



STATE HEALTH ACCESS  
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## Sample Frame Assessment for a Large Metropolitan County's Health Survey

Presented by:

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## Study Coauthors

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- Todd Rockwood, University of Minnesota



## Background

- Hennepin County MN, has been conducting a large county-wide health survey
- The survey is called the Survey of the Health of Adults, the Population and the Environment (SHAPE)
- In 2002 the SHAPE survey relied mainly on a listed telephone number sample frame
  - They did this to make sure they could map the results
- In 2006 the county's researchers were interested in examining alternative sample frames



3

## Basic Features of Hennepin County

- Most populated county in MN - 1.2 million
- Includes largest city in MN - Minneapolis
- 34% urban core / 64% suburban / 2% rural
- 79% white non-Hispanic / 21% persons of color
- 10% foreign-born
- \$51,711 median household income
- 20% of population with income < 200% poverty level



4

## Why the Need for Alternative Sample Frame?

- The proportion of the population with land-line telephones was decreasing nationwide
  - Mainly because cell phone only households were increasing in number
- Those people living in cell phone only households tended to have different health characteristics than those with land-lines
  - More likely to smoke, drink, and lack health insurance according to national numbers from Blumberg et al
- This greatly concerned the SHAPE researchers
- So we set out to examine using the US Postal Service's Delivery Sequence File (DSF)

5



## Hennepin County 2006 Sample Frame

- The sample frame assessment questions were:
  - What proportion of the housing units in Hennepin county were in the DSF? How did this vary by geography?
  - What proportion of the DSF records were linkable to listed telephone numbers so they could be called? How did this vary by county geography?
- To answer these questions we purchased all the DSF addresses in the county and all of the listed telephone numbers in the county from Marketing Systems Group

6



# Sample Frame Assessment

Table 1: Delivery Sequence File Housing Units, and Delivery Sequence File Housing Units with a Listed Telephone Number Compared to US Census 2000 Total Occupied Housing Units by Survey Strata

Geographic Sample Stratum	DSF Addresses as of November 2005	Percent of DSF Addresses with Listed Telephone	Ratio of DSF Addresses to Occupied Census 2000 Housing
01	7,109	51.3%	1.04
01A	15,727	36.1%	1.05
02	33,787	43.2%	1.02
02A	11,012	33.5%	0.98
03	25,099	33.2%	1.12
03A	23,553	28.0%	1.05
04	48,499	57.8%	1.00
04A	4,874	52.2%	1.00
05	92,784	61.3%	1.04
05A	19,886	47.9%	1.02
06	186,698	63.3%	1.12
06A	16,544	46.1%	1.10
<b>Total</b>	<b>485,572</b>	<b>54.7%</b>	<b>1.06</b>

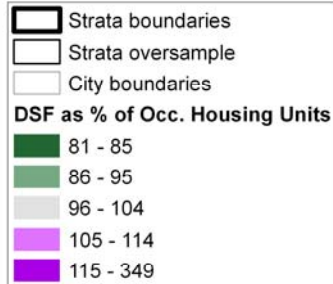


7

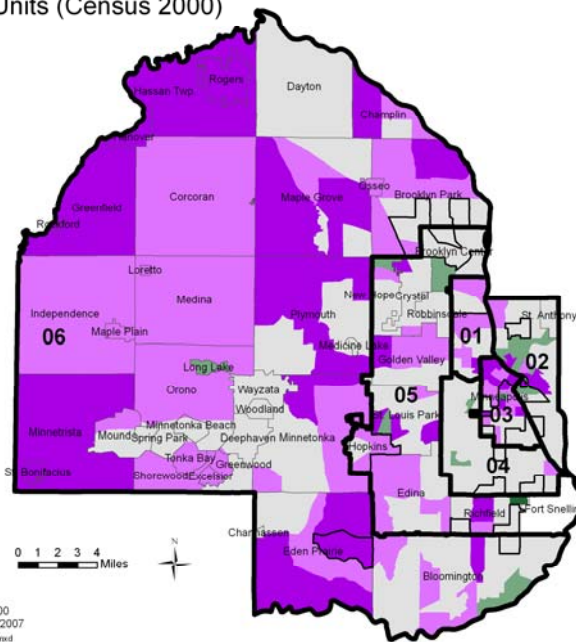
## SHAPE 2006: DSF Addresses (November 2005) as a % of Occupied Housing Units (Census 2000)

Hennepin County

Data Displayed by Census Tract



**Overall = 106.5%**  
 DSF = 485,572  
 Census = 456,129

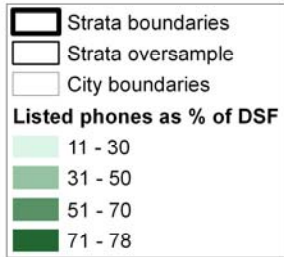


Source: MSG/GENESYS; Hennepin County HSPHD; U.S. Census, 2000  
 Prepared by: Hennepin County HSPHD - Public Health Protection, 5/8/2007  
 (shd) DSF addr as % of occ housing units (census)\_5-8-2007\_r (no oversampled areas) mxd

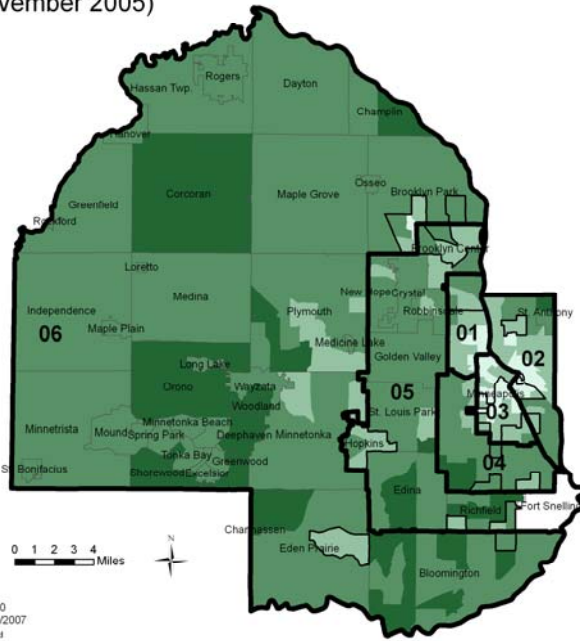
SHAPE 2006: Listed Phones Matched to DSF Addresses  
as a % of DSF Addresses (November 2005)

Hennepin County

Data Displayed by Census Tract



Overall = 54.7%  
Listed phones = 265,415  
DSF = 485,572

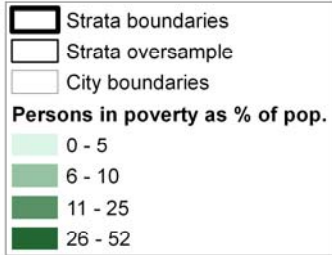


Source: MSG/GENESYS; Hennepin County HSPHD; U.S. Census, 2000  
Prepared by: Hennepin County HSPHD - Public Health Protection, 5/14/2007  
shd06 listed phones matched to DSF as % of DSF\_5-6-2007\_0 (no oversampled areas).mxd

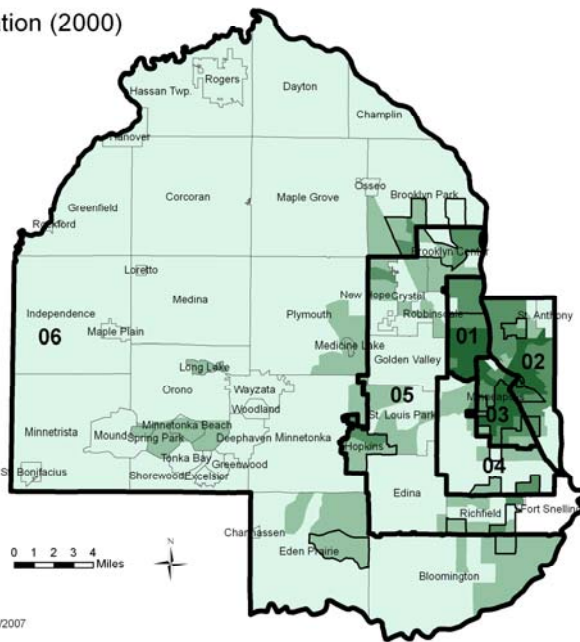
SHAPE 2006: Persons Below 100%  
of the Federal Poverty Level  
as a Percentage of the Population (2000)

Hennepin County

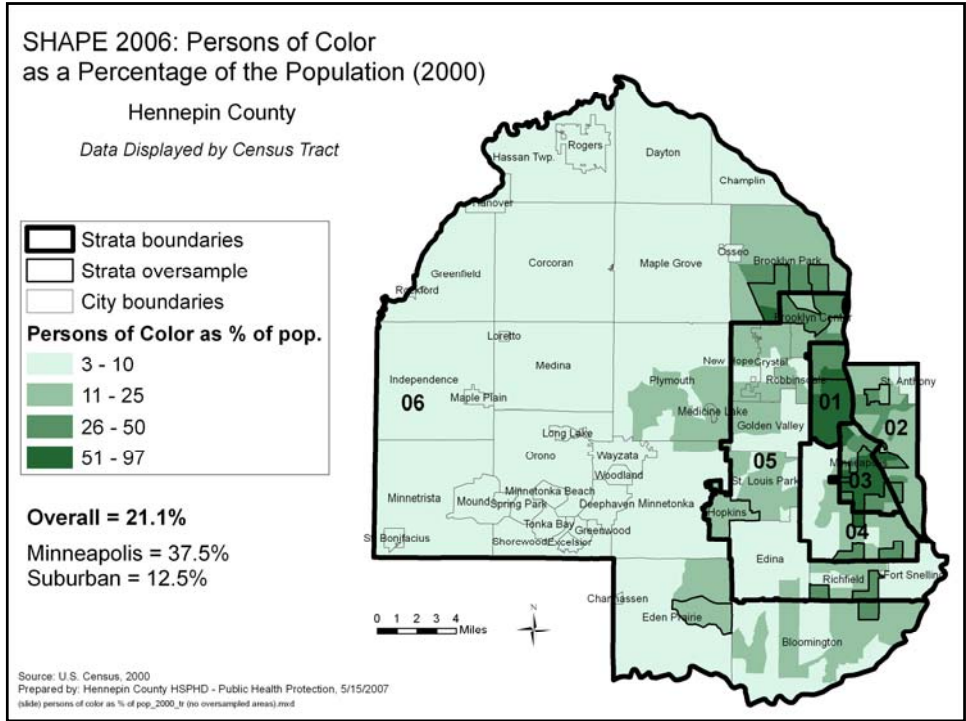
Data Displayed by Census Tract



Overall = 8.3%  
Minneapolis = 16.9%  
Suburban = 3.9%



Source: U.S. Census, 2000  
Prepared by: Hennepin County HSPHD - Public Health Protection, 5/15/2007  
shd06 persons in poverty pop\_2000\_0 (no oversampled areas).mxd



## Sample Frame Assessment Conclusion

- After careful consideration, the team decided to rely on the Delivery Sequence File (DSF) from the US Postal Service (purchased through Marketing Systems Group).
  - It provided fairly good coverage in most of the county
  - Allowed us to map each address
  - Allowed us to try some new methods of sampling nearest neighbors for non-responding households
  - We could have also used implicit geographic stratification and drew a systematic sample (since the data are sorted by geography)
    - We did not end up doing this but in the future we would



## Next set of Questions for our Analysis

- After these questions were answered, we were interested in two additional questions as well:
  - How many people in Hennepin County lived in cell phone only households and did they show similar health characteristics as the nationwide sample?
    - We have data on today
  - How would our estimates have been different if we had used a listed telephone number sample frame in 2006 like we did in 2002?
    - We do not have the data run yet

13



## SHAPE 2006 Survey Basics

- The basic survey was of 4,304 adults 18 years of age and older
- Mixed mode data collection using a mail survey and phone
- Response Rate was roughly 41% (we are still awaiting the final AAPOR calculation)
- The survey was conducted between May, 2006 and March 2007

14



## Demographics of Cell Phone Only Population Versus Others

### Selected Characteristics by Status of Telephone Service at Home for Hennepin County Adults: SHAPE 2006

	Land Line Telephone	Cell only HH	Difference
<b>Socio-demographic characteristics</b>			
Age 18-24	8.2	30.7	-22.5 ***
Age 65 and older	16.9	0.8	16.1 ***
Male	47.0	48.0	-0.9
Race and ethnicity			
Hispanic/Latino	3.1	3.0	0.1
White (Non-Hispanic)	84.5	87.2	-2.7
Black/African American (Non-Hispanic)	7.1	5.0	2.1
American Indian (Hon-Hispanic)	0.3	0.7	-0.5
Asian/Pacific Islander (Non-Hispanic)	3.8	3.4	0.3
Having less than High School education	4.6	0.7	3.9 ***
Household income below 100% FPL	6.8	11.6	-4.8
Household income below 200% FPL	17.3	22.8	-5.5
From Minneapolis	30.0	54.2	-24.2 ***
<b>Overall rate (weighted by cellphone weight)</b>	<b>89.5</b>	<b>10.5</b>	

\* p < .05

\*\* p < .01

\*\*\* p < .001

15



## Demographics of Cell Phone Only Population Versus Others

### Selected Characteristics by Status of Telephone Service at Home for Hennepin County Adults: SHAPE 2006

	Land Line Telephone	Cell only HH	Difference
<b>Community and neighborhood</b>			
Never involved in school, community or neighborhood activities	21.9	31.4	-9.5 *
People in this neighborhood are afraid to go out at night due to violence - Strongly agree or somewhat agree	18.4	24.9	-6.5
Gangs are a serious issue in this neighborhood - Strongly agree or somewhat agree	12.8	18.1	-5.3
Worry food would run out before had money to buy more- Often or Sometime	9.2	16.4	-7.2 *
Moved at least 2 times in past 2 years	5.3	41.4	-36.1 ***
Missed a rent or mortgage payment due to not have enough money	6.0	15.5	-9.5 **

16



## Key Health Characteristics of Cell Phone Only Population vs. Others

### Selected Characteristics by Status of Telephone Service at Home for Hennepin County Adults: SHAPE 2006

	Land Line Telephone	Cell only HH	Difference
<b>Overall Health Status</b>			
Self-rated health as poor or fair	9.0	8.3	0.7
Recent frequent mental distress	9.7	13.9	-4.3
Currently having asthma	8.0	7.7	0.2
Ever been diagnosed with diabetes	6.7	0.3	6.3 ***
Ever been diagnosed with Depression	22.6	26.3	-3.7
Serious psychological distress	1.9	4.3	-2.5
Obese (BMI>=30.0)	18.7	9.7	9.0 ***
Overweight (BMI>=25.0, including Obese)	55.8	45.0	10.9 *

17



## Key Health Characteristics of Cell Phone Only Population vs. Others

### Selected Characteristics by Status of Telephone Service at Home for Hennepin County Adults: SHAPE 2006

	Land Line Telephone	Cell only HH	Difference
<b>Health access &amp; utilization</b>			
Currently uninsured	6.1	8.4	-2.3
Difficult in paying for premium, co-pay, deductible for you & your family	25.8	35.0	-9.3 *
Difficult in paying prescription each month	10.8	9.5	1.4
Having no regular source of care (personal Dr or health care provider)	22.0	47.9	-26.0 ***
Having no regular place of care (DrOffice/ clinic, VA clinic/hospital)	14.6	29.2	-14.6 ***
Speaks a language other than English at home	4.3	2.6	1.7
Unmet medical care needs in past 12 m	12.7	22.4	-9.7 **
Unmet mental health care needs in past 12 m	13.1	27.7	-14.6 ***
Having no cholesterol check in 5 years or never had one	14.4	34.9	-20.5 ***

18



## Key Health Characteristics of Cell Phone Only Population vs. Others

*Selected Characteristics by Status of Telephone Service at Home for Hennepin County Adults: SHAPE 2006*

	Land Line Telephone	Cell only HH	Difference
<b>Lifestyles, nutrition and exercise</b>			
Having 5 or more servings of veg/fruit yesterday	34.6	37.1	-2.5
Currently smoking	16.5	24.1	-7.6 *
No leisure time physical activity in past 30 days	15.0	7.8	7.2 **
Binge drinking at least once in past 30 days	18.3	55.1	-36.8 ***

19



## Conclusions

- DSF appears to be a good sample frame to work from for our purpose
  - And a majority of the addresses had listed numbers allowing us to perform a mixed mode survey
- The cell-phone only population
  - Very different with respect to some demographic and health characteristics
- Work left to do:
  - Examine the cell phone only population for possible mode effects since almost all were mail survey completes
  - Examine whether using listed numbers only as a sample frame would have led to similar estimates

20



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