Can a higher incentive increase physical examination response? Evidence from the National Health and Nutrition Examination Survey (NHANES)

Te-Ching Chen, Matt Jans, Lara Akinbami, Ryne Paulose-Ram, Damon Ogburn, David Woodwell, Allan Uribe, Jessica Graber
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Division of Health and Nutrition Examination Surveys
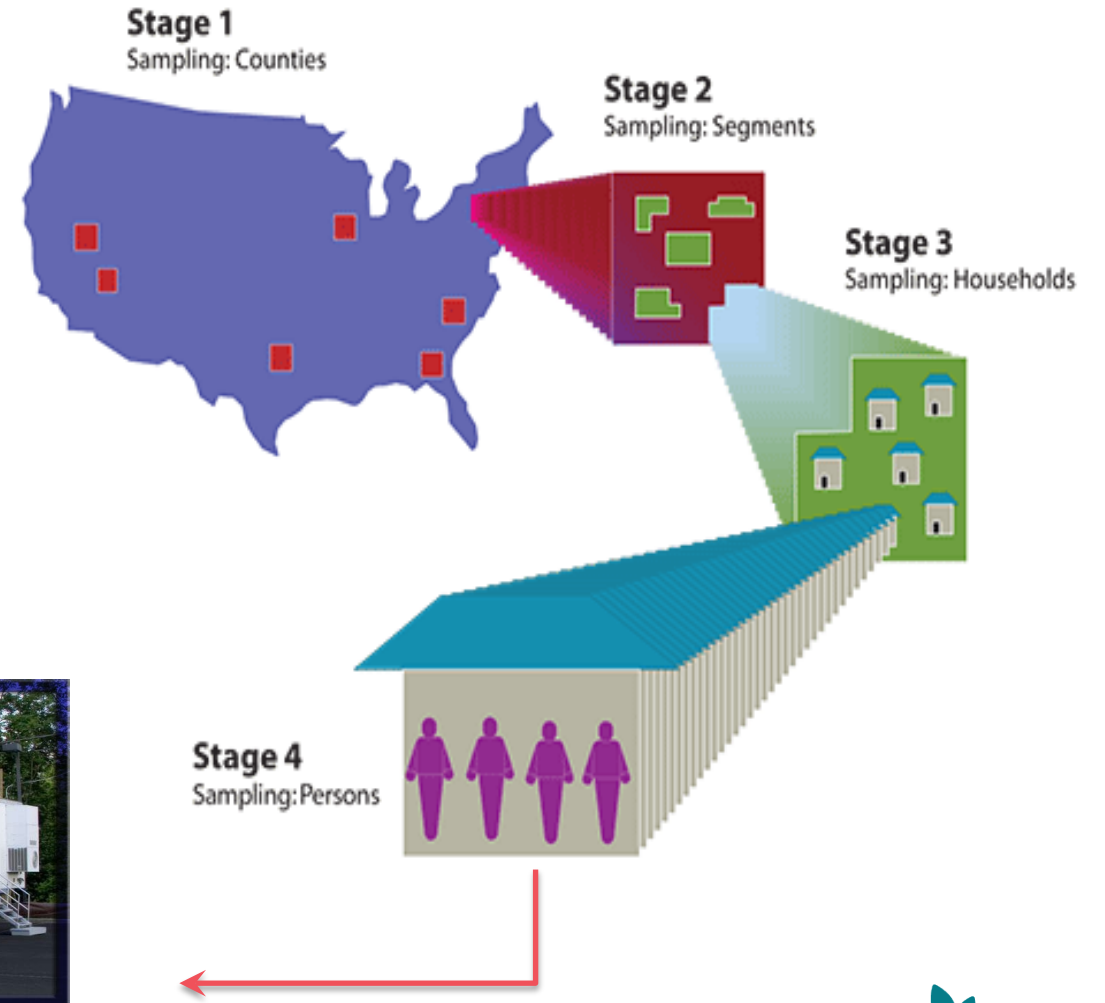National Center for Health Statistics

Disclaimer

The findings and conclusions in this presentation are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention
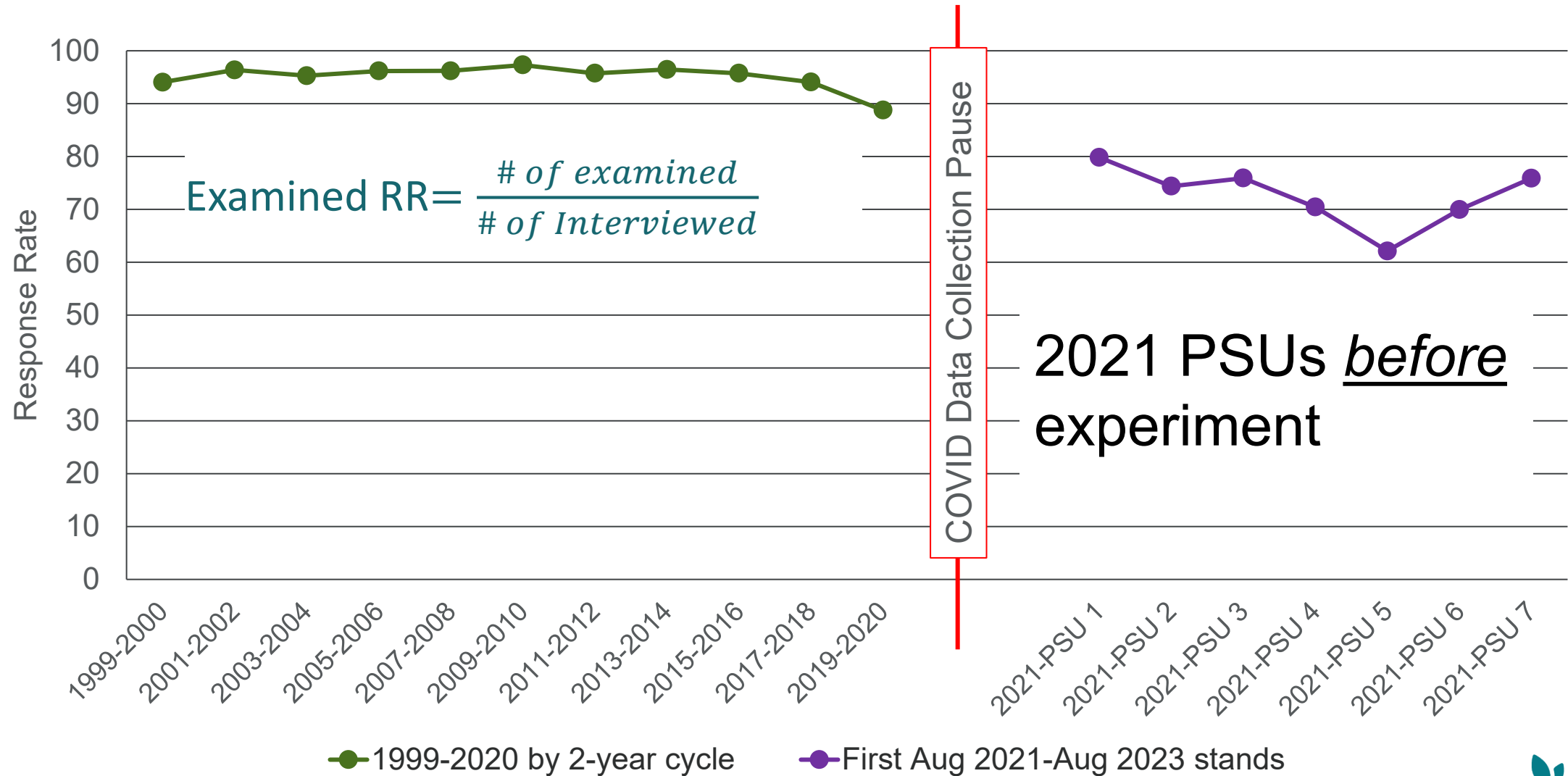
Background

NHANES Sample Design for August 2021-August 2023

- Complex multistage probability sample design

- Selected households are screened to identify eligible participants

- Data are collected in screener, interview and physical examination

Examined Response Rate Dropped in Early 2021/2023 cycle

Examined RR$= \dfrac{\text{\# of examined}}{\text{\# of Interviewed}}$

Response Rate

COVID Data Collection Pause

2021 PSUs *before* experiment

1999-2000, 2001-2002, 2003-2004, 2005-2006, 2007-2008, 2009-2010, 2011-2012, 2013-2014, 2015-2016, 2017-2018, 2019-2020

2021-PSU 1, 2021-PSU 2, 2021-PSU 3, 2021-PSU 4, 2021-PSU 5, 2021-PSU 6, 2021-PSU 7

— 1999-2020 by 2-year cycle — First Aug 2021-Aug 2023 stands

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NHANES Exam Incentive

- Exam incentive amount differed by age group.

0-11 years	12-15 years	≥16 years
$40	$60	$85

- SP receives interview incentive for the first time

- Exam incentives were smaller in 2021 compared with earlier cycles

Research Questions

- Can a higher exam incentive increase exam response rate?

- Will it change the rate of cancelations and "no shows"?

- Will it change the rate at which morning session participants fast before blood drawn?

Methods and Data

NHANES MEC Exam Incentive

- Incentive pilot study started in PSU 8

	0-11 years	12-15 years	≥16 years
PSU 1-7	$40	$60	$85
PSU 8+	$40	$60	**$125**

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Data and Method

- NHANES August 2021- August 2023 cycle
- Interviewed sampled participants (SPs) aged 16 years and over
- Characteristics compared
  - Demographics: race, sex, age group (16-19, 20-39, 40-59, 60+)
  - Household size (1-2, 3-4, 5+)
  - Interview mode (in-person, by phone)
  - Health insurance status (with, without)
  - General health (excellent, very good, good, fair/poor)
  - Ever diagnosed diabetes (Yes, No)
  - With Interpreter (Yes, No)
  - Language used during interview (English, Spanish)

MEC Examination Statuses Analyzed (Key Outcomes)

- MEC examined:
  - Interviewed SP who also did MEC examination

- No appointment:
  - Interviewed SP who didn't make an appointment for MEC examination

- Cancelled:
  - Interviewed SP who made an appointment but cancelled the appointment

- No show:
  - Interviewed SP who made an appointment but didn't show up to the MEC

Fasting status before blood drawn

- Fasting sample

  - All SPs aged 12 years and over examined in a morning session are asked to fast 8 hours before their MEC visit.

- Did the incentive increase the compliance for SPs to fast for the morning session?

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Findings

Overall Incentive Effect – Increases examined and Reduces Cancellation and "No Show"

	Percent of Interviewed SPs	
	$85 (PSUs 1 – 7)	$125 (PSUs 8 – 30)
Examined	72.9%	79.5%*
No appointment	11.7%	11.1%
Cancelled/No show	15.4%	9.4%*

*2-sample t-test significantly different (p< 0.05) for examined and Cancelled/No Show

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Examined Rate for $125 Incentive PSUs is Higher Overall
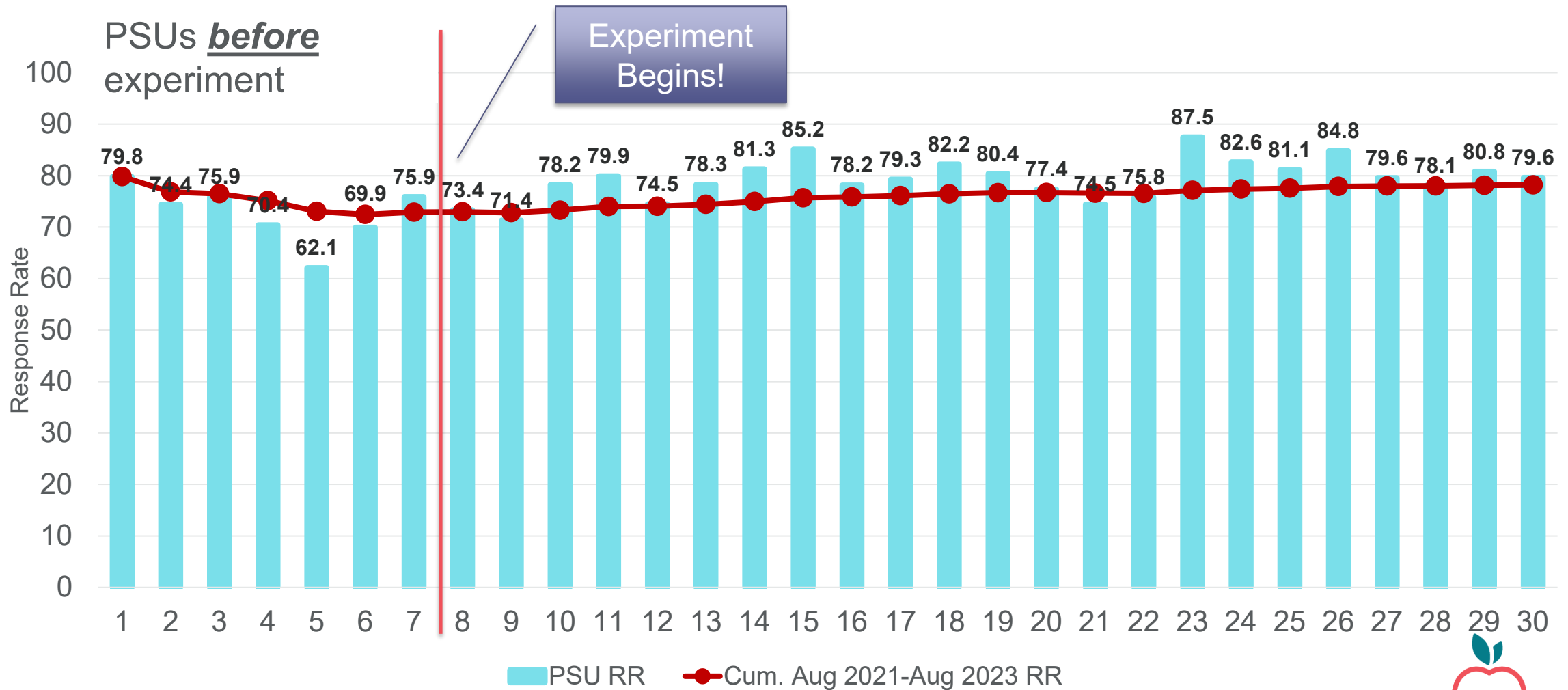
Difference of MEC examined rates

Difference = MEC examined % ($125 incentive) – MEC examined % ($85 incentive)
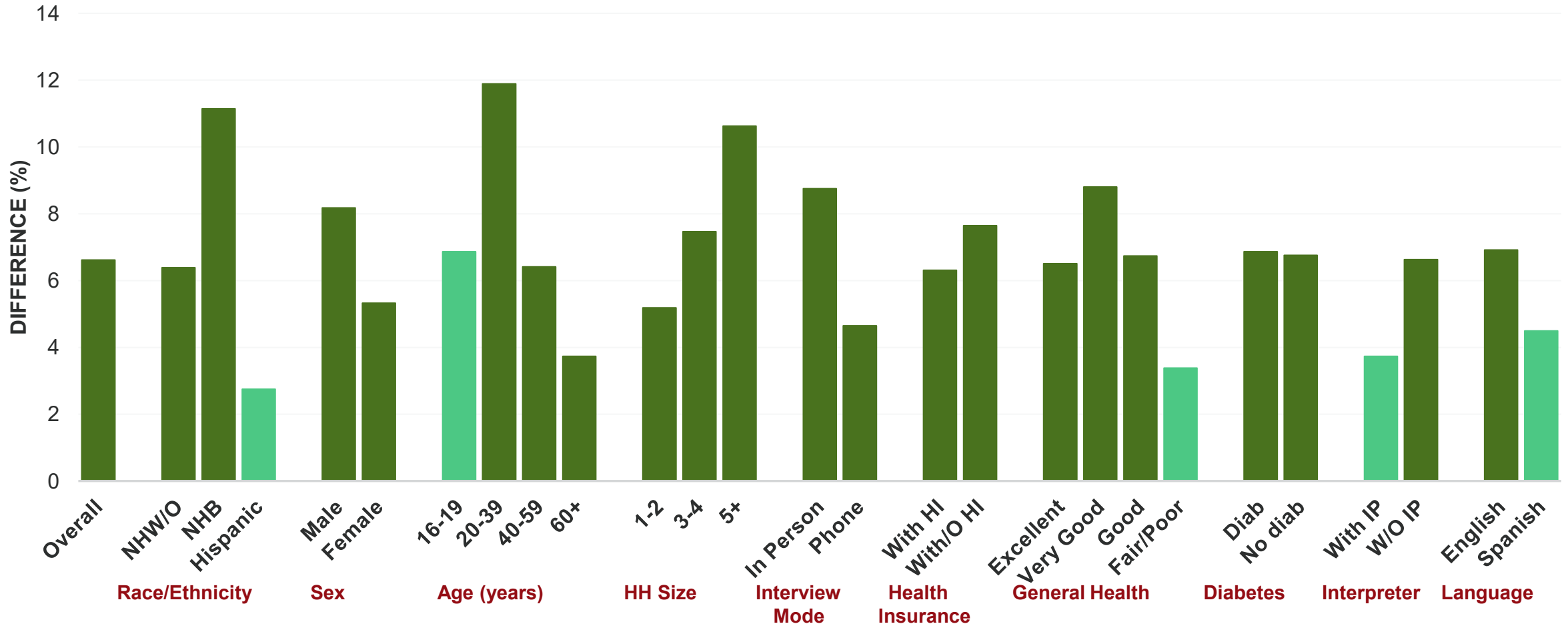
Legend:
- : 2-sample t-test significantly different at 0.05 level
- : difference did not reach statistical significance

Y-axis: DIFFERENCE (%), scale 0 to 14

X-axis (CHARACTERISTICS):
- Race/Ethnicity: Overall, NHW/O, NHB, Hispanic
- Sex: Male, Female
- Age (years): 16-19, 20-39, 40-59, 60+
- HH Size: 1-2, 3-4, 5+
- Interview Mode: In Person, Phone
- Health Insurance: With HI, With/O HI
- General Health: Excellent, Very Good, Good, Fair/Poor
- Diabetes: Diab, No diab
- Interpreter: With IP, W/O IP
- Language: English, Spanish

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Difference of Cancelled/No show rates
Difference = Cancelled/No show % ($125 incentive) – Cancelled/No show % ($85 incentive)

CHARACTERISTICS

Race/Ethnicity | Sex | Age (years) | HH Size | Interview Mode | Health Insurance | General Health | Diabetes | Interpreter | Language

Overall | NHW/O | NHB | Hispanic | Male | Female | 16-19 | 20-39 | 40-59 | 60+ | 1-2 | 3-4 | 5+ | In Person | Phone | With HI | With/O HI | Excellent | Very Good | Good | Fair/Poor | Diab | No diab | With IP | W/O IP | English | Spanish
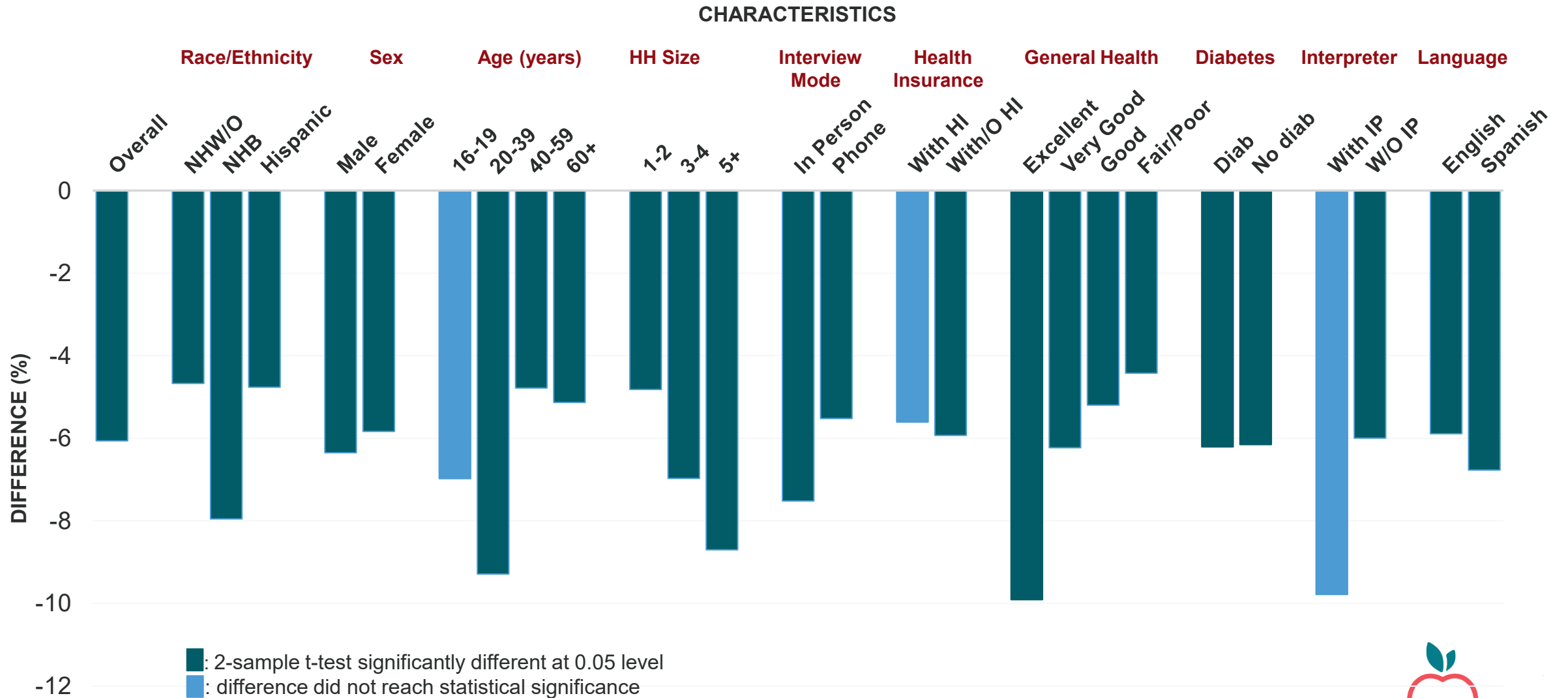
■ : 2-sample t-test significantly different at 0.05 level
■ : difference did not reach statistical significance

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Difference of No Appointment rates
Difference = No Appointment% ($125 incentive) – No Appointment % ($85 incentive)

■ : 2-sample t-test significantly different at 0.05 level
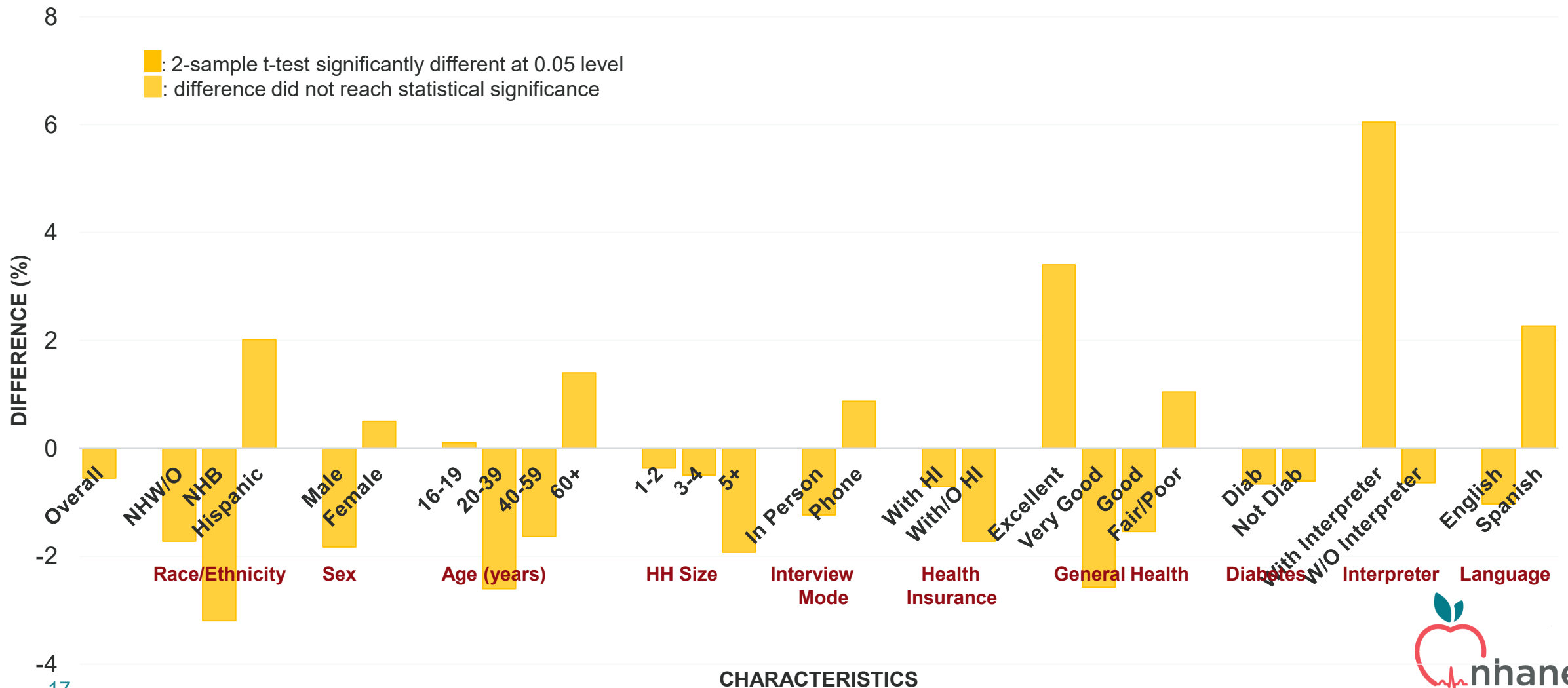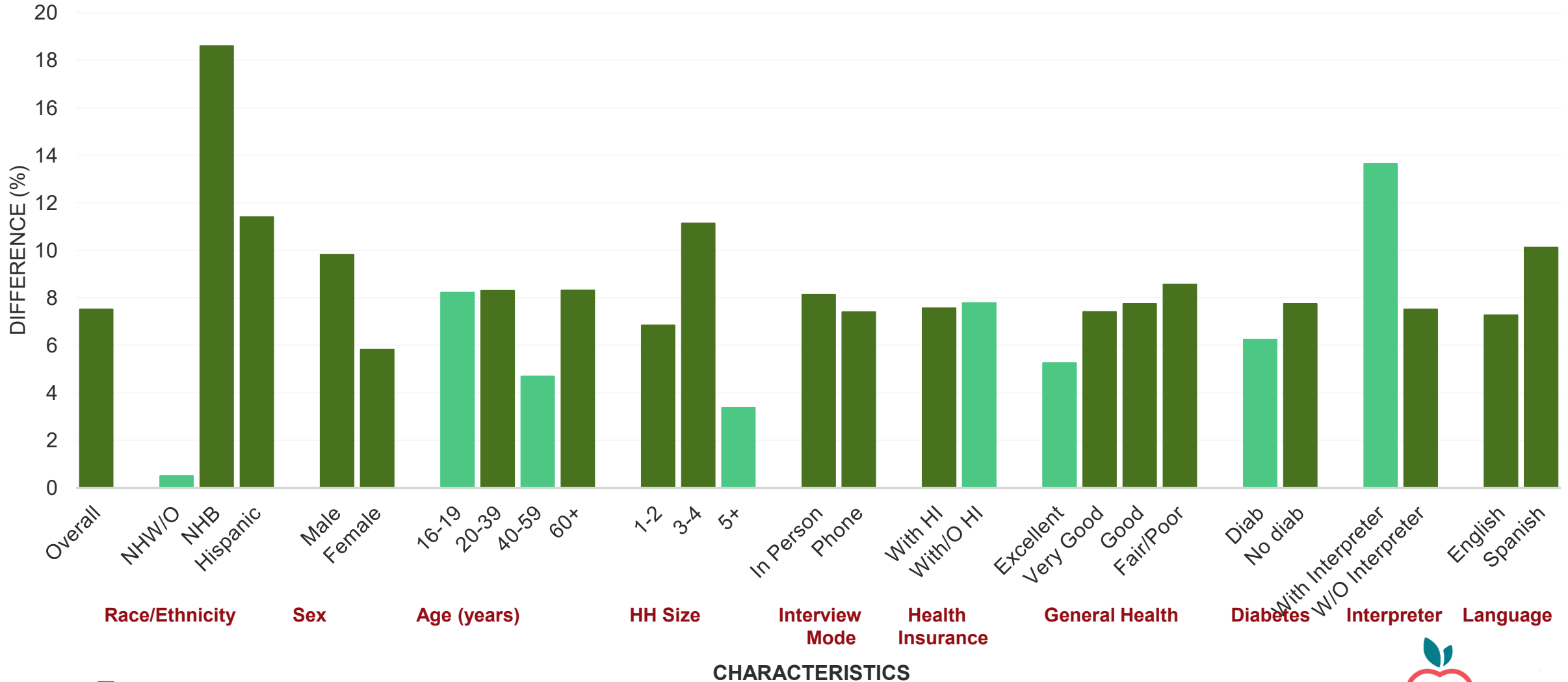■ : difference did not reach statistical significance

DIFFERENCE (%)

Overall · NHW/O · NHB · Hispanic · Male · Female · 16-19 · 20-39 · 40-59 · 60+ · 1-2 · 3-4 · 5+ · In Person · Phone · With HI · With/O HI · Excellent · Very Good · Good · Fair/Poor · Diab · Not Diab · With Interpreter · W/O Interpreter · English · Spanish

Race/Ethnicity   Sex   Age (years)   HH Size   Interview Mode   Health Insurance   General Health   Diabetes   Interpreter   Language

CHARACTERISTICS

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Difference of morning sample fasting rate

Difference = morning sample fasting % ($125 incentive) – morning sample fasting % ($85 incentive)

DIFFERENCE (%)

CHARACTERISTICS

Race/Ethnicity — Overall, NHW/O, NHB, Hispanic
Sex — Male, Female
Age (years) — 16-19, 20-39, 40-59, 60+
HH Size — 1-2, 3-4, 5+
Interview Mode — In Person, Phone
Health Insurance — With HI, With/O HI
General Health — Excellent, Very Good, Good, Fair/Poor
Diabetes — Diab, No diab
Interpreter — With Interpreter, W/O Interpreter
Language — English, Spanish

■ : 2-sample t-test significantly different at 0.05 level
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Highlights of Results not Shown

- $125 incentive reduced variability in response rates across demo and health characteristics

  - Indicator of nonresponse bias risk reduction

- Incentive effect remains after control for person-level and PSU-level characteristics

Summary

- Higher incentive
  - increased examined rates
  - reduced cancelled/no show rates
  - made no difference in scheduling a MEC appointment
  - increased fasting rate for morning participants
  - had less response rate variation among characteristics categories

Future Directions

- Does the incentive increase impact other rates

  - Response rate for SPs younger than 16 in the same household?

  - MEC Examination item response rates?

- Models to predict/estimate size of effect among various groups controlling for others

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Thank you!

Te-Ching Chen: tchen3@cdc.gov

Real texts of the selected questions used in this project

- **Health insurance status:** The (first/next) questions are about health insurance. {Are you/Is SP} covered by health insurance or some other kind of health care plan? [Include health insurance obtained through employment or purchased directly as well as government programs like Medicare and Medicaid that provide medical care or help pay medical bills.]

- **General health:** {First/Next} I have some general questions about {your/SP's} health. Would you say {your/SP's} health in general is . . .(excellent, very good, good, fair, poor)

- **Diagnosed diabetes:** The next questions are about specific medical conditions. {Other than during pregnancy, {have you/has SP}/{Have you/Has SP}} ever been told by a doctor or health professional that {you have/{he/she/SP} has} diabetes or sugar diabetes?(Yes, No)

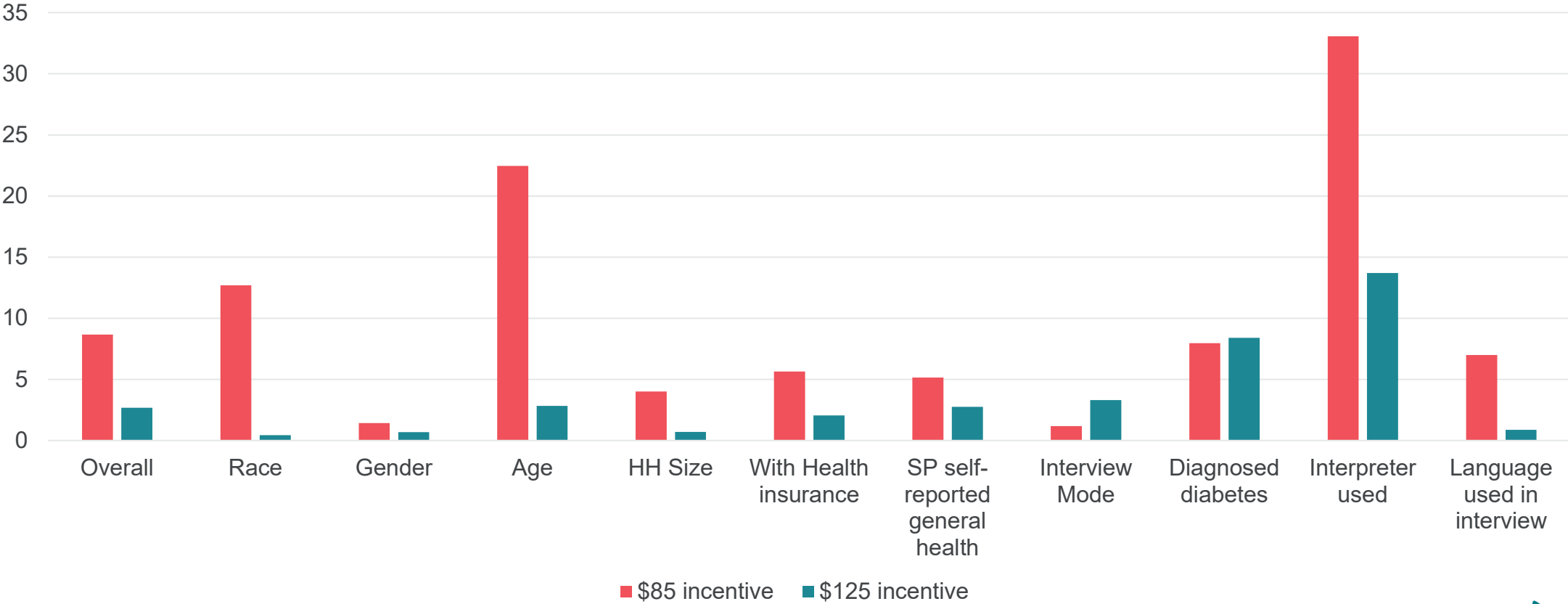nhanes
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Examination Statuses Analyzed (Key Outcomes)

- Examined:
  - Interviewed SP who also did examination

- No appointment:
  - Interviewed SP who didn't make an appointment for MEC examination

- Cancelled:
  - Interviewed SP who made an appointment but cancelled the appointment

- No show:
  - Interviewed SP who made an appointment but didn't show up to the MEC

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Variability in response rate (RR variance) across demographic variables as a metric of nonresponse bias risk

- Variability in response (or nonresponse) rates across demographic groups is one measure of nonresponse bias risk

- Calculated:
  - Conditional MEC response rates for several demographic and health groups
  - Simple variance of RR values across categories of each group

- Each demographic or health variable has an RR variance value associated with it

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Assessed variability in response rate (RR variance) across demographic variables

Legend: ■ $85 incentive ■ $125 incentive

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Assessed variability in RR variance across demographic variables (tabular results for figure on prior slide)

	$85 incentive	$125 incentive
Overall	8.7	2.7
Race	12.7	0.4
Sex	1.4	0.7
Age	22.5	2.8
HH size	4.0	0.7
Interview mode	5.6	2.0
With/Without Health Insurance	5.1	2.7
General health	1.2	3.3
Diagnosed diabetes	8.0	8.4
With/Without interpreter	33.1	13.7
Language used in interview	7.0	0.9

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Assessed variability in morning sample fasting rate variance across demographic variables

	$85 incentive	$125 incentive
Overall	45.7	6.0
Race	132.2	5.6
Sex	10.0	0.1
Age	15.3	7.7
Interview mode	1.3	0.4
With/Without Health Insurance	0.0	0.1
General health	113.1	1.3
Diagnosed diabetes	0.3	0.3
With/Without interpreter	131.8	51.1
Language used in interview	0.5	1.7

Predicting Incentive Effect Controlling for PSU Characteristics

Fixed	Random	ESTIMATE	LOWER	UPPER
Incentive only		**1.443**	**1.278**	**1.631**
Incentive	Census region, Health state, MEC season, Urban-rural	1.375	1.178	1.606
Incentive, gender, race, age group		1.445	1.277	1.636
Incentive, gender, race, age group	Census region, Health state, MEC season, Urban-rural	1.383	1.197	1.597
Incentive, Gender, race, age group, HH size, interview mode, diab (Y/N), general health, health insurance		1.421	1.252	1.611
Incentive, Gender, race, age group, HH size, interview mode, diab (Y/N), general health, health insurance	**Census region, Health state, MEC season, Urban-rural**	**1.365**	**1.180**	**1.579**

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		Incentive $85		Incentive $125		Examined Rate		RR variance	
		Examined	Interviewed	Examined	Interviewed	$85	$125	$85	$125
Overall	**All**	**1244**	**1706**	**5383**	**6768**	**73%**	**80%**	**8.7**	**2.7**
Race	NHW/O	682	932	3820	4801	73%	80%	12.7	0.4
	NHB	268	388	661	824	69%	80%		
	Hispanic	294	386	902	1143	76%	79%		
Gender	Male	558	775	2439	3042	72%	80%	1.4	0.7
	Female	686	931	2944	3726	74%	79%		
Age	16-19	95	127	459	562	75%	82%	22.5	2.8
	20-39	270	411	1291	1664	66%	78%		
	40-59	320	436	1419	1778	73%	80%		
	60+	559	732	2214	2764	76%	80%		
HH size	1-2	709	956	3078	3879	74%	79%	4.0	0.7
	3-4	368	512	1594	2009	72%	79%		
	5+	167	238	711	880	70%	81%		
Interpreter used	Yes	17	21	94	111	81%	85%	33.1	13.7
	No	1227	1685	5289	6657	73%	79%		
Language used in interview	English	1109	1529	5026	6326	73%	79%	7.0	0.9
	Spanish	135	177	357	442	76%	81%		

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		Incentive $85		Incentive $125		Examined Rate		RR variance	
		Examined	Interviewed	Examined	Interviewed	$85	$125	$85	$125
Overall	**All**	**1244**	**1706**	**5383**	**6768**	**73%**	**80%**	**8.7**	**2.7**
With Health insurance*	Yes	1079	1470	4967	6231	73%	80%	5.6	2.0
	No	159	227	404	520	70%	78%		
SP self-reported general health*	Excellent	169	240	770	1001	70%	77%	5.1	2.7
	Very good	364	511	1768	2209	71%	80%		
	Good	428	579	1889	2342	74%	81%		
	Fair/Poor	283	376	954	1213	75%	79%		
Interview Mode	In Person	462	642	2959	3666	72%	81%	1.2	3.3
	Phone	782	1064	2424	3102	73%	78%		
Diagnosed diabetes*	Yes	193	253	681	819	76%	83%	8.0	8.4
	No	1049	1451	4702	5948	72%	79%		

*Don't know/Refusal are excluded

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