same as the statewide percentage. Renters account for 24% of the households in these counties, compared to 28.7% statewide. Finally, the poverty rate in these counties is about the same as the statewide average (11.7% in the four counties compared to 11.0% statewide).

So, do we have the wrong list of characteristics of households that lack telephone service? Is there an error in the data for these four counties? Or is there something else about these counties that is not measured in the census data?

The Role of Religion in the Use of Telephone Service in Pennsylvania

There is one important characteristic missing from the census data: religion. Crawford, Juniata, Mifflin, and Snyder Counties have some of the highest concentrations of Old Order Amish and Old Order Mennonite communities in Pennsylvania. For example, more than 3% of Mifflin County's population is Old Order Amish (1,435 people out of a population of 46,486) – the highest concentration in the state. Similarly, 2% of Snyder County's population is Old Order Mennonite (885 out of 37,546), the highest concentration of that denomination in Pennsylvania. Juniata and Crawford Counties have the third and fourth highest concentrations of Old Order Amish in Pennsylvania (1.79% and 1.73% of the population, respectively). (ASARB 2002)

A comprehensive study of telephone usage among Amish and Mennonite communities in Pennsylvania discusses the different rules concerning in-home telephone service in various Amish and Mennonite sects. As of mid-1990, the only group that continued to ban telephone service in the home was the Old Order Amish. Among Old Order Mennonites, telephone service "had become increasingly common" by the mid-1980's, but there were still about 20 percent of the homes that lacked telephone service for religious reasons. (Umble 1996)

In order to understand the reasons why households lack telephone service in Pennsylvania, therefore, it is necessary to account for households that lack telephone service for religious reasons. According to a nationwide survey of religious organizations, in 2000 Pennsylvania had more than 25,000 people who were identified as Old Order Amish, and another 12,000 who are Old Order Mennonite. Using an average of three to four people per household, it can be estimated that there are between 6,000 and 8,000 Old Order Amish households, and between 3,000 and 4,000 Old Order Mennonite households. Assuming that 20 percent of Old Order Mennonite households do not have telephone service (as Umble reports), then it can be estimated that between 6,500 and 9,000 Pennsylvania households lack telephone service for religious reasons.

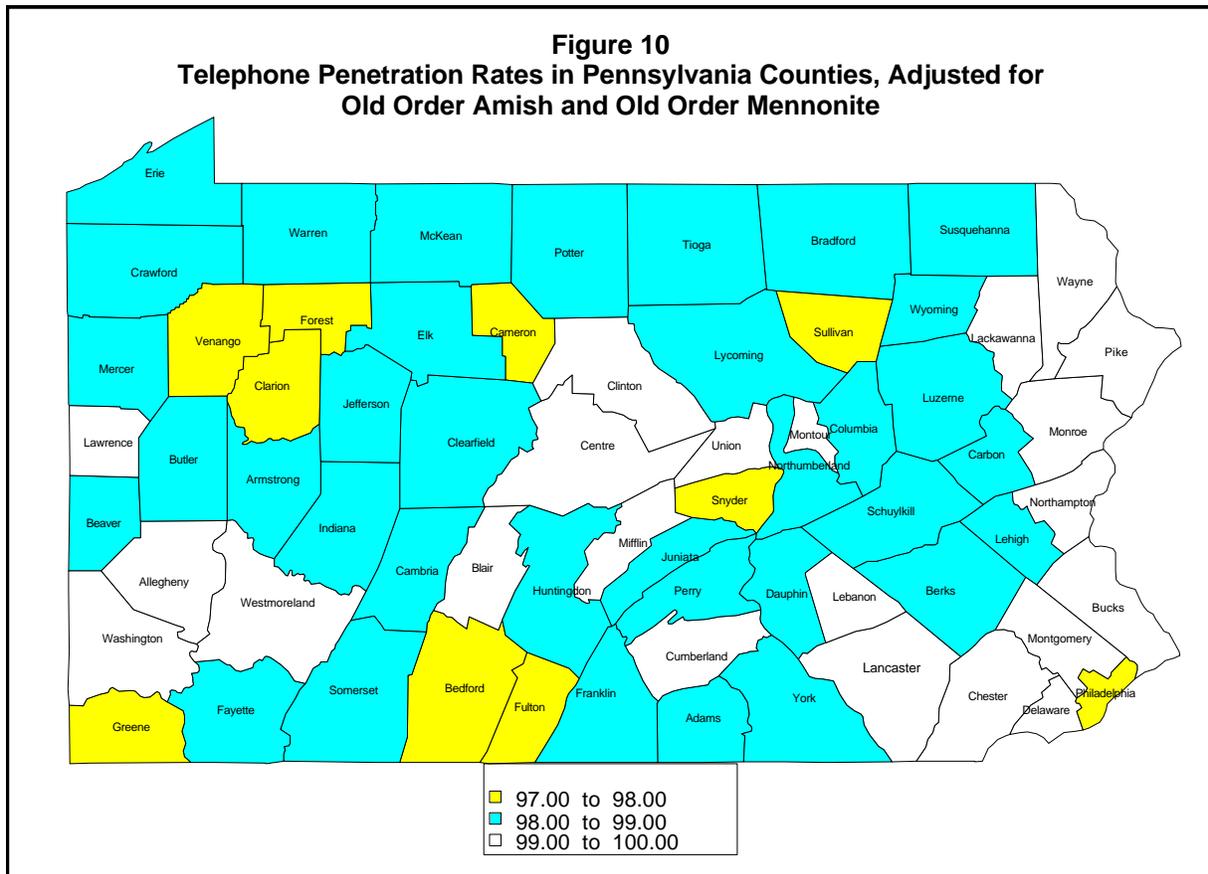
County-Level Data Adjusted for Religion

In order to focus on people who lack telephone service for reasons other than religion, it is necessary to adjust the census data to exclude an estimate of Old Order Amish and Old Order Mennonite households that lack telephone service for religious reasons. This adjustment is calculated for each county by summing the Old Order Amish population and 20% of the Old Order Mennonite population, from ASARB. This total is then divided by the population in the county, according to the U.S. Census. This percentage is then subtracted from the percentage of households in the county who lack telephone service to arrive at an estimate of households

Understanding Telephone Penetration in Pennsylvania

who lack telephone service for non-religious reasons.

Figure 10 illustrates the results of this calculation. All of the counties that had telephone penetration rates below 97% before the adjustment now have rates in excess of 97%. The resulting rates range from 97.3% in Snyder County to 100.0% in Lancaster County.



Areas in Pennsylvania with Low Telephone Penetration Rates

There are between 55,000 and 60,000 households across Pennsylvania that lack telephone service for non-religious reasons. Those households, however, tend to be concentrated in certain communities. In order to understand the geographic distribution of households without telephone service – and to try to focus on certain characteristics that might explain the lack of telephone service – data were analyzed for each census tract in Pennsylvania.

Pennsylvania is divided into 3,135 census tracts, of which 3,118 contain at least one household. (Census tracts without households might be areas that are solely commercial and industrial, or areas that contain group living quarters, such as prisons, colleges, and nursing homes.) Counties that have at least 1% of their population classified as Old Order Amish or Old Order

Understanding Telephone Penetration in Pennsylvania

Mennonite have 249 census tracts. Those tracts contain 10,205 households that lack telephone service. This is reasonably consistent with our earlier estimate that between 6,500 and 9,000 households in Pennsylvania would lack telephone service for religious reasons. Those tracts and households will be excluded from the remainder of this analysis. The counties excluded by applying this criterion are Clinton, Crawford, Indiana, Jefferson, Juniata, Lancaster, Lawrence, Lebanon, Mifflin, Montour, Snyder, and Union. For ease of reference, these counties will be referred to collectively as the “Amish/Mennonite counties.” See Table 2.

County	Percent Old Order Amish & Mennonite	Number of Census Tracts	Tracts with Telephone Penetration Less than 95%	Households without Telephone Service	Percent of Households without Telephone Service
Clinton	1.4%	9	1	331	2.2%
Crawford	1.7%	20	3	1,104	3.2%
Indiana	1.2%	23	2	792	2.3%
Jefferson	1.0%	13	1	376	2.1%
Juniata	1.8%	4	1	267	3.1%
Lancaster	4.1%	94	21	4,670	2.7%
Lawrence	1.0%	27	1	625	1.7%
Lebanon	1.5%	29	1	690	1.5%
Mifflin	3.1%	12	2	642	3.5%
Montour	1.2%	4	0	128	1.8%
Snyder	2.4%	7	1	471	3.5%
Union	1.7%	7	0	109	0.8%
Total	2.6%	249	34	10,205	2.4%

Understanding Telephone Penetration in Pennsylvania

Table 3 shows the concentration of households that lack telephone service in certain census tracts. For example, the table shows that 27% of the occupied census tracts have 100% telephone penetration rates; that is, every household has telephone service. At the other end of the scale, 25% of the households in the state without telephone service are concentrated in just 156 (5%) of the census tracts. Figure 11 (on the next page) shows the distribution of these 156 census tracts, by county, throughout Pennsylvania.

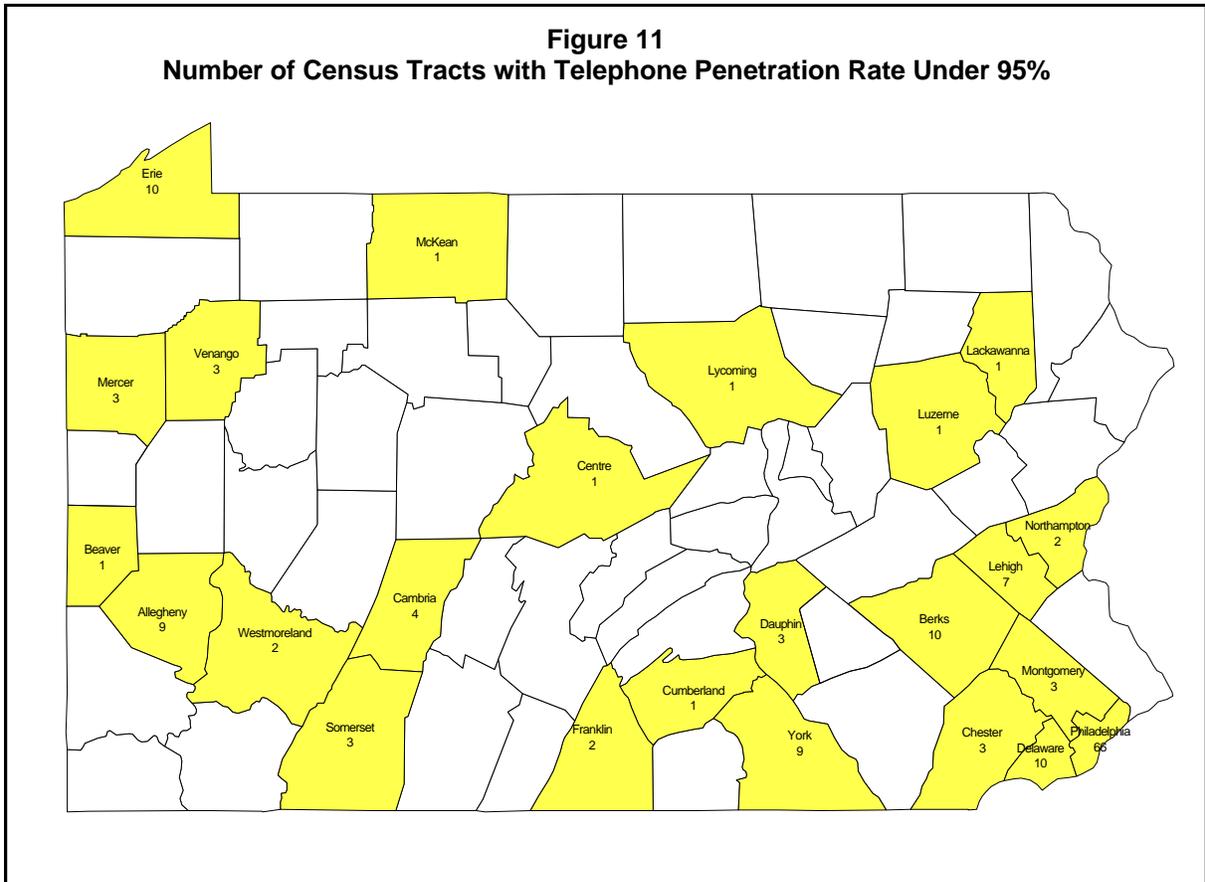
Table 3				
Concentration of Households Without Telephone Service				
	Census Tracts	Percent of All Census Tracts	Households without Telephone Service	Percent of All HH without Telephone Service
Census tracts with households	3,118	100%	65,680	100%
Tracts in counties less than 1% Old Order Amish / Mennonite	2,869	92%	55,475	84%
	Census Tracts	Percent of Non-Amish / Mennonite Tracts	Households without Telephone Service	Percent of Non-Amish / Mennonite HH without Telephone Service
Tracts with 100% penetration	770	27%	0	0%
Tracts with 99.0-99.9% penetration	887	31%	8,765	16%
Tracts with 98.0-98.9% penetration	584	20%	13,113	24%
Tracts with 97.0-97.9% penetration	275	10%	9,490	17%
Tracts with 96.0-96.9% penetration	122	4%	5,840	11%
Tracts with 95.0-95.9% penetration	75	3%	4,373	8%
Tracts with less than 95% penetration	156	5%	13,894	25%

Of these 156 low-penetration census tracts, 66 (42%) are located in Philadelphia, even though Philadelphia accounts for fewer than 13% of the census tracts in Pennsylvania (after excluding the Amish/Mennonite counties). Because of the concentration of low-penetration communities in Philadelphia, and the significant differences in socio-economic characteristics

Understanding Telephone Penetration in Pennsylvania

between Philadelphia and the remainder of Pennsylvania, Philadelphia will be analyzed separately from the remainder of Pennsylvania. (The socio-economic differences between Philadelphia and the remainder of Pennsylvania include significantly higher poverty levels (23% in Philadelphia compared to 9% in the rest of the state), significantly higher percentage of households with incomes below \$10,000 per year (19% vs. 9%), significantly higher percentage of people receiving public assistance (9% vs. 2%), and an unemployment rate that is more than double that experienced in the rest of the state (11% vs. 5%).)

Figure 11
Number of Census Tracts with Telephone Penetration Rate Under 95%



Identifying Who Doesn't Have Telephone Service in Pennsylvania

This section will look at Pennsylvania, excluding Philadelphia and the Amish/Mennonite counties, to determine if communities with low penetration rates have particular characteristics that differ from those of other communities. This analysis initially focuses on 90 census tracts that have telephone penetration rates below 95%.

These census tracts represent 3.6% of the census tracts in these portions of Pennsylvania, and they account for just 2.6% of the population, but they contain 17% of the households that do not have telephone service. Indeed, in these 90 census tracts, 7.3% of the households lack telephone service, while in all other census tracts only 0.9% of the households did not have telephone service.

In other words, these 90 census tracts have a concentration of people without telephone service that is eight times higher than the rest of Pennsylvania (excluding Philadelphia and the Amish/Mennonite counties). It is believed, therefore, that analyzing these census tracts will not only provide us with information about the tracts themselves, but with insight into others in Pennsylvania who lack telephone service but are not surrounded by a high concentration of people in the same situation.

Comparing Low-Penetration Areas to Other Areas

Comparing the low-penetration census tracts with the remainder of Pennsylvania reveals the following:

- ◆ **Poverty rate** in low-penetration areas is **3 times higher** than the poverty rate in the remainder of Pennsylvania (27.9% vs. 8.7% living in poverty)
- ◆ Percentage of households receiving **Supplemental Security Income** is **3 times higher** (9.9% vs. 3.6%)
- ◆ Percentage of households receiving **public assistance** is **4 times higher** (9.0% vs. 2.2%)
- ◆ **Unemployment rate** is **2 times higher** (11.2% vs. 4.9%)
- ◆ Percentage of **renters** is **2 times higher** (54.4% vs. 26.3%)
- ◆ Percentage of **young householders** (age 15-24) is **2 times higher** (7.3% vs. 3.5%)
- ◆ Percentage of **African-American householders** is **6 times higher** (26.7% vs. 4.3%)
- ◆ Percentage of **Hispanic householders** is **10 times higher** (12.5% vs. 1.3%)

Simply, these communities look very different from the remainder of Pennsylvania. In the low-penetration rate census tracts, renters outnumber homeowners; African Americans and Hispanics make up more than one-third of the population; one out of every nine people is unemployed; nearly one out of every five households receives government assistance; and more than

one-quarter of the people live in poverty.

In fact, in the low-penetration areas, households with certain characteristics have dramatically lower telephone penetration rates than do households with similar characteristics in the remainder of Pennsylvania. For example:

- ◆ **Hispanic** households have a telephone penetration rate of just 87.4% in these communities, compared with a rate in the remainder of Pennsylvania (excluding Philadelphia) of 96.9%
- ◆ **African-American** households: 92.2% vs. 98.0%
- ◆ **White, non-Hispanic** households: 94.0% vs. 99.2%
- ◆ **Renters**: 89.3% vs. 97.8%
- ◆ **Young householders**: 87.8% vs. 97.3%
- ◆ **Poverty** households: 86.5% vs. 96.4%

From these data, it is difficult to draw definitive conclusions about the reasons for the lack of telephone service. While it is readily apparent that low income levels (measured here by the poverty level) are related to low telephone penetration rates, there must be more to it. Otherwise, telephone penetration rates for poverty households would be fairly constant throughout the state. In fact, though, poverty households that are concentrated in these low-penetration census tracts are **4 times** as likely to lack telephone service as poverty households in other portions of Pennsylvania (13.5% vs. 3.6%).

The lack of telephone service in certain communities may be a function of inter-relationships within the community itself. It is possible that in a community or neighborhood where a high percentage of residents are in poverty and share similar characteristics (young minority renters), it may be easier or more socially acceptable to go without telephone service. Gonzalez (1993) refers to this possibility by noting that certain Hispanic communities with large numbers of young immigrants informally develop other ways to provide telephone service, without having in-home service for everyone.

It also is possible that some of the exigencies that make telephone service a high priority for low-income families (such as having someone with a chronic illness or having children being left alone during part of the day) might be met without having in-home telephone service in these communities. This could be done, for instance, if a neighbor has a close relationship with the family and has a telephone, or if a community telephone (in a hallway of an apartment building, for example) were provided.

The notion of some type of community access to a telephone is further borne out by comparing the penetration rates among elderly (age 65 and over) householders. Generally, the elderly are more likely than any other age group to have telephone service, presumably because it is viewed as a necessity in case of an accident or other health-related concern. Of course, it also

provides a method for children and other family members to remain in contact with the elderly person. Thus, Pennsylvania's statewide penetration rate among elderly householders is in excess of 99%. However, elderly householders in the 90 low-penetration communities have a penetration rate of less than 96%. That is, the elderly in these communities are **7 times** more likely to lack telephone service than are elderly householders in the remainder of Pennsylvania (4.4% vs. 0.6%).

In summary, one out of every six Pennsylvanians outside of Philadelphia that lacks telephone service lives in one of the 90 low-penetration census tracts. The characteristics of these communities appear to be very different from the remainder of Pennsylvania, excluding Philadelphia. This includes significantly higher concentrations than are found in the remainder of the state of African-American or Hispanic households, renters, young heads of household, and people living in poverty. It appears that it may be the confluence of a number of these characteristics that leads to households doing without telephone service. For example, people in poverty in these communities are 4 times as likely to lack telephone service as people in poverty in the rest of Pennsylvania. The same relationship is seen for all of the relevant demographic groups – people are less likely to have telephone service in these communities than people with similar characteristics in other portions of Pennsylvania.

It may be that communities that have high concentrations of young, African-American or Hispanic renters with low incomes find ways to share or provide telephone service that are not prevalent in other communities. It also may be that, for reasons that are as yet unexplored, people who live in certain communities may have less need for in-home telephone service than similar people who live in different types of communities.

Regression Analysis

Using these same characteristics, regression analyses were performed to determine if there is, in fact, a statistically significant correlation between these characteristics and the telephone penetration rate in the census tract. The analyses evaluated the following characteristics for each census tract, excluding the Amish-Mennonite counties and Philadelphia:

- ◆ Percent of people in households with incomes below 100% of the poverty level
- ◆ Percent of households receiving SSI
- ◆ Percent of households receiving public assistance
- ◆ Percent of the labor force that is unemployed
- ◆ Percent of households occupied by renters
- ◆ Percent of householders age 15-24
- ◆ Percent of householders age 65 or older
- ◆ Percent of African-American householders
- ◆ Percent of Hispanic householders

Numerous multiple regression analyses analyzing different sets of characteristics were performed. Based on those analyses, it was determined that each of these characteristics except the unemployment rate and the percentage of African-American householders exhibits a statistically significant relationship to the telephone penetration rate in a community. (Statistical significance is defined as the relationship having less than a 5% likelihood of being due to random chance. All of these characteristics are significant at less than this 0.05 level; all but age 65 and older are significant at less than the 0.001 level, meaning that there is less than a 0.1% likelihood that the relationship is due to random chance.)

The insignificance of the race of the householder is noteworthy. Several studies, including the FCC's periodic reports on telephone penetration rates, highlight the differences between African-American and white households. Statistical analysis of the 2000 census data for Pennsylvania, however, indicate that this relationship is not "real" in a statistical sense. Rather, the data are showing that race isolated from other household characteristics is not related to telephone penetration rates. That is, African-American households are no more or less likely to have telephone service than white households, when other factors (such as poverty status, age, and tenancy) are held constant. It appears, therefore, that data showing that African Americans are less likely to have telephone service are really measuring differences in poverty and tenancy between African-American and white households. When those factors are measured directly, race does not appear to be a factor in the presence of telephone service.

In contrast, Hispanic households (those where the householder is of Hispanic origin) do exhibit a significant, negative correlation with telephone penetration. That is, even after controlling for poverty, government assistance, age, and tenancy, Hispanic households remain less likely to have telephone service than similar households with a different ethnic origin. The reasons for this cannot be determined from the census data, but the result appears to be consistent with the report of Gonzalez (1993) indicating that some Hispanic communities have developed ways to provide telephone service outside of the home that might make in-home telephone service a lower priority for some low-income households.

Table 4 shows the detailed results of the regression analysis. The only apparent anomaly in these results is that the percentage of householders age 15-24 shows a positive correlation with the telephone penetration rate. That is, the more young householders in a community, the higher the telephone penetration rate. This appears to be contrary to the results seen by comparing the low-penetration census tracts with the remainder of Pennsylvania.

Further analysis shows that the age 15-24 variable is necessary in order to fully define the relationships of renters and of those age 65 and older to telephone penetration rates. In other words, the "real" relationship appears to be a combination of age and tenancy. Since a high proportion of those age 15-24 will be renters, it is necessary to account for them separately in the analysis. (Statewide, 83% of householders age 15-24 are renters.) Moreover, because the percentage of young householders tends to be only about one-seventh the percentage of renters in a community, the two variables together generally will show a negative correlation to the telephone penetration rate in a community, which is consistent with the comparisons discussed

Understanding Telephone Penetration in Pennsylvania

above. For example, if a community had 28% renters and 4% young householders, the net effect would be a decline in the telephone penetration rate of 0.04 percent.

Characteristic	Coefficient	t-Statistic	P-value
Intercept	99.833	1,048.4	< 0.001
Percent of population with income below the poverty level	-0.054	-9.9	<0.001
Percent of households receiving Supplemental Security Income	-0.075	-5.9	<0.001
Percent of households receiving public assistance	-0.043	-3.4	<0.001
Percent of households occupied by renters	-0.009	-4.1	<0.001
Percent of householders age 15-24	0.050	6.3	<0.001
Percent of householders age 65 or older	0.007	2.0	0.043
Percent of householders who are Hispanic	-0.063	-14.3	<0.001
Regression statistics: R-squared = 0.42, F-statistic = 257, p < 0.001			

The following comparisons put the results of the regression analysis into simpler terms:

- ◆ For each 10% increase in the percentage of households with **incomes below the poverty level**, the telephone penetration rate will **decrease by 0.5%**
- ◆ For each 10% increase in the percentage of households **receiving SSI**, the telephone penetration rate will **decrease by 0.7%**
- ◆ For each 10% increase in the percentage of households **receiving public assistance**, the telephone penetration rate will **decrease by 0.4%**
- ◆ For each 10% increase in the percentage of households **occupied by renters**, the telephone penetration rate will **decrease by 0.09%**
- ◆ For each 10% increase in the percentage of householders age 15-24, the telephone penetration rate will **increase by 0.5%**
- ◆ For each 10% increase in the percentage of **householders age 65 and older**, the telephone penetration rate will **increase by 0.7%**

- ◆ For each 10% increase in the percentage of **householders who are Hispanic**, the telephone penetration rate will **decrease by 0.6%**

Statistically, a theoretical community that exhibited none of these characteristics – that is, no one was in poverty, no one received SSI, etc. – would have a telephone penetration rate of 99.8%. The statistical analyses also indicate that if we had 100 such theoretical communities exhibiting none of these characteristics, 95 of them would have penetration rates between 99.6% and 100.0%.

It must be noted, however, that the regression analyses do not perfectly predict telephone penetration rates. While all of the characteristics exhibit a high level of correlation with telephone penetration, collectively these characteristics only account for 42% of the variability in the data. This means that there are other factors that may be determining whether a household has telephone service. This may include, for example, cultural or community differences that are not captured by the census data.

It also may include Amish and Mennonite communities that are present in relatively small numbers in some Pennsylvania counties. Recall that the cut-off for Amish-Mennonite counties was that 1% of the county's population was Old Order Amish or Old Order Mennonite. This excluded 12 counties from the analysis. There are 24 other counties in Pennsylvania that have Old Order Amish or Old Order Mennonite adherents living in them, but where they account for less than 1% of the county's population.

These analyses do allow us to conclude, however, that several characteristics are highly correlated to the absence of telephone service in a household. That is, we can conclude that households in poverty, that receive income-determined government assistance (SSI and public assistance), that rent, or that have an Hispanic origin are significantly less likely to have telephone service than other households.

Focus on Philadelphia

This section will attempt to determine whether the trends that are exhibited in the remainder of Pennsylvania are also found in Philadelphia. Philadelphia has a much higher incidence of poverty than the rest of Pennsylvania (23% of households in Philadelphia vs. 9% of households in the non-Amish-Mennonite counties), a higher percentage of renters (40% vs. 27%), and a much higher percentage of Hispanic households (6.4% vs. 1.6%). If the statewide analysis holds true in Philadelphia, it would be expected that Philadelphia, as a whole, would have a lower telephone penetration rate than the rest of the state. It also would be expected that low-penetration neighborhoods (census tracts) in Philadelphia would contain high concentrations of poverty, Hispanic households, and renters.

Initially, we know that Philadelphia does, in fact, have a lower telephone penetration rate than the rest of Pennsylvania. Approximately 15,000 Philadelphia households lack telephone service, which is 2.5% of all households in the city. This compares with just 1.1% of households in the other non-Amish-Mennonite counties that lack telephone service.

Philadelphia has 368 census tracts, of which 66 (18%) have telephone penetration rates below 95%. In comparison, only 3.6% of census tracts in the non-Amish-Mennonite counties had penetration rates below 95%. In fact, Philadelphia has roughly the same percentage of census tracts with low penetration rates as is found in the Amish-Mennonite counties (which have about 17% of census tracts with penetration rates below 95%).

Comparing Low-Penetration Neighborhoods to Other Neighborhoods

Comparing the low-penetration census tracts in Philadelphia with the remainder of the city reveals the following:

- ◆ **Poverty rate** in low-penetration areas is **2 times higher** than the poverty rate in the remainder of Philadelphia (41.7% vs. 19.1% living in poverty)
- ◆ Percentage of households receiving **Supplemental Security Income** is **2 times higher** (14.5% vs. 6.8%)
- ◆ Percentage of households receiving **public assistance** is **3 times higher** (19.5% vs. 6.9%)
- ◆ **Unemployment rate** is **2 times higher** (19.2% vs. 9.7%)
- ◆ Percentage of **renters** is **25% higher** (48.9% vs. 39.3%)
- ◆ Percentage of **young householders** (age 15-24) is **20% higher** (6.6% vs. 5.5%)
- ◆ Percentage of **African-American householders** is **50% higher** (55.6% vs. 38.1%)
- ◆ Percentage of **Hispanic householders** is **5 times higher** (21.2% vs. 3.9%)

Simply, the low-penetration census tracts in Philadelphia exhibit many of the same characteristics as low-penetration tracts in the remainder of Pennsylvania, and they appear to be sig-

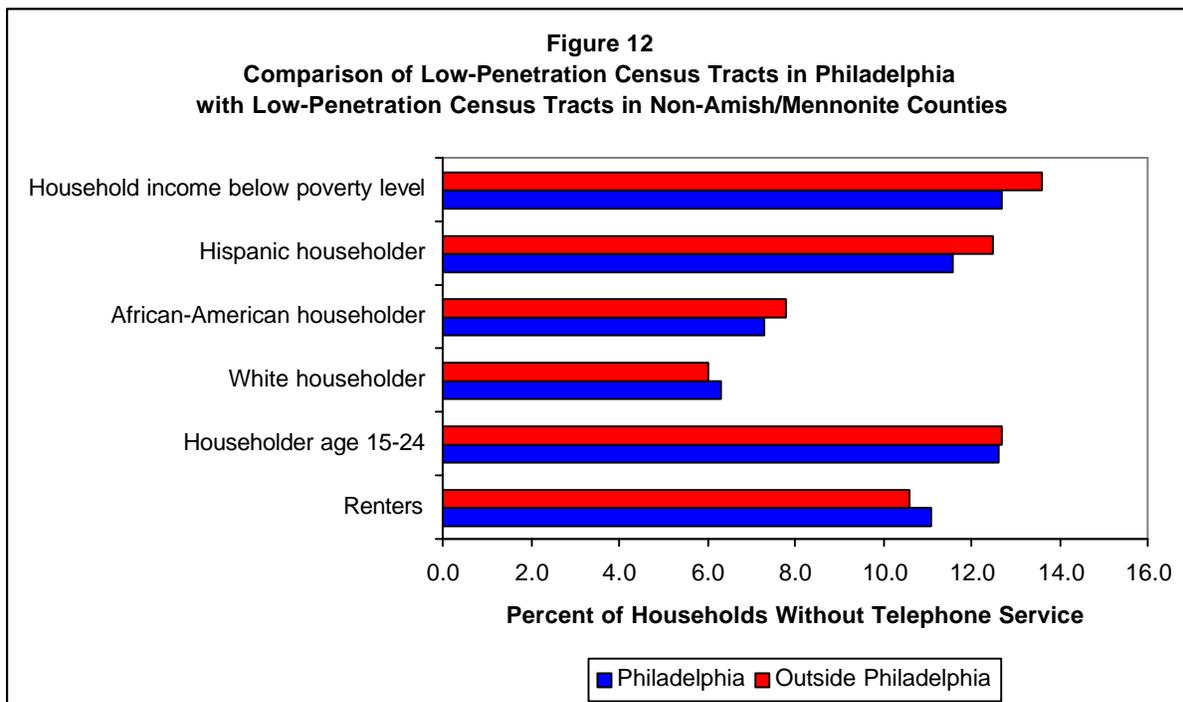
Understanding Telephone Penetration in Pennsylvania

nificantly different from other neighborhoods in Philadelphia. Low penetration rate census tracts have much higher levels of poverty, more households receiving government assistance, an unemployment rate that is twice as high as that experienced in the rest of the city, and more than five times the percentage of Hispanic households.

As we found in the rest of Pennsylvania, in the low-penetration areas, households with certain characteristics have dramatically lower telephone penetration rates in Philadelphia than do households with similar characteristics in the remainder of the city. For example:

- ◆ **Hispanic** households have a telephone penetration rate of just 88.4% in these communities, compared with a rate in the remainder of Philadelphia of 96.3%
- ◆ **African-American** households: 92.7% vs. 97.7%
- ◆ **White, non-Hispanic** households: 93.7% vs. 99.2%
- ◆ **Renters**: 88.9% vs. 97.2%
- ◆ **Young householders**: 87.4% vs. 97.5%
- ◆ **Poverty** households: 87.3% vs. 95.8%

Figure 12 compares these same characteristics for low-penetration census tracts in Philadelphia and low-penetration tracts in the remainder of Pennsylvania. It is readily apparent that there is little difference between low-penetration areas in Philadelphia and low-penetration areas in the rest of Pennsylvania.



Regression Analysis

Regression analyses were conducted for Philadelphia that are similar to those conducted for the rest of Pennsylvania. The results again show a highly significant correlation between several of these characteristics and the telephone penetration rate in the census tract.

Table 5 shows the detailed results of the regression analysis. The following comparisons put the results of the regression analysis for Philadelphia into simpler terms:

- ◆ For each 10% increase in the percentage of households with **incomes below the poverty level**, the telephone penetration rate will **decrease by 0.6%**
- ◆ For each 10% increase in the percentage of households **receiving SSI**, the telephone penetration rate will **decrease by 1.9%**
- ◆ For each 10% increase in the percentage of households **receiving public assistance**, the telephone penetration rate will **decrease by 1.4%**
- ◆ For each 10% increase in the percentage of **householders age 65 and older**, the telephone penetration rate will **increase by 0.3%**
- ◆ For each 10% increase in the percentage of **householders who are African American**, the telephone penetration rate will **increase by 0.1%**

Table 5 Factors that Explain Level of Telephone Penetration in Census Tracts in Philadelphia			
Characteristic	Coefficient	t-Statistic	P-value
Intercept	100.051	250.6	< 0.001
Percent of population with income below the poverty level	-0.059	-4.4	<0.001
Percent of households receiving Supplemental Security Income	-0.195	-5.7	<0.001
Percent of households receiving public assistance	-0.139	-4.9	<0.001
Percent of householders age 65 or older	0.033	2.6	0.010
Percent of householders who are African American	0.012	3.2	0.002
Regression statistics: R-squared = 0.62, F-statistic = 118, p < 0.001			

There are some important differences between the regression results for Philadelphia and those for the rest of Pennsylvania. In particular, the Philadelphia results are much more sensi-

Understanding Telephone Penetration in Pennsylvania

tive to the households receiving public assistance or SSI. In Philadelphia, as the percentage of assistance households increases, the telephone penetration rate falls precipitously – by almost 2% for each 10% increase in the percentage of SSI households. In the rest of Pennsylvania, the relationship is much less severe, with telephone penetration falling by 0.7% for each 10% increase in SSI households.

It is also noteworthy that the percentage of Hispanic households is not a statistically significant indicator of telephone penetration in Philadelphia, while it was in the rest of the state. This result is particularly surprising because of the concentration of Hispanic households in the low-penetration census tracts in the city. This may call into question the hypothesis that there are cultural differences that make Hispanic households less likely to have telephone service than other households, all else being equal.

Finally, the Philadelphia analysis indicates that there is a slight positive correlation between the percentage of African-American households and the level of telephone penetration. This provides further support for the apparent finding from the statewide regression analysis that race, in and of itself, does not have any bearing on the presence of telephone service in the home.

Conclusions

The descriptive and statistical analyses described in this report highlight several important factors that lead a household to discontinue (or to never connect) telephone service. First, of course, policymakers must be aware of religious tenets that prohibit or discourage in-home telephone service in some portions of Pennsylvania. For that reason, the analyses conducted for this study excluded 12 counties where at least one percent of the population is listed as an Old Order Amish or Old Order Mennonite adherent.

Second, this study confirms indications from several other studies and the FCC's periodic reports of telephone penetration. Specifically, the data show that low income levels, measured here as incomes below the poverty level and the receipt of SSI or public assistance, are highly correlated with the absence of in-home telephone service. In addition, this study confirms that the elderly are more likely to have telephone service than any other age group, even when faced with comparable levels of poverty.

Third, this study questions whether there is a relationship between race or ethnicity and the presence of in-home telephone service. There is no question that African-American and Hispanic households are less likely than white, non-Hispanic households to have telephone service. Detailed analysis of the data, however, indicate that any racial difference is likely to be the sole result of differences in income or poverty levels; there does not appear to be any cultural difference that would make African-American households less likely to have telephone service than other households. The results for Hispanic households are less clear. Outside of Philadelphia, it appears that there may be some cultural or other factors that make Hispanic households less likely to have telephone service, even with similar income and poverty levels. Within Philadelphia, however, no such relationship appears.

Fourth, there also is uncertainty about the relationship between renters and in-home telephone service. Once again, there is no question that renters are less likely than home owners to have telephone service. More detailed analysis, though, is unclear about whether this relationship is due solely to differences in income levels, or whether there is something inherent in the characteristics of renters (for example, they may be transient or have fewer children) that makes them less likely to have telephone service. Outside of Philadelphia, it appears that renters are inherently less likely to have telephone service. Within Philadelphia (where over 40% of the housing units are rented), no such relationship appears.

Fifth, it is important to keep the results of this study in perspective. Pennsylvania's telephone penetration rate is one of the highest in the United States, and the highest among large, industrial states. The statewide rate would be even higher but for religious practices that discourage or prevent several thousand Pennsylvania households from having telephone service. Thus, there are between 55,000 and 60,000 Pennsylvania households – less than 1.5% of all households in the state – that lack telephone service for non-religious reasons.

Understanding Telephone Penetration in Pennsylvania

These households share certain characteristics, the most important of which are related to low income levels and the receipt of public assistance, that appear to be keeping them from being able to afford telephone service. Outside of Philadelphia, it appears that renters and people of Hispanic origin are even less likely to have telephone service than other people at the same income level.

It also appears that people without telephone service are often clustered together, in the same neighborhoods or communities. For example, almost one-half of the households in Philadelphia without telephone service are clustered into just 18% of the census tracts. In the rest of Pennsylvania, 17% of the households without telephones are located in just 3% of the census tracts.

Finally, Pennsylvania's policy analysts and decision makers should be wary of relying on the FCC's periodic telephone penetration reports. The FCC data are derived from the Census Bureau's Current Population Survey which has only about 2,000 respondents in Pennsylvania. Comparing the FCC data for March 2000 with the data from the 2000 census (collected in April 2000 from 800,000 Pennsylvania households) shows that the FCC data understate the level of telephone penetration in the state by approximately 1.25 percentage points. That is, rather than having over 120,000 Pennsylvania households without telephone service, as one might infer from the FCC's reports, the census shows that the number is only one-half as large – less than 66,000 Pennsylvania households without telephone service. Moreover, the analysis of religious survey data shows that approximately 10-15% of those households lack telephones for religious reasons.

References

- Association of Statisticians of American Religious Bodies (ASARB), *Religious Congregations and Membership in the United States: 2000* (Glenmary Research Center 2002).
- Bauman, Kurt, Direct Measures of Poverty as Indicators of Economic Need: Evidence from the Survey of Income and Program Participation, U.S. Census Bureau, Population Division Technical Working Paper No. 30 (Nov. 1998).
- Boushey, Heather, et al., *Hardships in America: The Real Story of Working Families* (Economic Policy Institute 2001).
- Census Bureau, *2000 Census of Population and Housing, Summary File 3: Technical Documentation* (2002).
- Census Bureau, CPS Questionnaire, <http://www.bls.census.gov/cps/bqestair.htm> (last revised Aug. 1, 1997).
- Edin, Kathryn and Laura Lein, *Making Ends Meet* (Russell Sage Foundation 1997).
- Ehrenreich, Barbara, *Nickel and Dimed: On (Not) Getting By in America* (Metropolitan Books 2001).
- Energy CENTS Coalition, *Minnesota's Energy Gap: Unaffordable Energy and Low Income Minnesotans* (Jan. 1999).
- Federal Communications Commission, *Telephone Subscribership in the United States* (May 2002).
- Gonzalez, David, "No Phone? New Stores Filling Gap," *The New York Times* (July 21, 1993), p. B1.
- Mercier, Joyce M., et al., *Iowa's Cold Winters: LIHEAP Recipient Perspective* (June 2000).
- Rubin, Scott J., "Telephone Penetration Rates for Renters in Pennsylvania" (Pa. Office of Consumer Advocate 1993).
- Umble, Diane Z., *Holding the Line: The Telephone in Old Order Mennonite and Amish Life* (The Johns Hopkins University Press 1996).