

An Assessment of Bias in Estimates Among Self-Reported Web Users: National Health Interview Survey, 2014-2016

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FEDCASIC, April 18, 2018

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DEPARTMENT OF HEALTH AND HUMAN SERVICES
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Outline

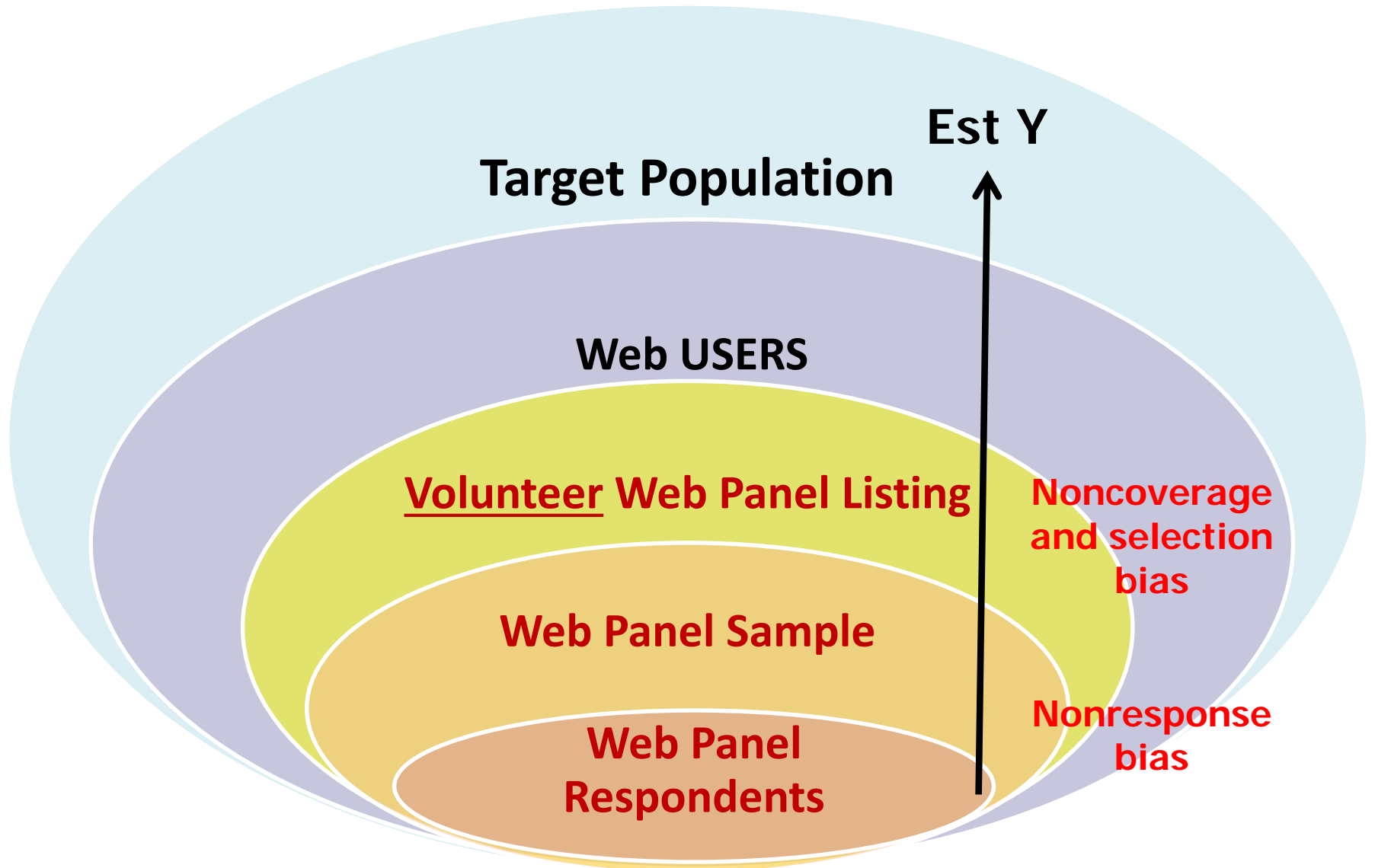
- **Objective**
- **Web users \simeq Internet or e-mail users**
 - \simeq **Potential Web survey participants**
- **National Health Interview Survey**
- **Estimates and Bias Assessment**
- **Summary**

Objective

Increase in

- **Web users and non-probability Web surveys**
- **Multimode data collection including Internet and smart phones**
- **Necessitates assessment of representativeness of the Web survey respondents and bias in estimates**
- **Question: Who are the Web users and potential Web survey respondents? Is there any bias in estimates from Web surveys?**

Web Panel Surveys



National Health Interview Survey (NHIS)

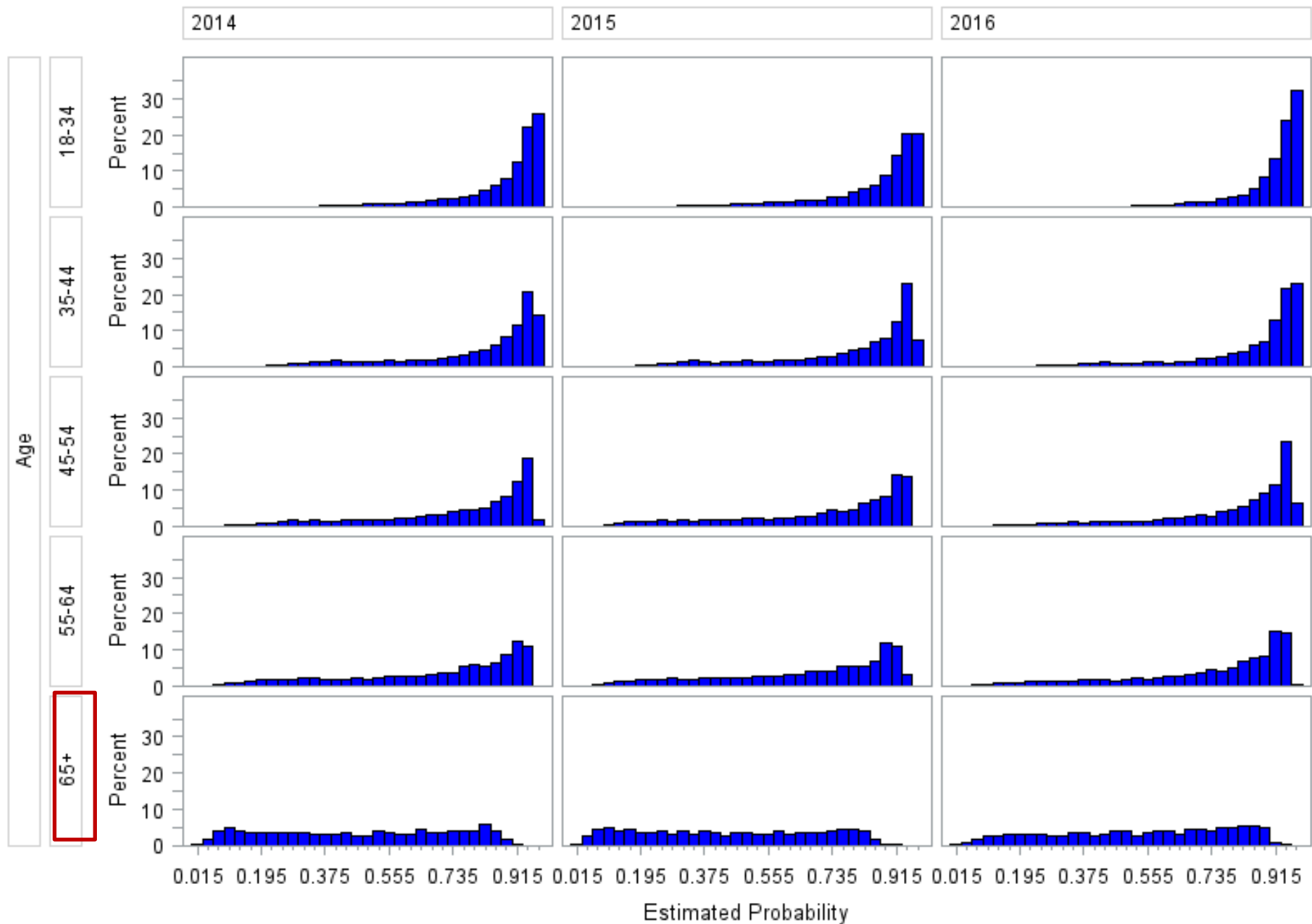
- **Large F-T-F household based health survey of the noninstitutionalized U.S. population**
- **Added questions (Adults)**
 - **On Internet and e-mail use (2013+)**
 - **On Web research panel membership (2014-2015); dropped in 2016**
- **Data: Adults, aged 18+ years, NHIS 2014-2016**
- **Interview response rate, 2014-2016 :**
 - **Overall: 73.8%, 70.1%, 67.9%**
 - **Adults: 55.2%, 58.9%, 54.3%**

NHIS Self-Reported Web Users, 2014-2016

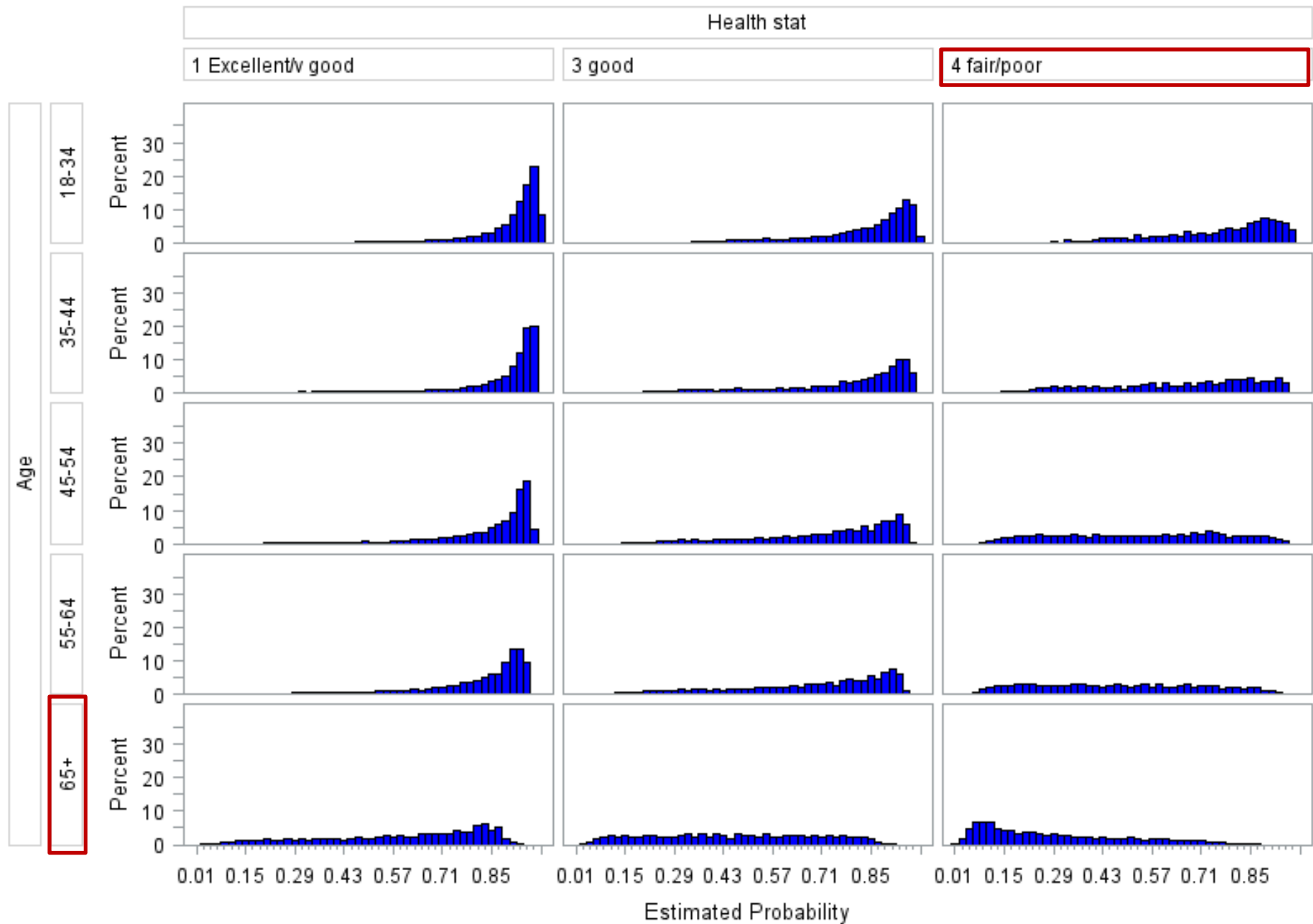
Adults	18+ Years	18-64 Years	65+ Years
Sample Size	103,397	77,473	25,924
Internet Users	74.3%	80.1%	49.8%
Email Users	66.1%	71.5%	43.2%
Web Users	75.2%	81.0%	50.8%

- **Web Research Panel participants 2.6%**
(NHIS 2014-2015; low compared to ~6% from an ICF study)
- **Web Users: Internet or e-mail users**
~Potential Web survey participants

Distribution of predicted probability of Web_user by age group (18+ yrs), combined 2014-2016 NHIS



Distribution of predicted probability of Web_user by age group (18+ yrs) and health status, combined 2014-2016 NHIS



Who are NOT Web Users?

NHIS 2014-2016

- **Overall ~25% of adults do not use Internet or email**
 - **49.2% of adults 65+ years**
 - **37.4% (65-74 years) and 66.1% (75+ years)**
- **Logistic regression model covariates: older adults (65+ years), adults with lower income, poverty status, and lower education, Hispanics, never worked, with fair/poor health status, had frequent home/provider/ER visits in past 12 months, uninsured, and have some health conditions**
- **Older persons of age 65+ years are excluded from analyses because they have different characteristics and are less likely to use Internet or emails**

Characteristics of Web Users among Adults Aged 18-64 Years, NHIS 2014-2016

- **81% of adults are Web users (n=77,437 adults)**
 - **Final Logistic regression model for Web user included following covariates with high propensity (n=73,362)**
 - **Age 18-34 years, female, NH-White or NH-Asian, having poverty status (PIR) > 200%, education >HS/college or Bachelor+, US citizen, having job last week or in the past 12 months, having a working cell phone, living in the West, being in excellent or very good health, and have health insurance**
- => These adults are more likely to have high representation in the sampling frames for Web surveys**

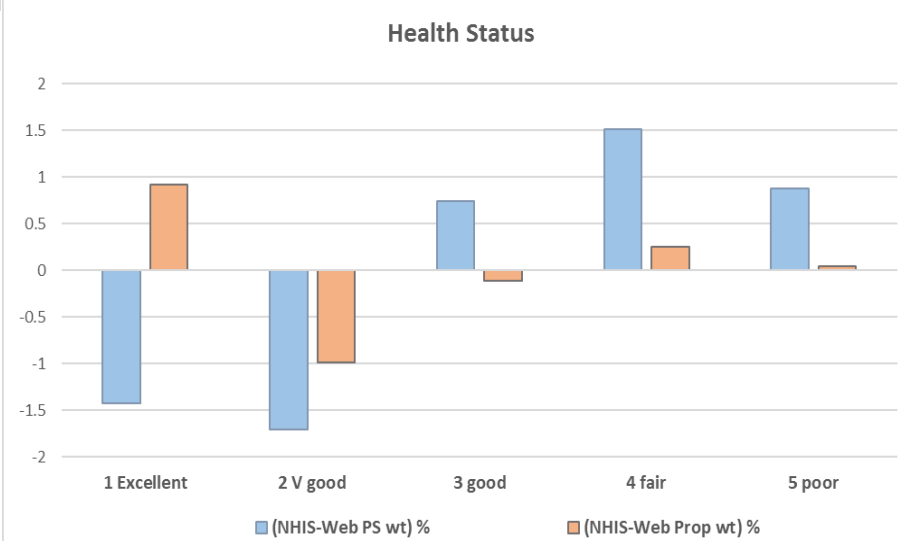
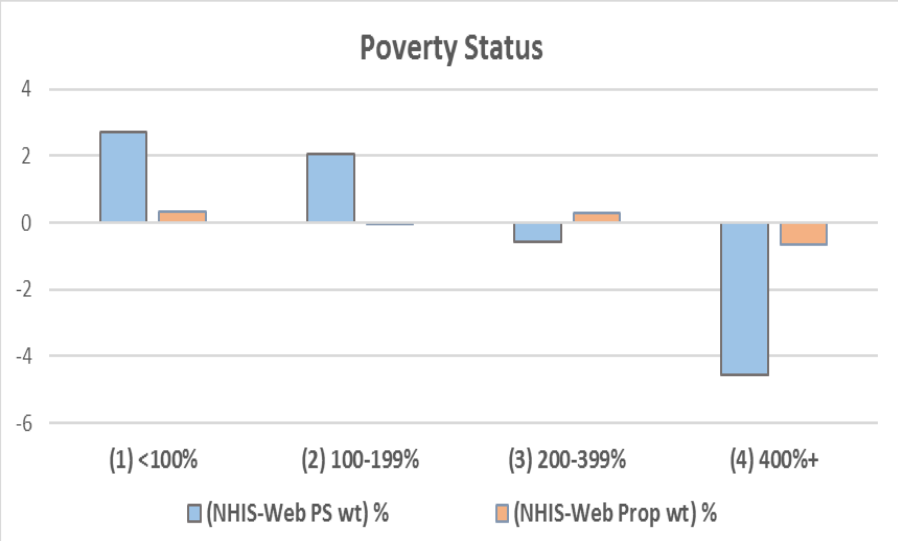
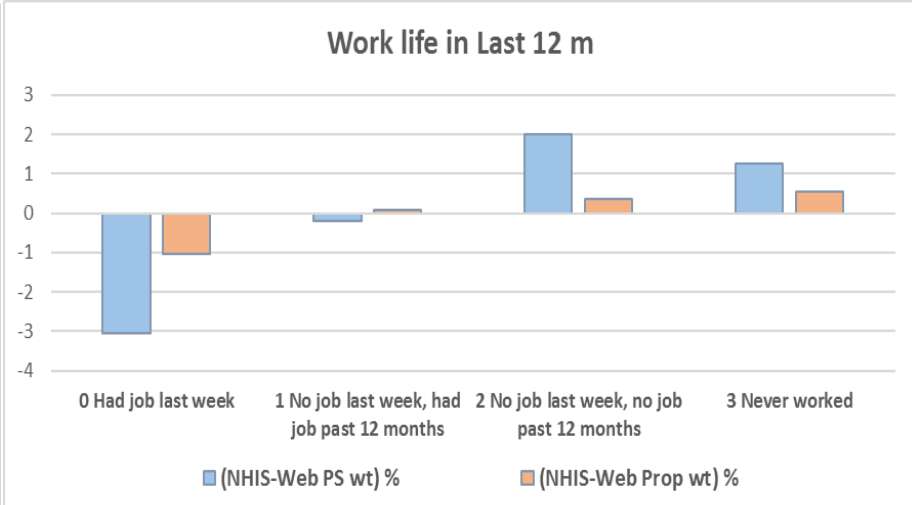
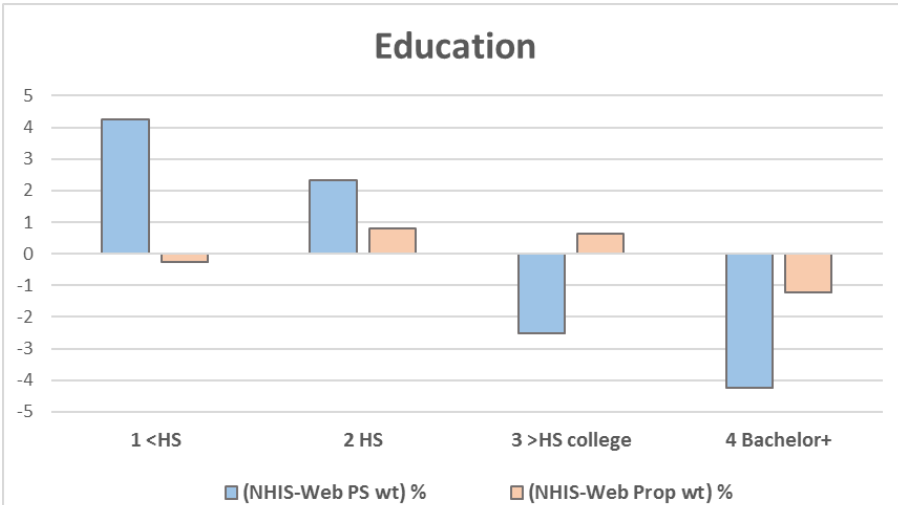
Assessment of Bias in Estimates among Web Users, Adults Aged 18-64 Years, NHIS 2014-2016

- Sample of self-reported Web users are reweighted up to all adults population by age, sex, race/ethnicity
- Weighting methods:
 - Simple calibration or post-stratification by demographics
 - Model based propensity scores and calibration
 - Two samples: all Web users and a 10% sample
- Compared socio-economic and health related estimates with overall NHIS estimates

Difference = 100* (NHIS Estimate - Web Sample Estimate)

Relative Bias (%) = Difference/ NHIS Estimate

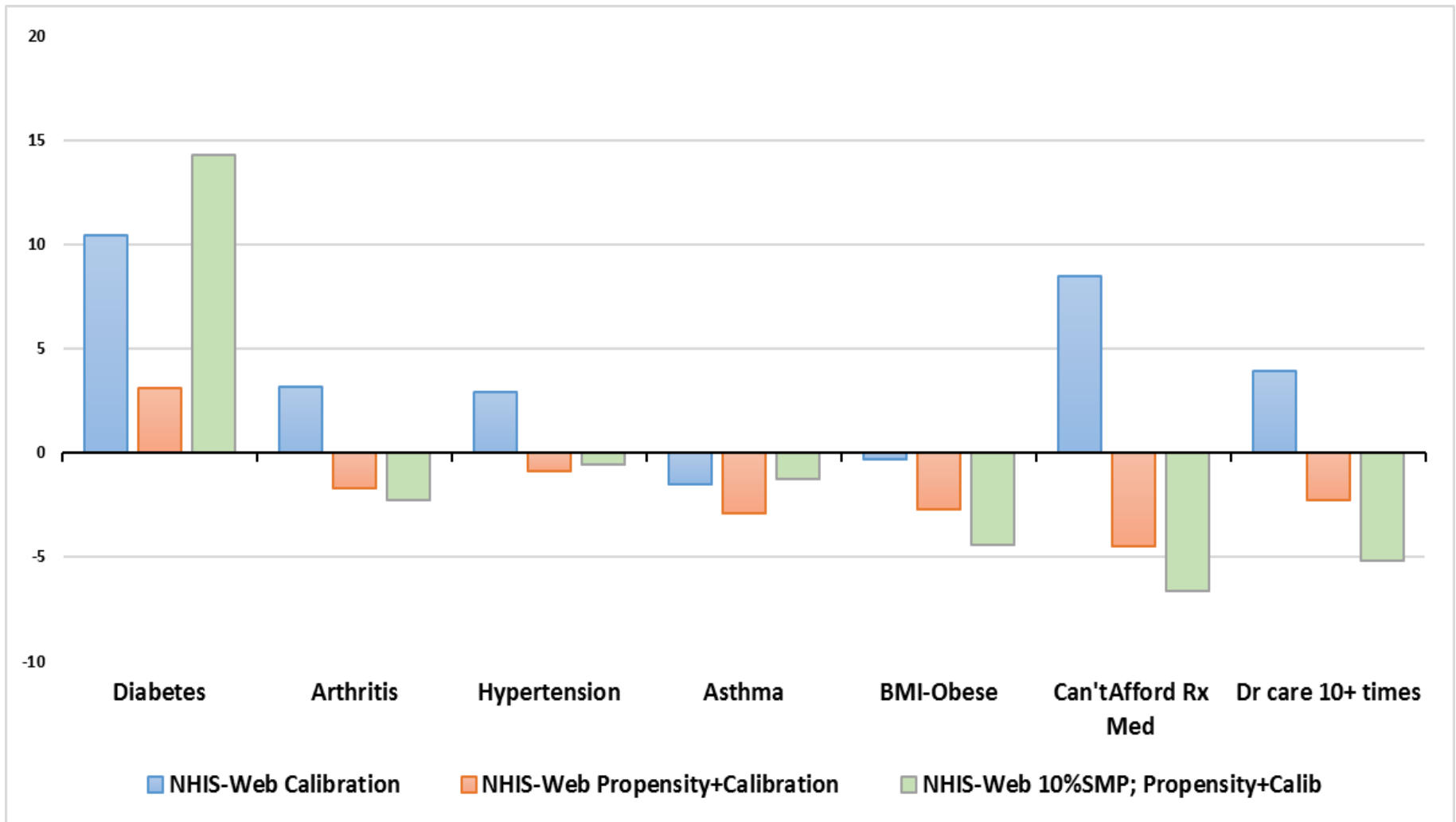
Difference in Weighted Distribution* of Web User Samples by Selected Characteristics, Adults Aged 18-64 Years, NHIS 2014-2016



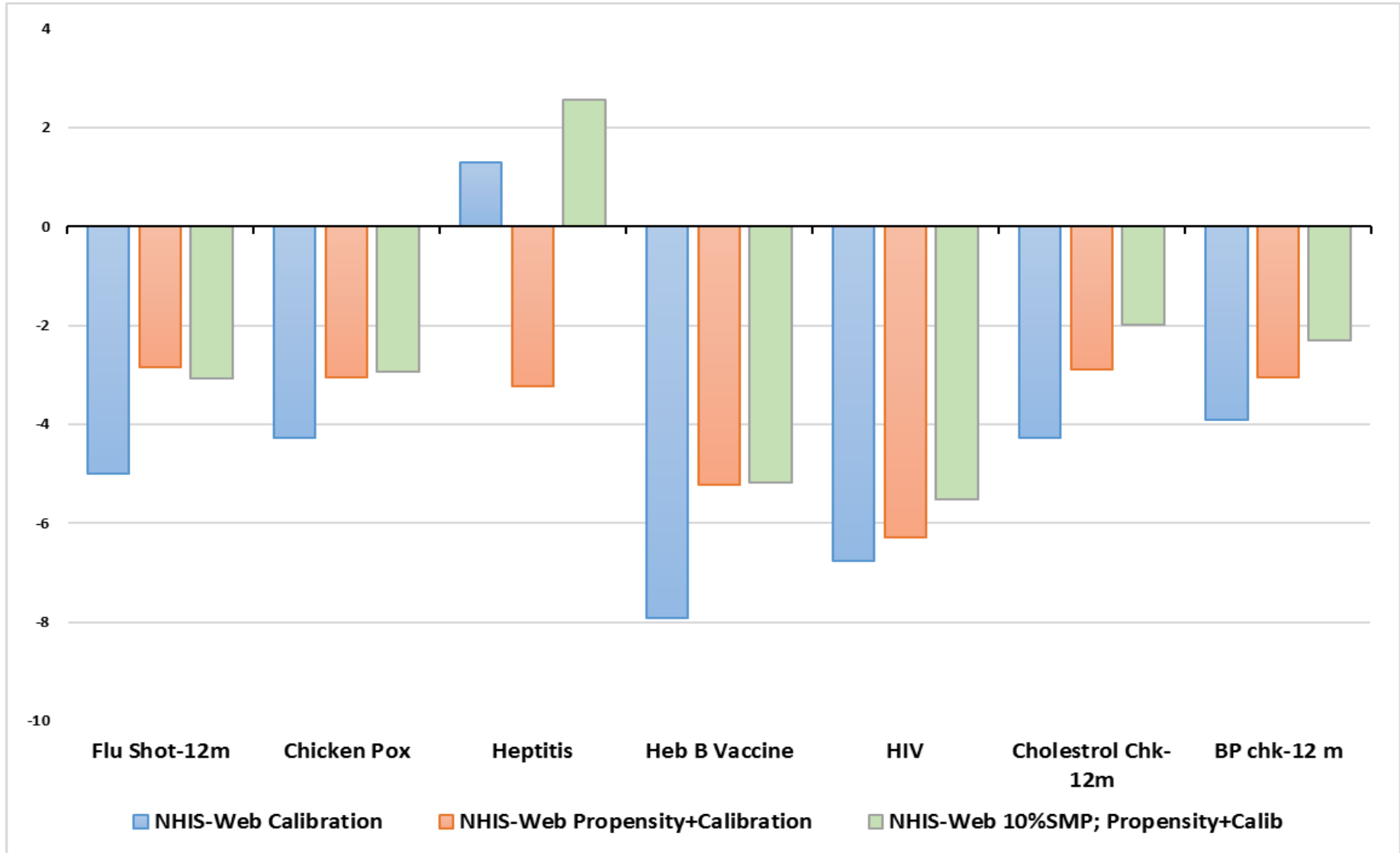
* Note: all weights are calibrated to Age, sex, and race/ethnicity;

Difference= NHIS est – Web sample est

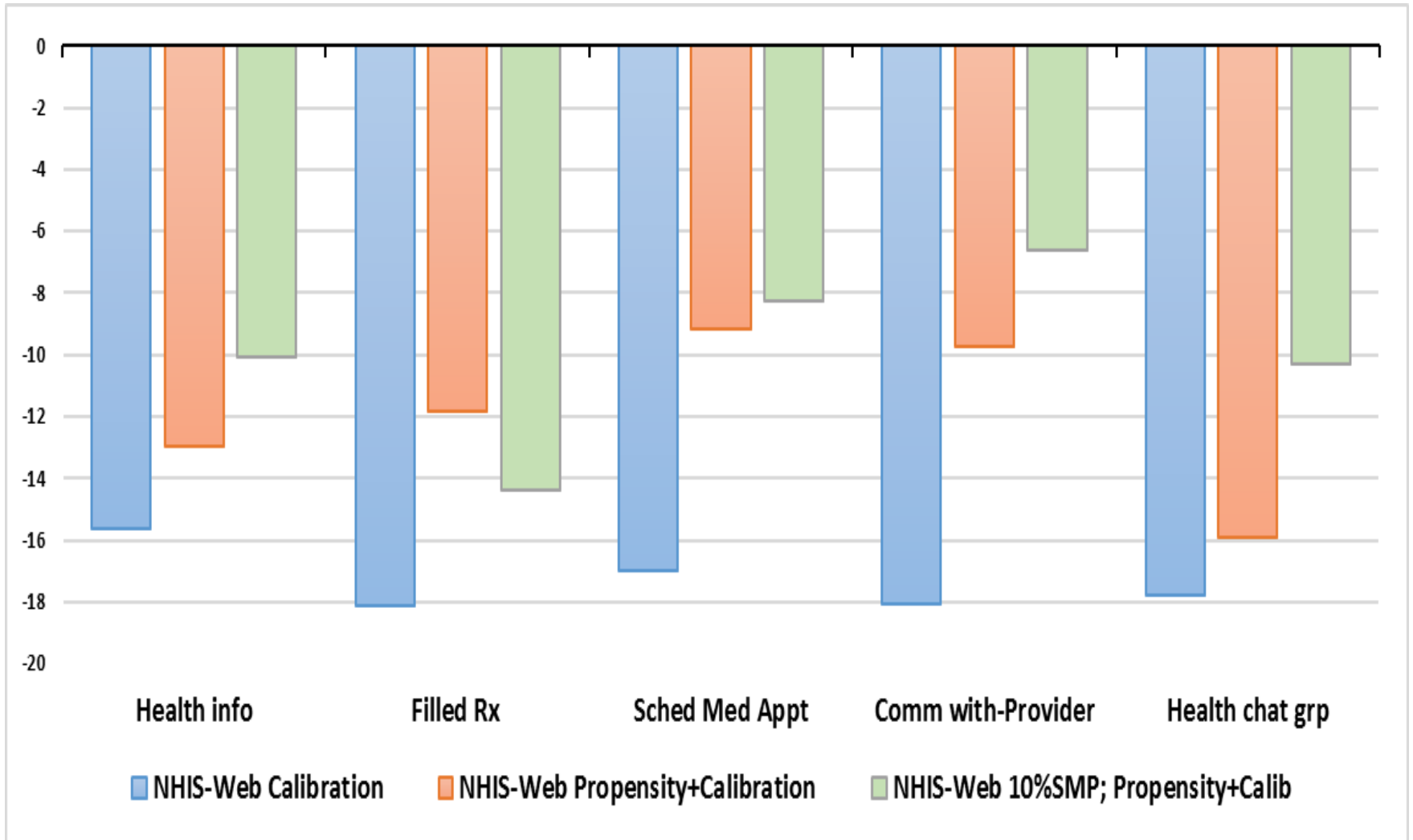
Relative Bias in Web User Sample Estimates (%) (Health Related Characteristics), Adults Aged 18-64 Years, NHIS 2014-2016



Relative Bias in Web Users Sample Estimates (%): Selected Health Condition, Tests and Vaccinations Adults Aged 18-64 Years, NHIS 2014-2016



Relative Bias in Web User Sample Estimates (%): Looked up health information on Internet in 12 months? Adults Aged 18-64 Years, NHIS 2014-2016



Summary

- **NHIS conducts F-T-F interviews**
- **Web users are self-reported NHIS adult respondents**
- **Potential Web survey participants: young adults, non-Hispanics, with higher education, higher income or poverty status >200%, healthy, US citizens, have a job last week or last month and have health insurance**
- **Web user propensity model included covariates: Age, sex, race/ethnicity, poverty status, education, US citizenship, having job last week or in the past 12 months, having working cell phone, region, health status, and health insurance status**

Summary

Weighting methods: A combination of model-based propensity scores and calibration methods appears to perform better than calibration-only method

- **Standard errors: <1% for all Web user sample estimates**
 - Slightly large for the propensity score method;
 - 2-4% larger in the 10% sample (~similar to a Web panel?)

Bias assessment (adults 18-64 Years):

- Larger bias using calibration only weights than combination weights
 - Bias varied by sample, weighting methods and by socio-economic and health characteristics or conditions
 - Large differences (NHIS-Web) in estimates for Web users looking for health, prescription, or provider information on the Internet (expected?)
- Suggests potential for noncoverage bias in Web survey estimates**

Thank You

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