

The Declining Working Phone Rate and Its Impact on RDD Efficiency

By Jessica Smith, PRC

Researchers know that 98 percent of U.S. households can be reached via telephone. As a result, telephone sampling remains the first-choice mode for many syndicated, political polling, public release and marketing research studies. However landline telephone ownership is declining, while cell-only telephone households are increasing. Researchers conducting telephone interviewing are further challenged by the declining pre-screened working phone rate and decreasing cooperation RDD rates across all modes of interviewing.

In this article, I will provide a deeper understanding of the working phone rate issue and share actionable steps researchers can take to improve their telephone fielding efforts.

Learning the Terminology

In survey research, Working Phone Rate (WPR) refers to the proportion of telephone numbers in a sample that are working numbers. Non-working numbers include numbers that are not in service, disconnected or changed. A working number may not be an eligible number. Working Residential Rate (WRR) is the proportion of a telephone sample that connects to a residence.

For a residential telephone sample, ineligible units are those numbers that connect to an ineligible unit, such as a business, modem or fax machine. Answering machines are considered working numbers as they typically connect to a household.

WPR/WRR does not include contact rates or cooperation rates. Most researchers use WPR to mean WRR for residential samples, so I use that term throughout the article.

It is also important to understand the “anatomy” of a telephone number. In phone number 203-567-1234:

- 203 is the area code.
- 67 is the exchange.
- 1 is the 1000-block.
 - 1000 Telephone numbers can be created within the range of 1000-1999.
- 12 is the 100-block
 - 100 Telephone numbers can be created within the range of 1200-1299

Finally, the term “working block” is defined as a 100-block that has one or more directory listed numbers.

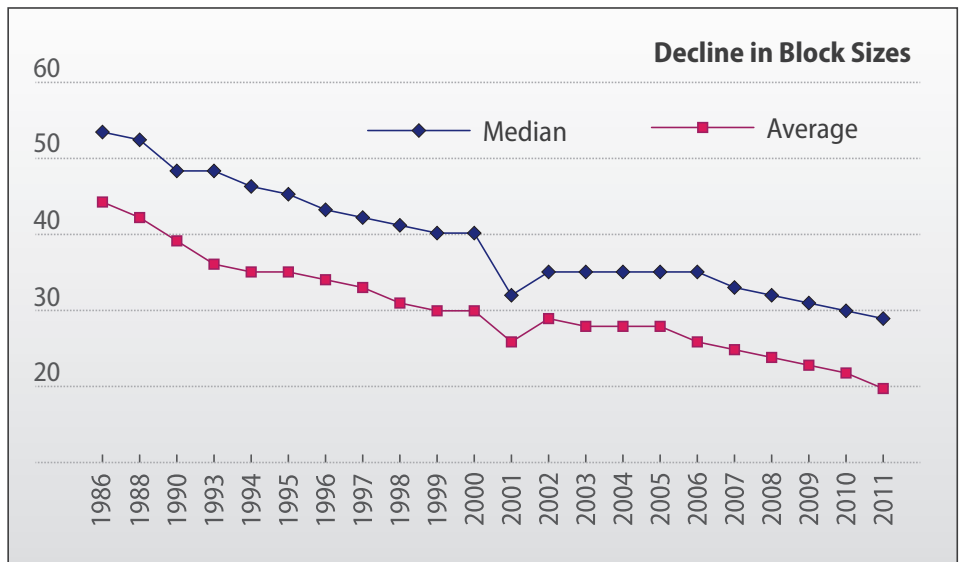
Defining the Issue

There has been a sharp decline in the landline working phone rate over the past few years. The exact number varies according to sampling methodology. A sample of directory-listed phone numbers typically has a higher WPR than a list-assisted landline RDD (Random Digit Dial) sample. However, it will represent only 50 percent of all households. Conversely, landline RDD sample will have a lower WPR than a directory-listed sample but will be more representative, covering approximately 70 percent of households.

The average WPR for a directory-listed sample is 80 percent, but varies by geography. An equal probability list-assisted landline RDD sample – a sample

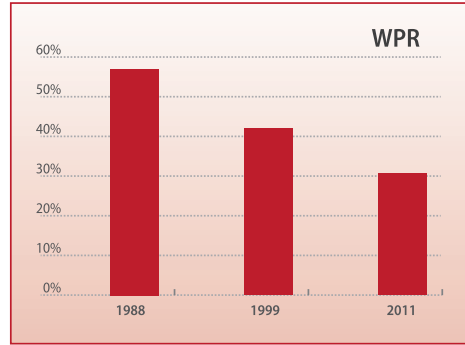
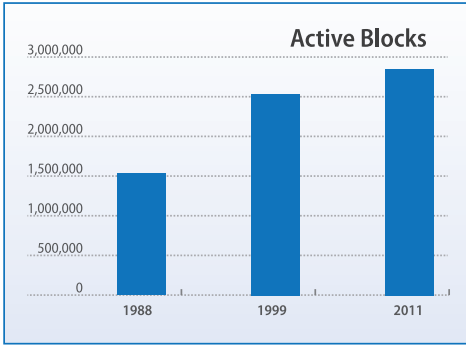
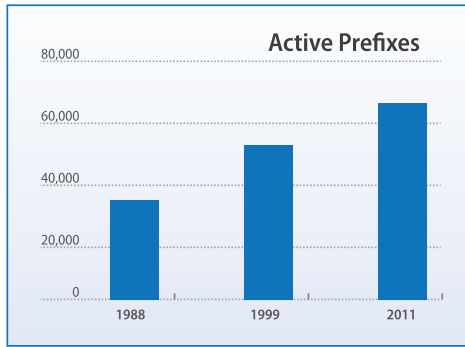
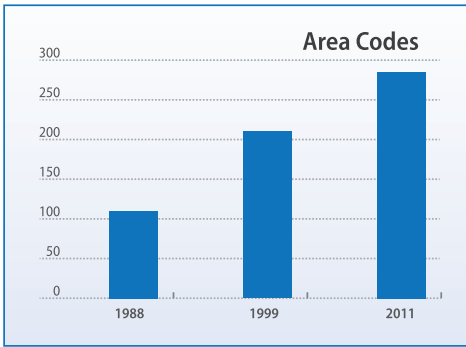
Efficiency gains for landline RDD samples can be achieved by using non-EPSEM sampling methodologies. (EPSEM is Equal Probability Selection Method.) For example, landline RDD samples can be selected from a frame that has been truncated based on the number of listed phones in the 100-block.

Selecting a sample from 100-blocks with three or more listed numbers or five or more listed numbers will increase efficiency. This higher efficiency comes at the expense of coverage and representation- to the extent that households in small blocks are different from those in blocks with more listed numbers. Probability Proportional to Size (PPS) RDD samples can also achieve



drawn with equal probability across eligible 100-blocks with one or more directory-listed numbers – will have a 21 percent – 38 percent WPR, again varying by geography.

higher working phone rates. PPS samples are selected using the number of listed phones in each 100-block as a measure of size (MOS) during sample selection. Such samples will be proportionate to listed numbers while still including non-listed



numbers.

For directory-listed sample, factors that impact the WPR include mobility, the accuracy of the compilation process, geo-coding and business number identification. It is important to note that for landline RDD samples, the WPR will be significantly lower than for directory-listed samples. List-assisted landline RDD samples offer better coverage of telephone households than directory-listed samples. This enhanced coverage results from including numbers that are not found in directories (ex-directory), through Directory Assistance or in operating company databases (unlisted) but are in 100-blocks that contain other directory-listed numbers.

Many of these not-listed landline RDD numbers are either nonworking or ineligible resulting in a lower WPR. In landline RDD samples, non-working numbers include those that have never been assigned, as well as those that are no longer assigned.

We will highlight the four key factors affecting the working phone rate:

- Universe Dynamics
- Number assignment policies
- Sample design/methodology
- Geography

Examining Universe Dynamics

It is helpful to understand that the WPR for a landline RDD sample is directly proportional to the number of residences present in the frame of possible landline RDD numbers. In the

late 1990s and early 2000s, to meet the demand for more telephone numbers, telephone companies around the world modified their numbering systems. The introduction of new area codes, overlays and exchange partitioning in the U.S. and the standardization of telephone number lengths in many countries negatively affected working phone rates by substantially increasing the pool of

possible RDD numbers.

Since 2000, the U.S. RDD frame has grown 18 percent, while the number of landline and wireless telephone households has only grown by 11 percent. When taking into account the 30 percent of telephone households that are cell-phone only, the number of landline telephone households has actually declined by six percent. The RDD frame has increased, while the need has decreased.

The working phone rate of a sample is directly proportional to the number of listed and unlisted telephone households in the sample. Over the past 25 years, the number of listed and (by inference) unlisted households in a 100-block has steadily declined. There are now more blocks with fewer listed numbers.

The average proportion of listed phones in a 100-block (and consequently in an EPSEM sample) has declined from 44 percent in 1986 to 20 percent today. The median block size (reflecting the proportion of listed numbers in a PPS sample) has declined from 53 percent to 28.5 percent. As long as the pool of possible numbers continues to increase, landline RDD samples will continue to have fewer listed numbers today than in the past, even though listed rates among landline telephone households have not

Quick Test/Heakin, the right way to do market research in the USA



Quick Test/Heakin ranked #1 in customer satisfaction. Our professional team offers a diverse range of products and maintains a high level of service in the **industry's largest nationwide network** of owned and operated mall based facilities.

Featured products:

3Q Research Solutions- Economic, powerful and valuable essential market research services and solutions to support, enhance and complete study from start to finish.

Data Collection- In-person, quantitative and qualitative methodologies to include mall intercept, focus groups, field services, Hispanic interviewing, low incidence interviewing, online and telephone.

GO-Q Reporting- Presents your findings according to the demands of your business - **Quickly**, providing **Quality** and producing **Quantifiable** results.

Real People. Real Results.



800.523.1288

www.QuickTest.com



© 2010 Quicktest/Heakin, Inc. All rights reserved. QuickTest/Heakin is a division of the MVL Group.

declined appreciably.

Simply stated, the pool of possible residential telephone numbers has grown faster than the target population of telephone households. But why?

During the 1990s, the demand for telephone numbers dramatically increased, driven by a rapidly changing telephony environment. More recently we see a decline in demand for multiple phone lines, as households and businesses are substituting DSL and Cable Voice (VoIP) for second and third lines. Cell phone only households have steadily increased every year – to 30 percent in 2011. But the area codes (and phone number possibilities) that were opened in the late 1990s and early 2000s have not gone away. They are just no longer “filled” with subscribers making dialing a landline RDD sample less effective than in the past.

Local Number Portability (LNP) has also had an adverse effect on sample efficiencies. LNP is the ability to change telephone service providers within a particular Rate Center without changing telephone numbers. Porting requires two 10-digit numbers for each telephone line. One is the original subscriber number. The other is the number associated with the switch belonging to the new carrier and to which the call is connected. In most cases, the new “ghost” numbers do not connect but their presence in RDD frames contributes to the overall decline in WPR.

Reviewing Number Assignment Policies

How local telephone companies assign telephone numbers within their allotted pool of numbers may affect WPR. As the demand for telephone numbers exploded in the late 1990s, administrators of the North American Number Plan anticipated the drain on resources and became concerned that we were in danger of exhausting the pool of available numbers.

To forestall this scenario, in 1998, the telephone regulatory administration mandated 1000-block pooling to conserve telephone numbers. This conservation measure declared that service providers in most Metropolitan Statistical Areas (MSAs) could no longer monopolize all 10,000 possible phone number combinations in a prefix. Service providers had to return unused 1000-blocks to a pool administrator for reassignment to other service providers. Although there was the possibility that this conservation effort would have a

positive effect on block densities and working phone rates, we have not seen any substantive improvement.

Since 2002 RDD landline sample efficiencies have been impacted by the steady and significant trend toward wireless substitution. As stated, the working “residential” rate is the proportion of the sample that connects to a residence. Not only has the pool of possible numbers been steadily increasing, but the number of residences with landline service has been decreasing as more households go cell phone only. While our “pond” of eligible numbers continues growing, the number of fish – aka landline telephone households – continues to drop. The result is a declining WPR.

Understanding Sample Design/ Methodology

There are several common landline RDD methodologies. EPSEM and SSI's RDD A and RDD B are examples. Different landline RDD methodologies offer trade-offs based on research objectives, balancing coverage and fielding efficiencies. RDD landline samples were built on these basic assumptions behind list-assisted RDD:

- Unlisted households are likely to be found in the same 100-blocks as directory listed numbers.
- Sample efficiencies will be affected by the number of listed phone numbers in a 100-block.

The decline of landline telephone households has altered our basic assumptions. It may be hard to believe, but landline telephone directory-listed rates remain constant. What has dramatically changed is the number of cell phone only households.

Currently 30 percent of households are cell phone only. These households have disconnected from the traditional landline telephone system and are not typically “listed” in the published telephone directories. As these households disconnect from the landline system, “listedness rate” in the working blocks decline. Among landline telephone households listedness rates remain constant. The increasing popularity of cable/VoIP as a replacement for traditional telephone company phone service has further reduced the number of listed residential landline numbers in working blocks.

A block is working if it contains one or more directory-listed numbers. However,

some telephone numbers of VoIP and cable service customers are not eligible for selection within working blocks. This is because VoIP and cable service providers do not provide subscriber numbers to directory publishers or Directory Assistance.

Looking at Geography: Urban/ Suburban/Rural Variations

Researchers may see that small-area samples have unusually low or unusually high Working Phone Rates. Listed samples in rural areas tend to have a higher WPR, because of lower mobility rates, fewer privacy concerns and fewer businesses. Rural areas may have lower RDD WPRs because there are fewer new listings, less chance of coming across a non-listed number, and more underutilized exchanges and blocks. Urban areas tend to have a lower listed and RDD WPR because they have higher mobility rates, more renters, more businesses, more ported numbers and more wireless-only households. Suburban communities, with their higher growth rates and higher unlisted rates, generally have a higher WPR.

Determining What You Can Do: Strategies for Improvement

- 1. Calculating Sample Need** – It is important when calculating sample need to use an accurate estimate of the WPR. Due to the decline of the WRRs, researchers will need more telephone numbers to complete interviews. Expectation ratios from the early 2000s will consistently be short of sample in field, causing time delays and interviewer frustration.
- 2. Screening for Working Numbers** – There is technology that will take a sample and determine if numbers are working. This pre-screening identifies 90 percent of the disconnected numbers associated with landline RDD dialing.
- 3. Altering the Working Block Selection Threshold** – As a reminder, a block is the last 2-digits of the 4-digit phone number suffix. A block is working if it has one or more listed numbers. The working block threshold can be altered. However, it is important to understand that there are trade-offs between coverage and field efficiency gains.

By reducing the number of working blocks in a sample, researchers shrink their universe. Samples will be generated

from those working blocks that contain more directory-listed telephone numbers, positively affecting the working phone rate and the amount of sample needed to order and dial. But use caution.

Raising the working block threshold eliminates blocks based on listedness rate. If the households systematically eliminated from a sampling frame are different from those included, researchers threaten the accuracy of their research results.

Those who list in telephone directories tend to be older, more suburban and with middle incomes. Telephone numbers provided by cable companies/VoIP tend to be in smaller blocks. While the landline directory-listed rates are relatively stable, the continued growth of cell phone only households will certainly have an impact on accuracy. Including wireless sample in project designs may mitigate these concerns.

4. Using Directory Listed

(Published) Sample – The sampling frame is households listed in the white pages of telephone directories, or available through Directory Assistance or directly from service carriers. This methodology does not represent the entire telephone universe, but it does provide fielding efficiencies, raising the working phone rate to a national average of 80 percent.

5. Using Wireless/Mobile Sample

– The number of households disconnected from the traditional landline system continues to grow. There are challenges to fielding a

wireless sample. However, with cell-phone penetration at 90 percent+ a wireless sampling frame is representative and typically offers a WPR of 60 percent.

The main challenges associated with dialing wireless sample are well documented and include cost (due to compliance with the TCPA); higher refusal rates; technology issues, such as dead zones and battery life; and integrity of the interview based on the respondent's environment.

6. Choosing Directory Listed/Wireless

– There is growing support for using directory-listed sample combined with wireless/mobile sample. The directory-listed sampling frame provides fielding efficiencies, and the wireless/mobile sample provides coverage of the demographic and geography pockets that are missing in the directory-listed sampling frame.

7. Combing Modes with Address-Based Sampling

– If time permits, using modified USPS delivery sequence files and appending name and telephone numbers where available provides a robust sampling frame. With this approach, mixed modes of contact (telephone/mail) are possible for at least half of the records. Alternatively, researchers can mail to the entire sample, allowing for mixed modes of response.

8. Moving to Online or Mixed

– While online sampling is considered non-probability, it is an option when

fielding efficiency is paramount over coverage. Researchers also may choose to combine online and offline to reach specific audiences. This approach is particularly effective for B2B studies.

Conclusions

We are facing challenges. The landline working phone rate will continue to decline as the universe of eligible numbers continues to increase. The increasing popularity of cell phones and various non-residential uses of telephone numbers will continue to erode the incidence of residential landline telephone numbers. Using alternative sample designs such as listed frames, truncated frames or PPS sampling can improve WPR but at the expense of coverage and representation. Missing or underrepresented households may cause error – and to the extent that missing or underrepresented households are different, may introduce bias. These alternative sample designs may meet some research objectives.

It is a challenging yet exciting time for research. There are no simple solutions. Each methodology has pros and cons that researchers must explore to find the best approach for their studies. To receive a copy of the full 15 page white paper, contact info@surveysampling.com.

Jessica Smith, PRC is vice president, office services at Survey Sampling International.

Everyone's
asking
why?.. find out.



Elemental
DATA COLLECTION INC

... it's in our nature

DATA COLLECTION AT IT'S **BEST**

- State-of-the-art CATI call centre
- Online surveys
- Elite B2B interviewing team
- Multilingual interviewing capabilities
- Remote monitoring capabilities
- Mail and data entry services
- Data tabulation and analysis

1.866.667.9352

www.elementalDCI.com

GET THE **REAL** ANSWERS YOU NEED...