Recent Trends in Nonresponse Bias in the National Health Interview Survey (NHIS)

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Final Response Rates: NHIS, 1997-2016
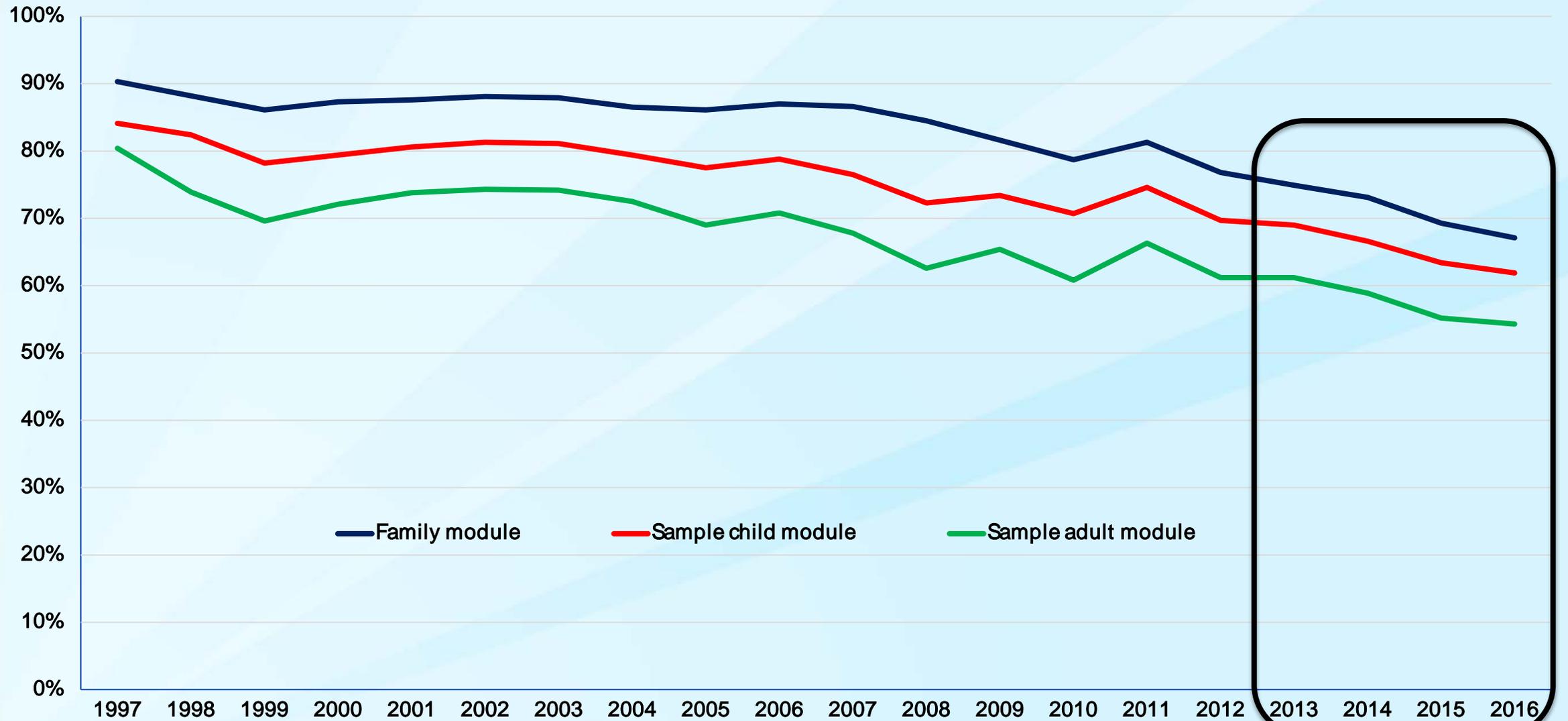
Nonresponse Bias Analysis (1)

❑ What do we know about nonresponse bias in key health outcomes, and how has it changed over time (2013-2016)?

- Approach 1: Studying variations within the survey

  - Output response propensities from model and split responders into quintiles

  - Compute estimates (base weights) across quintiles for 19 key survey outcomes

    - Pattern of estimates
    - Low response propensity quintile vs. rest of sample (t-test)
    - Relative bias: $(\bar{Y}_{high} - \bar{Y}_{low})/ \bar{Y}_{high}$

  - How does the final weight, with nonresponse and post-stratification adjustments, move the estimate?

Nonresponse Bias Analysis (2)

- Approach 2: Comparisons to similar estimates from other sources

  - Compare final weighted NHIS estimates of health insurance coverage and disability status to estimates from the American Community Survey (ACS)

Variables Included in the Response Propensity Model (1)

- Interviewer observations

  – Household's income relative to the general population

  – Whether or not all household occupants are over the age of 65

  – Whether or not a language other than English is spoken by residents

  – Whether or not one or more adults of the household are employed

  – Whether or not one more residents are disabled, handicapped, or has a chronic health condition

  – Whether or not residents may be smokers

  – Whether or not the sample unit has a well-tended yard or garden

  – Condition of the sample unit

Variables Included in the Response Propensity Model (2)

- Census Planning Database measures (census tract)

  – % of persons 25+ that have a college degree or higher (ACS)

  – Average aggregated household income of occupied housing units (ACS)

  – % of civilians 16+ that are unemployed (ACS)

  – % of persons classified as below the poverty line (ACS)

  – % of persons that are uninsured (ACS)

  – % of 2010 Census occ. housing units with female householder(s) and no husband

  – % of 2010 Census occ. housing units where householder and spouse in same household

  – % of 2010 Census housing units with no registered occupants on Census day (vacant)

Key Survey Outcomes

Health insurance coverage
Disability status

General health status
Failure to obtain needed medical care due to cost
Personal care needs
Receipt of influenza vaccination
Asthma episodes in the past 12 months
Current asthma
Usual place to go for medical care
Diagnosed diabetes
Serious psychological distress
Current smoking
Alcohol consumption
Leisure-time physical activity
HIV testing
Obesity
Receipt of pneumococcal vaccination

RESULTS:
Studying variations within existing survey

Percentage of Persons of All Ages Who Had Excellent or Very Good Health, across Response Propensity Quintiles (base weights), by Year
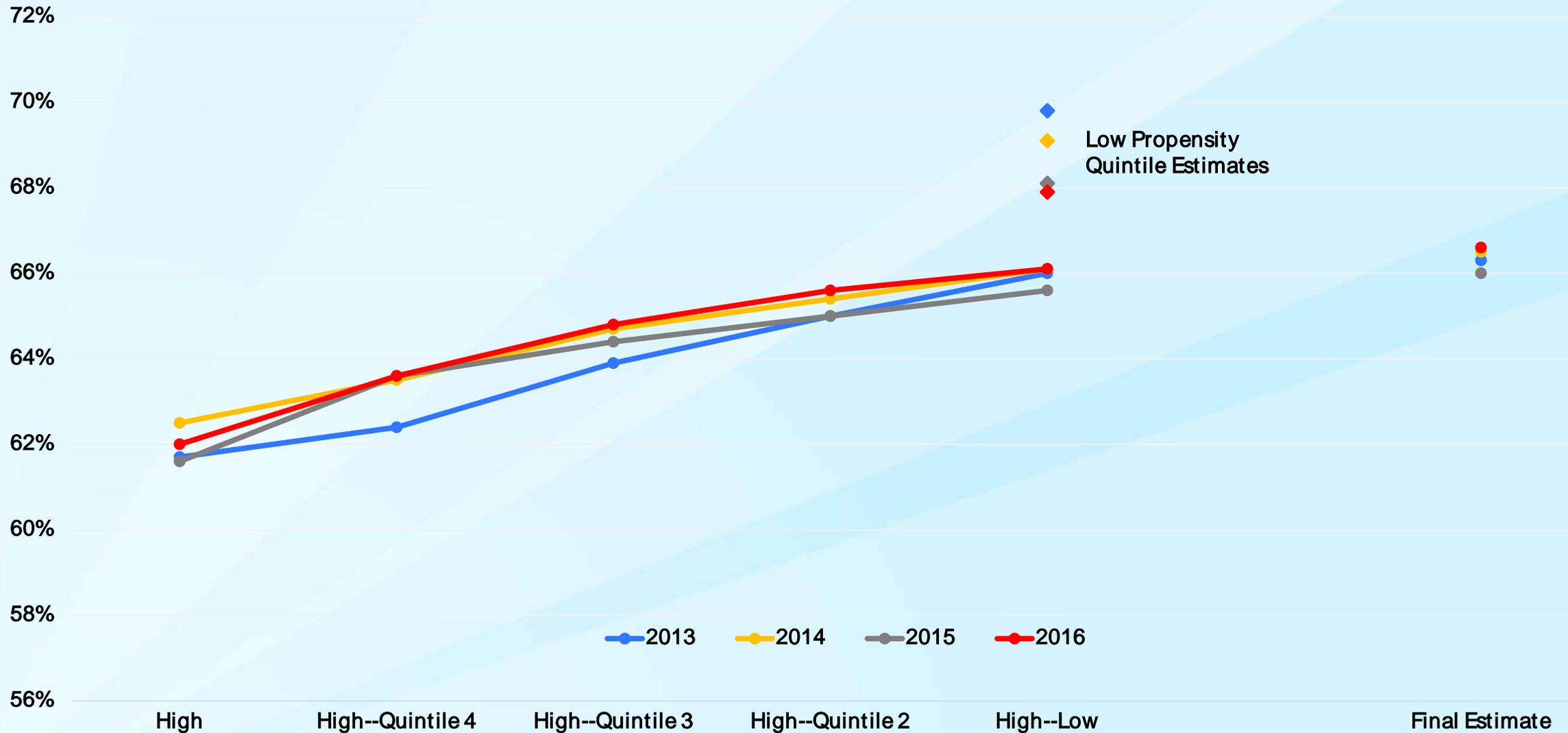
Low Propensity Quintile Estimates

Legend: 2013, 2014, 2015, 2016

X-axis: High, High--Quintile 4, High--Quintile 3, High--Quintile 2, High--Low, Final Estimate

Y-axis: 56%, 58%, 60%, 62%, 64%, 66%, 68%, 70%, 72%

NOTE: For all 4 years, there is a significant difference between the low response propensity quintile estimate and the estimate for the rest of the sample.

Prevalence of Current Smoking among Adults Aged 18 and over, across Response Propensity Quintiles (base weights), by Year
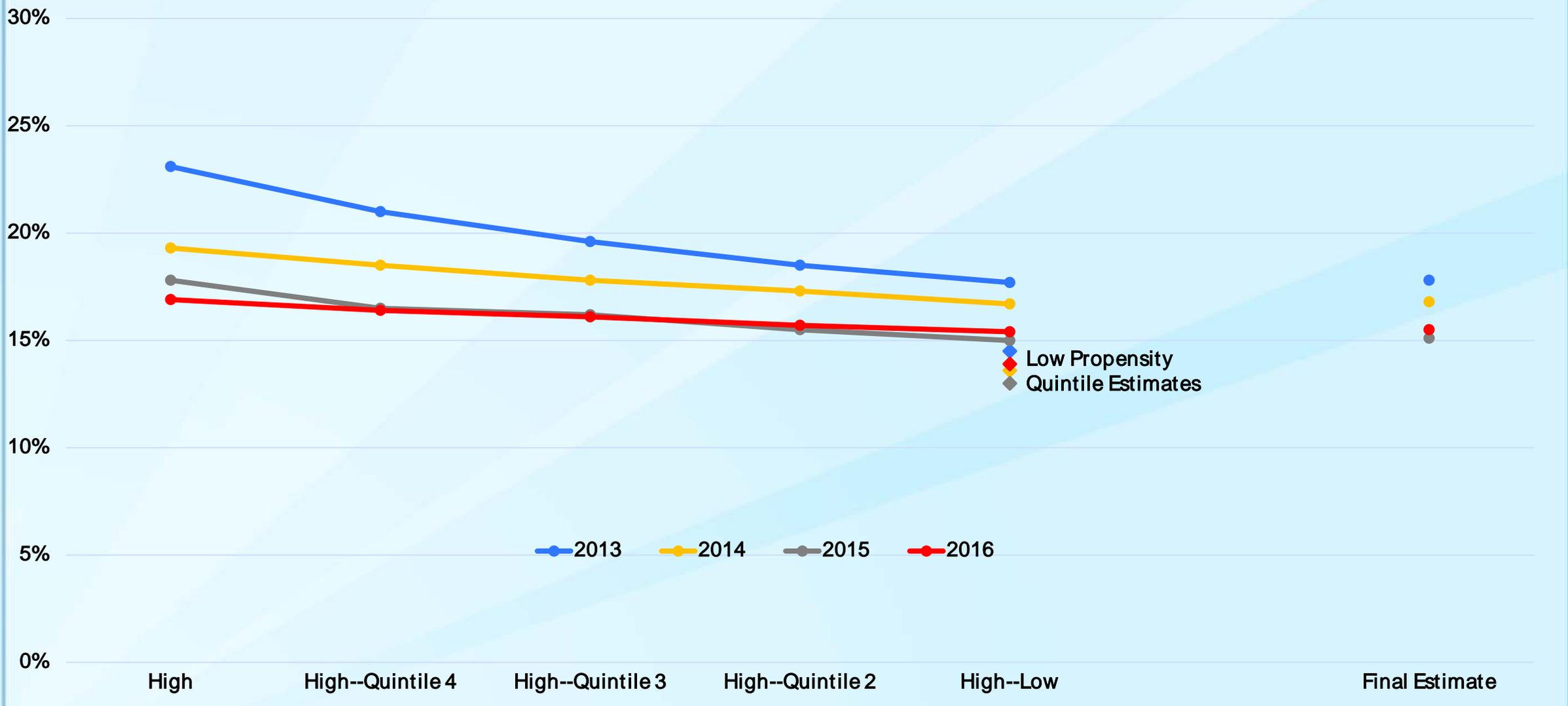
Legend: 2013 · 2014 · 2015 · 2016

X-axis: High | High--Quintile 4 | High--Quintile 3 | High--Quintile 2 | High--Low | Final Estimate

Low Propensity Quintile Estimates

NOTE: For all 4 years, there is a significant difference between the low response propensity quintile estimate and the estimate for the rest of the sample.

Percentage of Adults Aged 18 and over Who Experienced an Asthma Episode in the Past 12 Months, across Response Propensity Quintiles (base weights), by Year
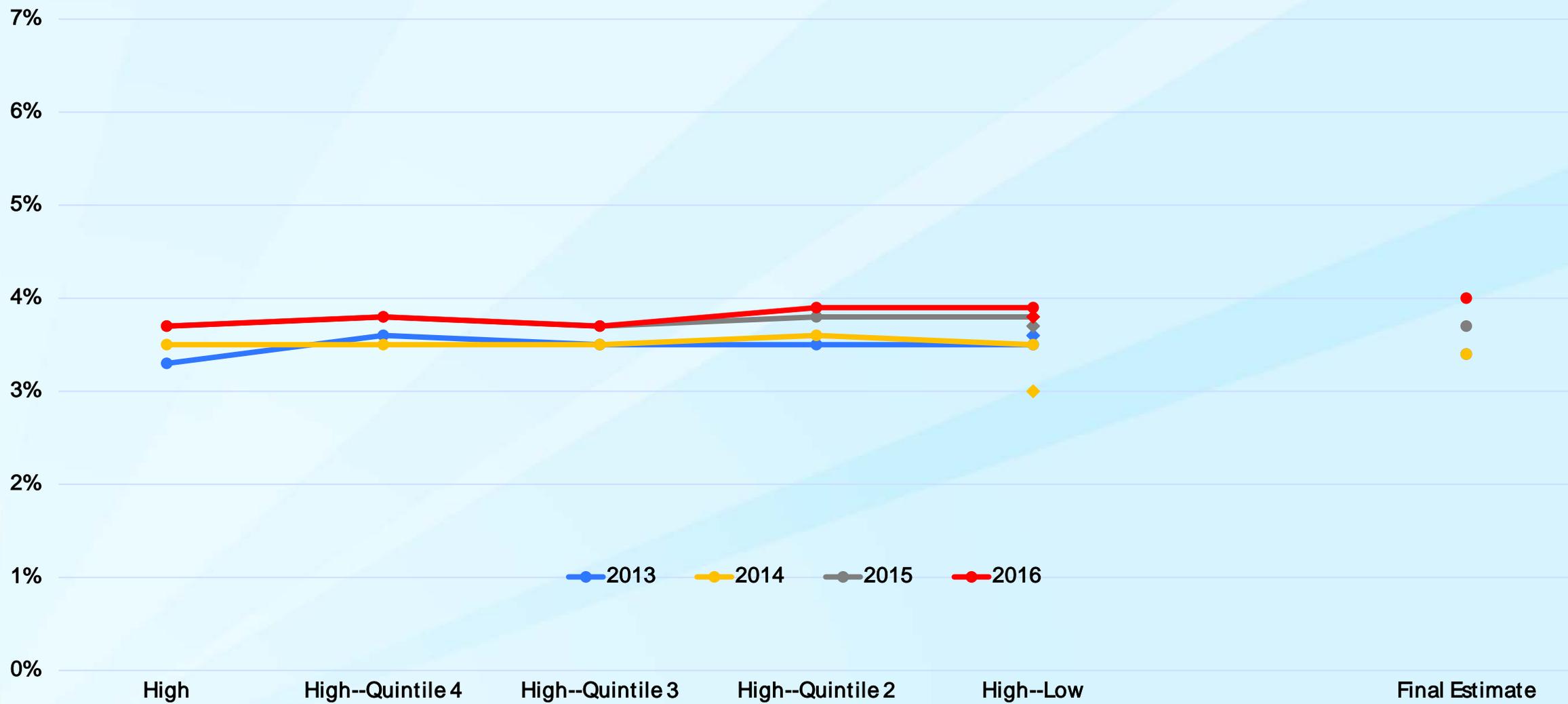
NOTE: For all 4 years under analysis, no significant difference was observed between the low response propensity quintile estimate and the estimate for the rest of the sample.

Summary of Pattern of Base-Weighted Cumulative Estimates across Response Propensity Quintiles and Impact of Final Weights: 19 Key Health Outcomes

	Upward Pattern across Quintiles (underestimate?)	Downward Pattern across Quintiles (overestimate?)	Total Number of Estimates with Potential NR Bias	Final Weighted Estimate Move in Right Direction?
2013	7	7	14	9
2014	6	8	14	9
2015	6	7	13	8
2016	5	8	13	7

Number of Significant Differences between the Low Response Propensity Quintile Estimate and the Estimate for the Rest of the Sample, by Year (19 comparisons)

Average Absolute Relative Bias for 19 Key Health Outcomes, by Year

RESULTS:
Comparisons to similar estimates from other sources

Percentage of Persons 1 Year of Age or Older with a Disability, across Response Propensity Quintiles (base weights), by Year
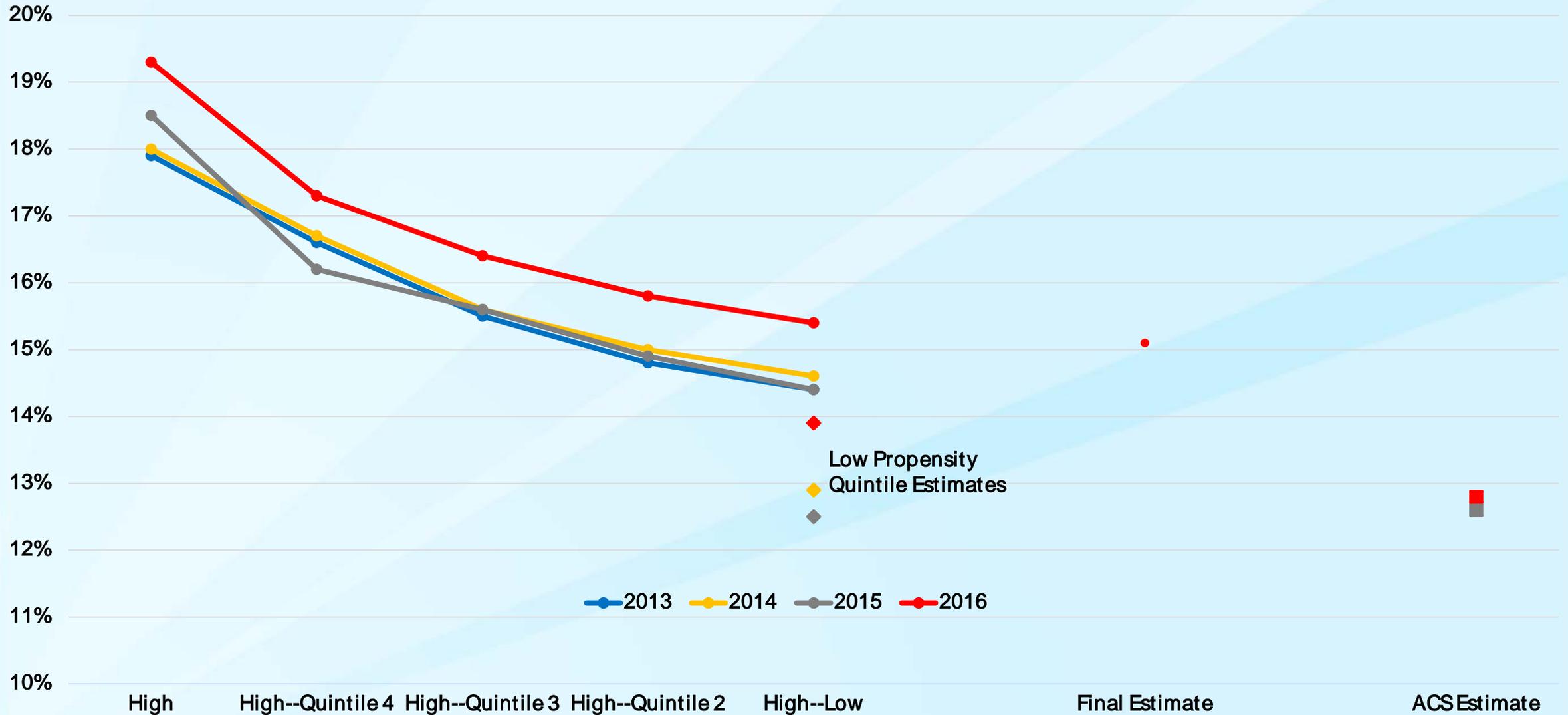
Low Propensity Quintile Estimates

Legend: 2013, 2014, 2015, 2016

X-axis: High, High--Quintile 4, High--Quintile 3, High--Quintile 2, High--Low, Final Estimate, ACS Estimate

NOTE: For all 4 years, there is a significant difference between the low response propensity quintile estimate and the estimate for the rest of the sample.

Percentage of Persons of All ages with Health Insurance Coverage, across Response Propensity Quintiles (base weights), by Year
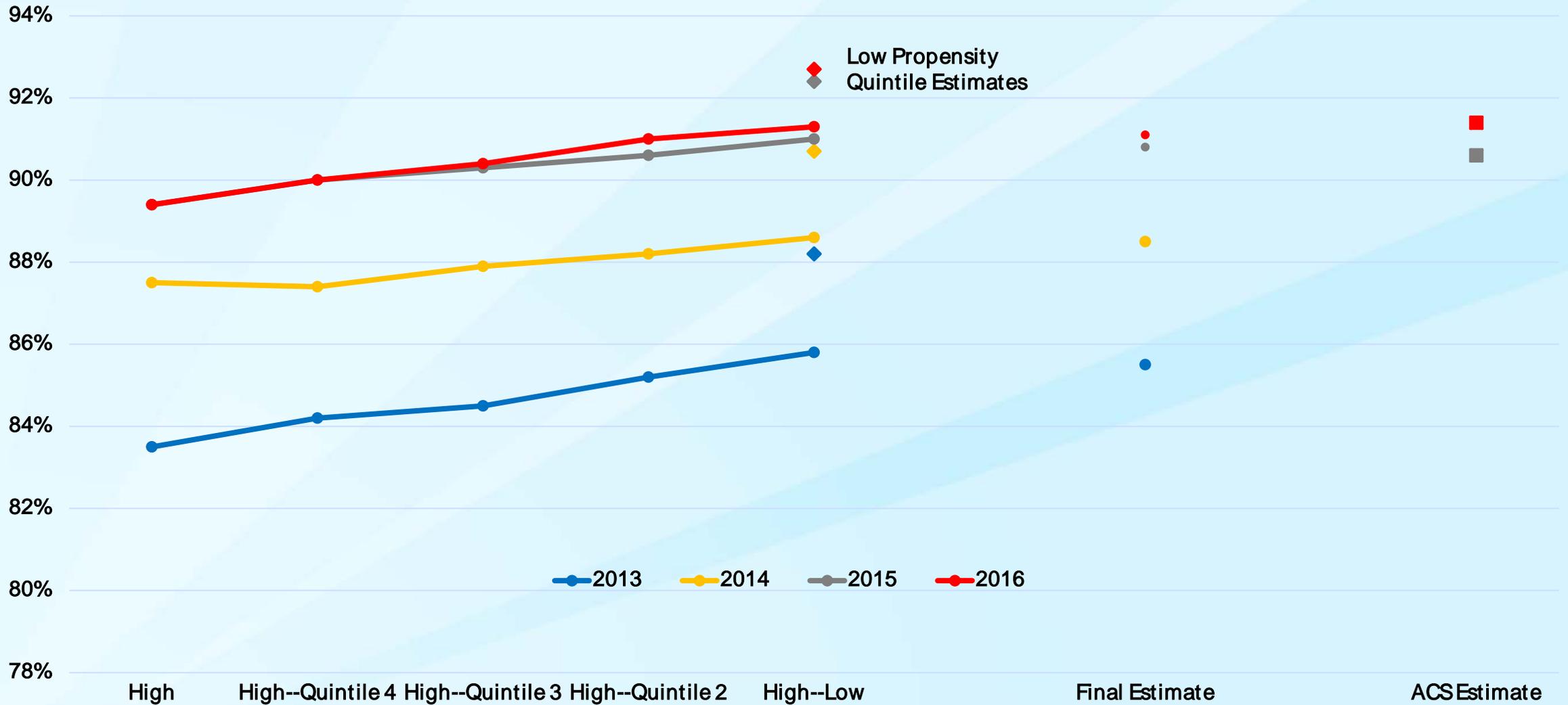
NOTE: For all 4 years, there is a significant difference between the low response propensity quintile estimate and the estimate for the rest of the sample.

Summary/Future Directions

- Evidence of *potential* nonresponse bias in several of the key survey estimates examined

  – Roughly three-quarter of 21 outcomes each year
  – Final weights not always compensating

- Results suggest that bias may have been minimized in recent years

  – Declines in relative bias and number of significant differences between low response propensity quintile estimate and rest of sample
  – Real change or artifact of the method/model?

- Reminder that NR bias is estimate specific (e.g., insurance coverage vs. disability status)

- Tweak response propensity model; explore other approaches

- Extend analysis to key subgroups

Thank You!

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