

# Using automated voice invitations to screen out-of-service phone numbers and increase response

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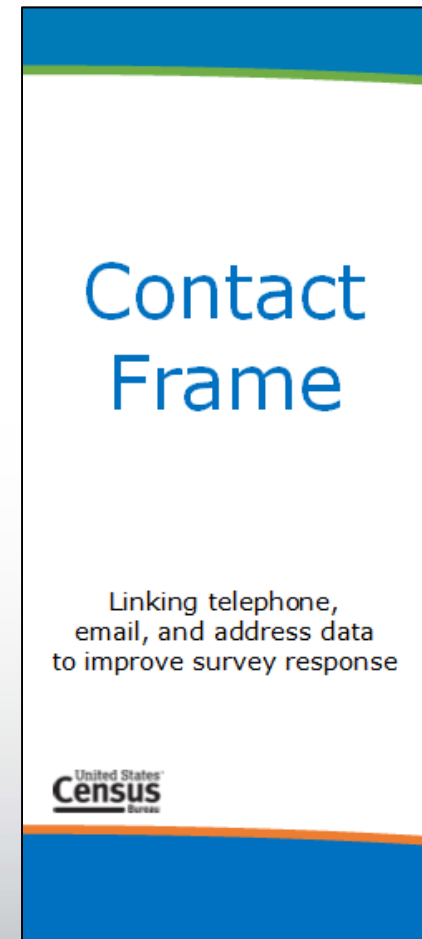
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# Outline

- Background
- Census Bureau use of AVIs
  - 2014 Census Test
  - 2015 Census Test
  - American Community Survey (ACS)
- Conclusions
- Future research
- Challenges

# Contact Frame

- The Contact Frame links phone numbers and email addresses to addresses
- Multiple data sources
  - Commercial
  - Survey
  - Administrative
- Pick up a brochure!



# What is an AVI?

- Automated Voice Invitation

## “Robocall”

- Machine plays a recorded message upon sensing a person or answering machine
- Records paradata

# Can you call cell phones?

## Yes!

- In 2016, the FCC clarified that the TCPA (Telephone Consumer Protection Act) does not apply to government or contractors working on behalf of government

[https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-16-72A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-72A1.pdf)

# Benefits of AVIs

- Increase response:

AVIs serve as an additional contact attempt and may increase response

- Screen out-of-service phone numbers:

AVI paradata allows classification of phone numbers into those answered by a person or machine, fax numbers, out-of-service numbers, and more

- Inexpensive

# Census Bureau use of AVIs

- 2014 Census Test
  - Site test in DC and Montgomery Co., MD
- 2015 Census Test
  - Site test in Savannah, GA
- December 2013 ACS
  - National sample

# 2014 Census Test

- Site test in DC and Montgomery Co., MD
- Landline phone numbers only
- Tested AVI pre-notice, AVI reminder

**Table 1: 2014 Census Test Contact Strategy Panels**

Selected Panel	Pre-Notice (June 17)	#1 (June 23)	#2 (July 1)	#3* (July 8)	#4* (July 15)	#5* (July 22)
6) Cold Contact Email Invite, and 1 <sup>st</sup> Reminder		Email	Email	Postcard	Mail Q'nnaire	
8) AVI Pre-notice, Email Invite, and 1 <sup>st</sup> Reminder	AVI	Email	Email	Postcard	Mail Q'nnaire	
3) Internet Push (Control)		Letter	Postcard	Postcard	Mail Q'nnaire	
5) Internet Push with AVI as 3 <sup>rd</sup> Reminder		Letter	Postcard	Postcard	Mail Q'nnaire	AVI



# 2014 Census Test: Results

- AVI prenotice
  - No impact on response rates vs. control
- AVI reminder
  - No impact on response rates vs. control
  - However, the AVI panel had lower response up until the AVI reminder. After the AVI there was a jump in response, allowing this panel to catch up to the control panel. Response rates *after* the call were significantly higher for the AVI panel.

# 2014 Census Test: Results

- Sometimes AVIs are delivered to the wrong housing unit.
  - Movers
  - Phone billed to another address
- We received responses from about 200 respondents with addresses outside the test site but with phone numbers that were linked to an address that was in sample
- Undesirable for surveys, but benefit for census?

# 2015 Census Test

- Site test in Savannah, GA
- Landline and cell phone numbers
- Calls made in absence of mail materials
- Tested AVI using three voices
  - Mayor
  - Local newscaster
  - Voice actor

# 2015 Census Test: Results

- Tested AVI using three voices
  - Mayor
  - Local newscaster
  - Voice actor

} No significant difference in response rate
- AVI did not increase response vs. control
- In the AVI panel, housing units with successful AVI had higher response rate than unsuccessful
  - Additional contact?
  - Proxy for vacancy?

# December 2013 ACS

- National survey
- Landline phone numbers only
- In the time between self-response and CATI, AVI calls were made so that out-of-service phone numbers could be screened from CATI
- Technical issues prevented some phone numbers from being screened out, so phones of all quality were called in CATI



# AVI system: PhoneTree

- The Census Bureau uses PhoneTree to deliver AVIs
- PhoneTree generates call-level paradata, which I group into three categories:

“Message delivered”	“In service, message not delivered”	“Out of service”
Answered by person Answered by +machine	Answered by machine Busy after voice Hung up early Max no answers No connect Outgoing message too long	Telco Fax or modem

# CATI outcomes

- ACS CATI transaction codes can be grouped by quality of phone number/address pair

“Good”	“Bad”	“Refusal”	“No info”
Complete	Out of service	Refusal	Fax or modem
Sufficient partial	Not a housing unit	Immediate hang up	Ring no answer
Respondent verified address	Respondent verified wrong address		Answering machine
Respondent will self-respond			Vacant

# 2013 ACS: AVI vs. CATI

- AVI paradata are correlated with CATI outcomes
  - Bad phones rarely have good CATI results

		AVI outcome for phone number	CATI outcome for phone number			
			% Good	% Bad	% Refusal	% No Info
Prioritize? →	Message delivered	33.4%	34.5%	6.6%	25.5%	
	In service, message not delivered	12.2%	59.8%	3.3%	24.8%	
Drop? →	Out of service	0.8%	89.4%	0.3%	9.4%	
		Total	18.1%	53.8%	4.1%	24.0%



# 2013 ACS: AVI vs. late self response

- In addition to using AVIs to screen out bad phone numbers, AVIs may also encourage late self response

AVI outcome for housing unit	Cases without LSR	Cases with LSR	LSR %	Total
Message delivered	42,205	18,098	30.0%	60,303
In service, message not delivered	48,121	11,064	18.7%	59,185
Out of service	10,886	740	6.4%	11,626
Total	101,212	29,902	22.8%	131,114

# 2013 ACS: AVI vs. late self response

- During this test, late self response was 50% more than the next highest month, and 100% more than most months
  - Additional contact?
  - Proxy for vacancy?
  - Are households linked to phone numbers simply more likely to respond?

# Conclusions

- AVIs do not significantly change self response rates in Census tests
  - Could the bleed from contacting improperly linked households be a benefit?
- AVI outcomes correlated to CATI outcomes
- AVI outcomes correlated with late self response
- No documented respondent complaints from AVIs

# Suggested future research

- A split-panel test to determine whether AVIs
  - Increase efficiency of call operation by removing out of service phone numbers
  - Boost late self response
- Variations on AVIs used to increase response
  - Frequency of calls
  - Time of day
  - Voice and message
  - Target low response areas

# Challenges

- Sending large lists through AVI can be problematic if there are glitches; we suggest multiple smaller files
- Increase in respondent burden
- Call blocking services such as Nomorobo

# Thank You

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# Resources

- *In the Matter of Rules and Regulations Implementing the Telephone Consumer Protection Act of 1991*, CG Docket No. 02-278, Declaratory Ruling, FCC 16-72 (July 5, 2016) Accessed from [https://apps.fcc.gov/edocs\\_public/attachmatch/FCC-16-72A1.pdf](https://apps.fcc.gov/edocs_public/attachmatch/FCC-16-72A1.pdf)
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