


A SYSTEMATIC REVIEW OF NONRESPONSE BIAS STUDIES IN FEDERALLY SPONSORED SURVEYS

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Federal Committee on
Statistical Methodology



Disclaimer: The findings and conclusions in this presentation are those of the authors and do not necessarily represent the views of the Office of Medical Policy (OMP) or the Food and Drug Administration (FDA)

BACKGROUND

- In 2006, the Office of Management and Budget (OMB) published Standards and Guidelines for Statistical Surveys mandating that all federal surveys with a unit response rate (RR) <80% conduct an analysis of nonresponse bias (NRB)
- Since 2006, federal surveys have increased activities involving NRB analyses
- However, there's been a lack of information on how these NRB analyses were conducted, the methods used to assess NRB, and the impact of any mitigation strategies to reduce bias

OBJECTIVE

- Conduct a systematic literature review to collect information on NRB studies involving federal surveys
- Specifically, the following information was collected for each study identified:
 - Characteristics of the surveys examined
 - NRB analysis methods used
 - Results of the assessment of NRB
 - Impact of weighting adjustments on bias reduction

METHODS

Criteria For Including Studies for this Review

NRB studies conducted since the 2006 OMB guidance from the following sources were considered for inclusion:

- Peer-reviewed research papers
- Published book chapters
- Conference proceedings
- Published government reports or memoranda, and
- Other grey literature materials including unpublished reports produced by the government, and reports produced by academics and the survey industry in print and electronic formats not controlled by commercial publishers

METHODS

Studies identified at each study phase

Table I. Number of non-response bias studies at each study phase

Study phase	Number of studies	
After 2010 OMB solicitation	87*	n=425
After March 2017 literature search	23	
After May 2017 literature search	59	
After ASA/AAPOR solicitation	240*	
Gathered post 2018 FCSM	16	
Final included and coded studies	165	
Final excluded studies	69	

*Included some duplicate reports and non-pertinent documents.

METHODS

Inclusion and exclusion criteria

1. The 425 reports were first checked by two reviewers for duplicates
2. After duplicates were removed, the remaining documents were divided and randomly assigned to the 6 members of the working group
3. Studies were **excluded** if:
 - Conducted prior to 2006
 - Non-federally funded surveys
 - Review papers or non-pertinent documents
 - Reports that had not been cleared for public release or were in draft form
4. After these exclusion criteria were applied, 165 studies were deemed eligible

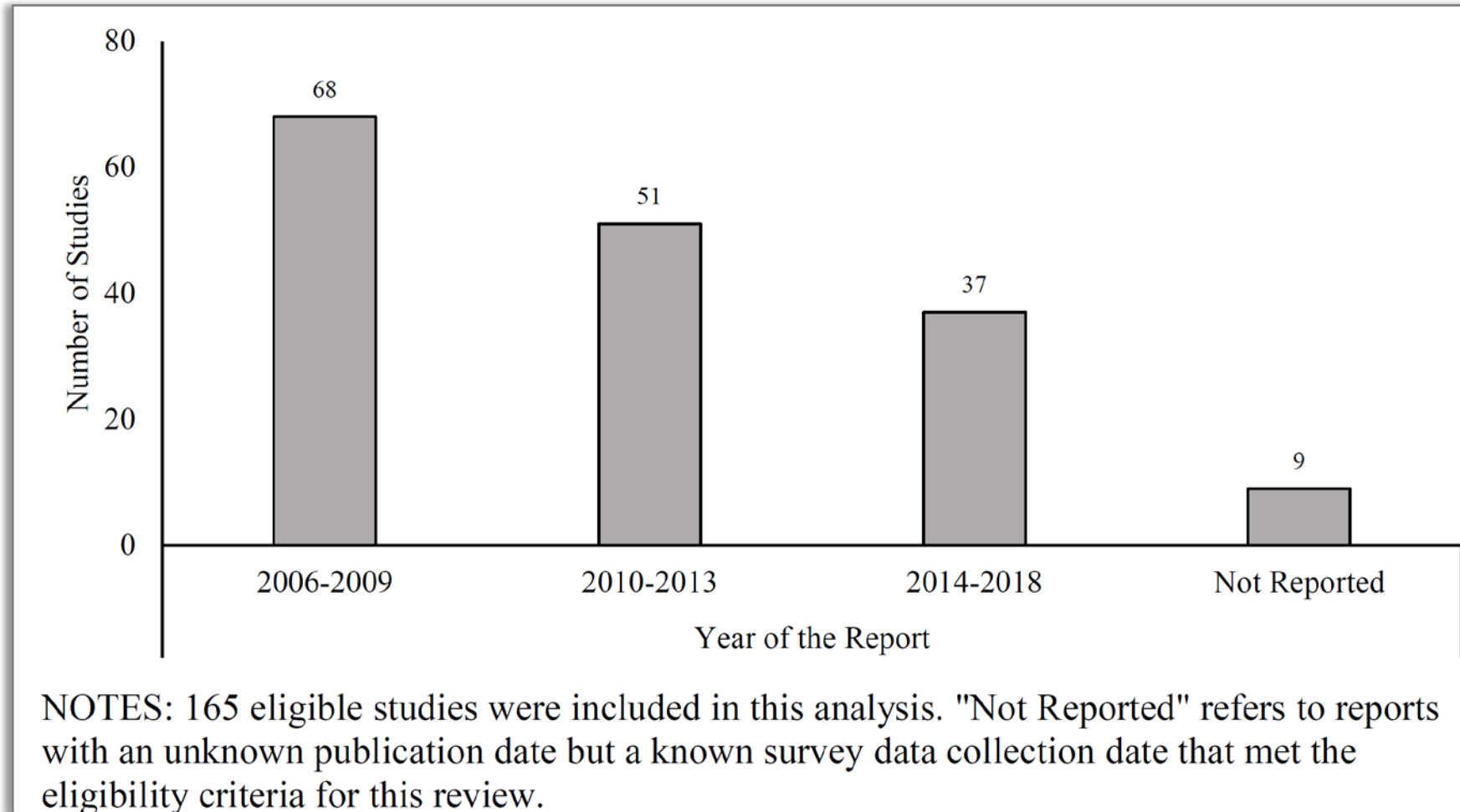
METHODS

Coding Process

- A standardized data extraction form was used to extract data from the 165 eligible studies on:
 - General characteristics, including agency sponsorship, response rates, type of survey, and mode of data collection;
 - Types of NRB assessment method(s) used;
 - Target of the NRB analyses (i.e., sample composition, survey estimates, or both); and
 - Whether post-survey nonresponse adjustments were employed and if these adjustments appeared to reduce bias in final estimates.
- A second round of blinded reviews of the reports were conducted by three reviewers (R1, R2, and R3)
 - Differences in coding between the raters were adjudicated by consensus

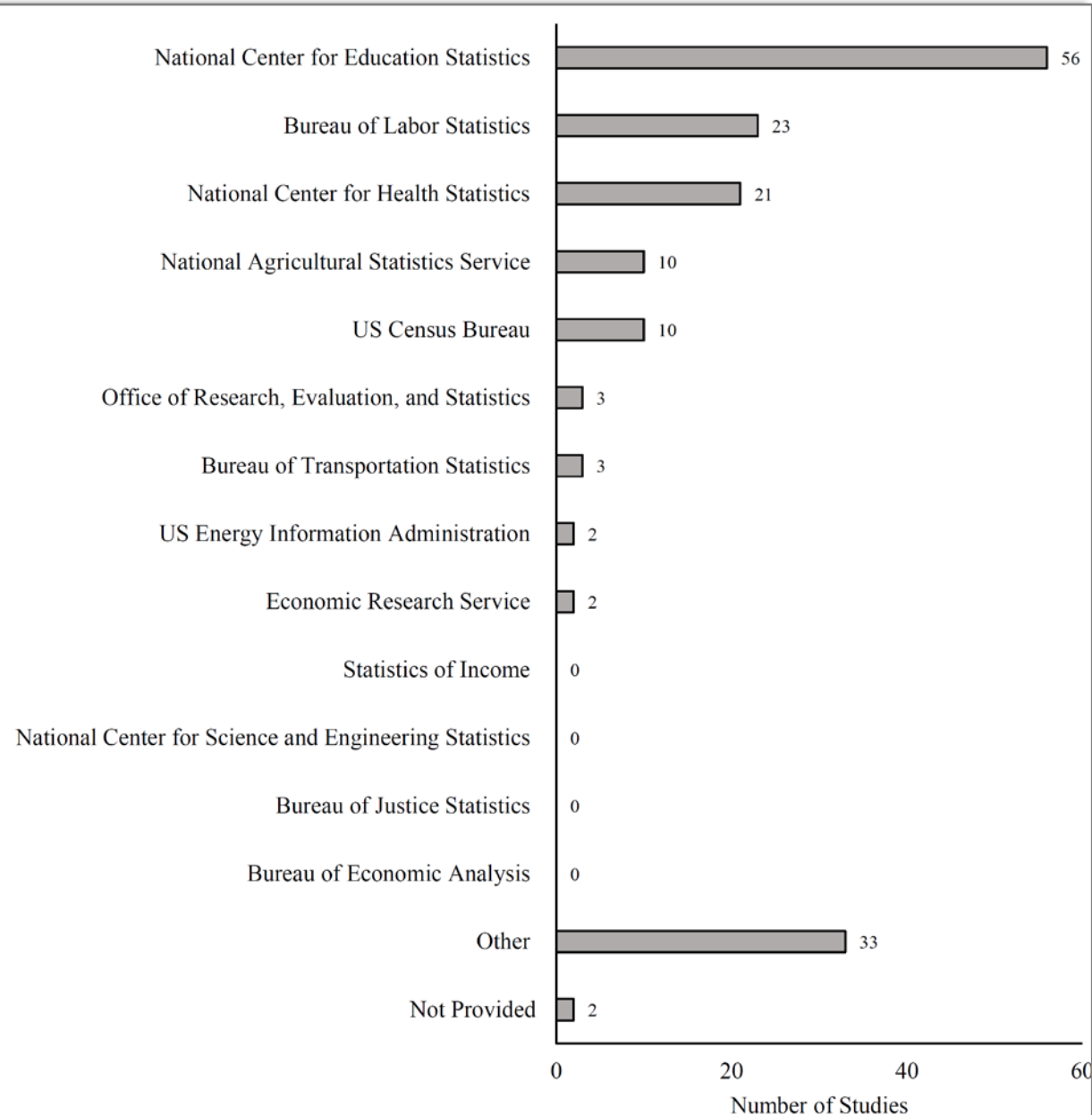
RESULTS

Characteristics of the NRB studies – number of NRB studies published by year



RESULTS

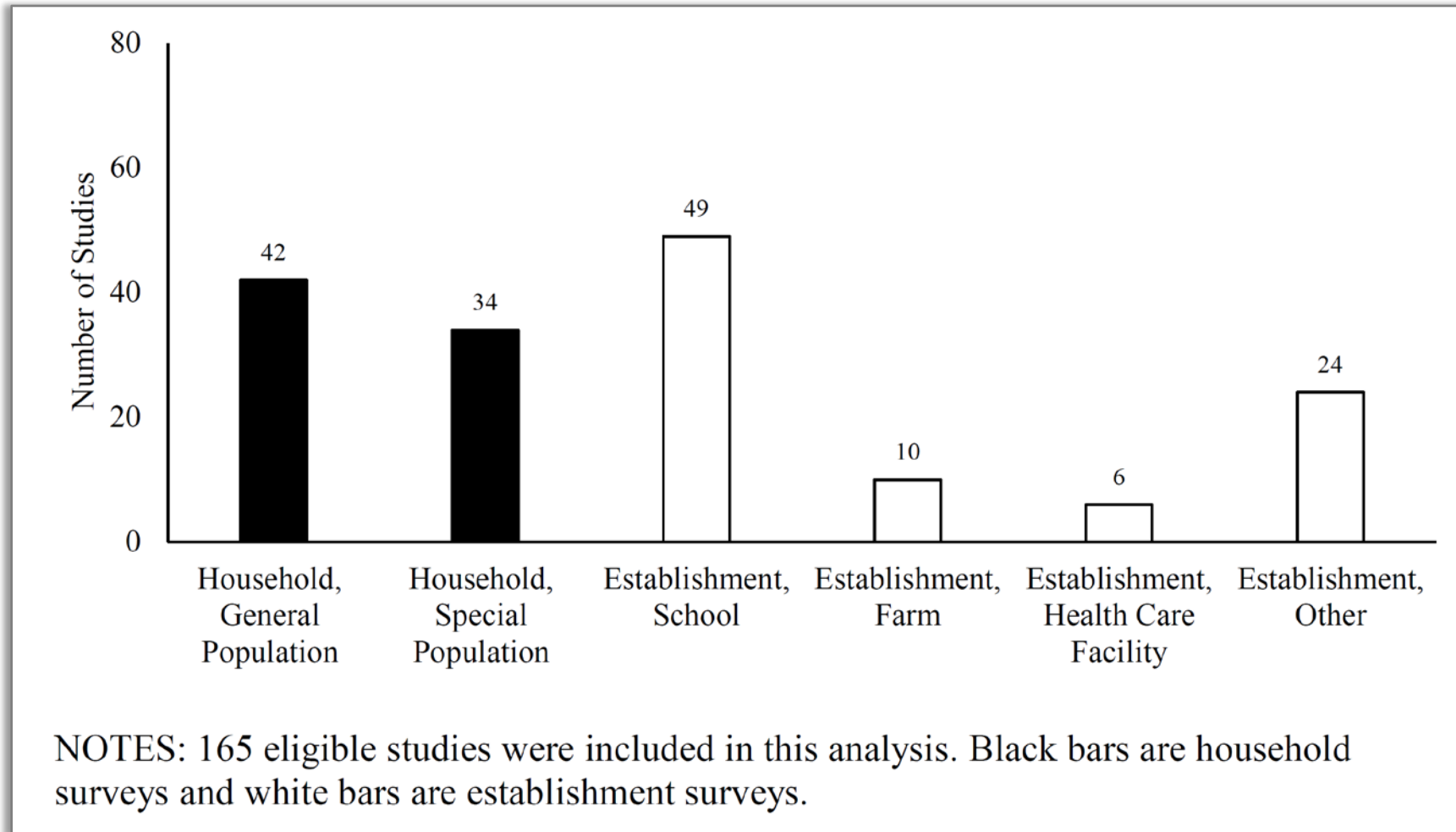
Characteristics of the NRB studies – number of NRB studies published by agency



NOTES: 165 eligible studies were included in this analysis. The 13 federal statistical agencies are listed. The “other” category represents studies conducted by multiple statistical agencies or by non-statistical government agencies.

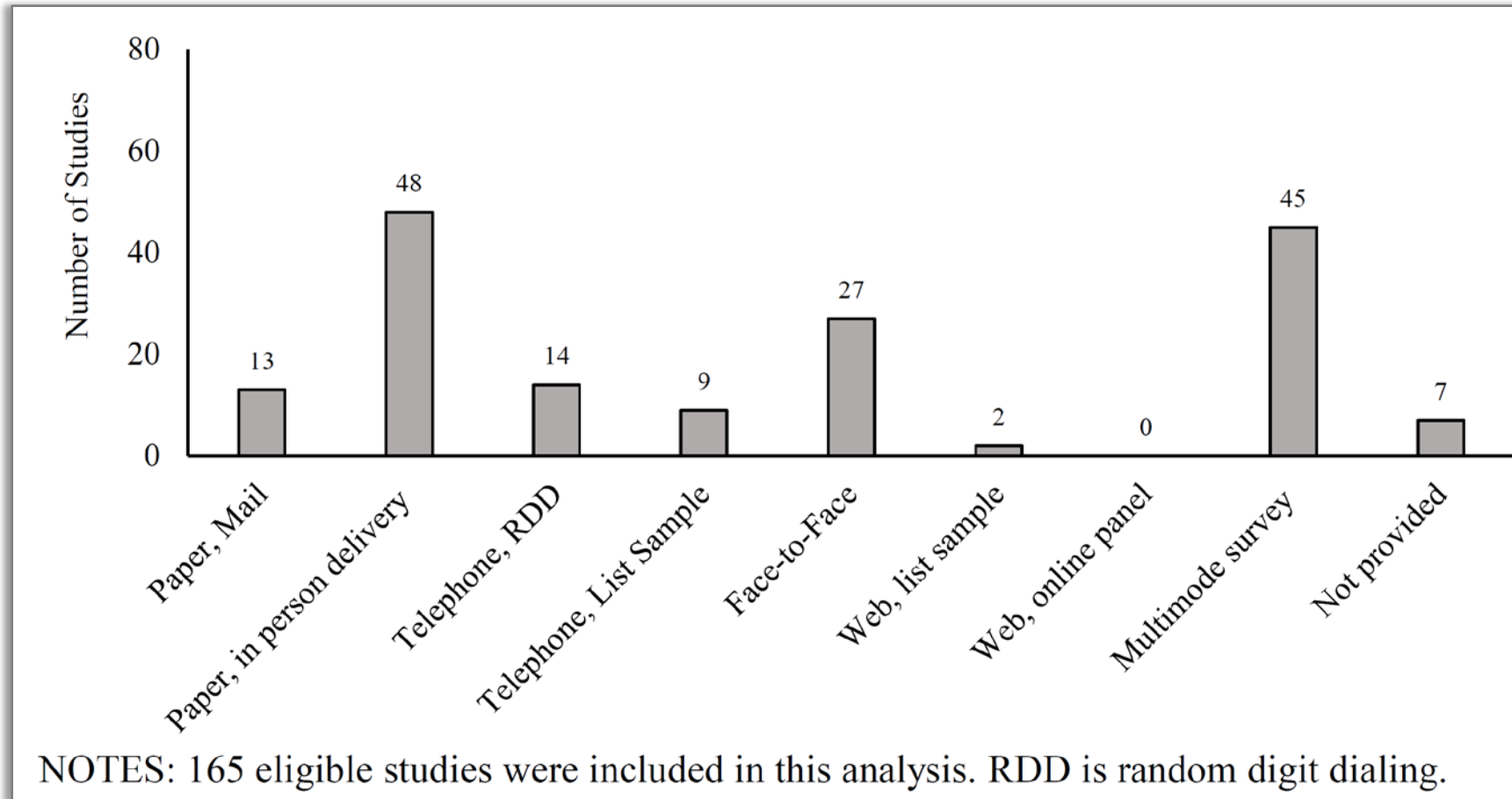
RESULTS

Characteristics of the NRB studies – number of studies published by survey type



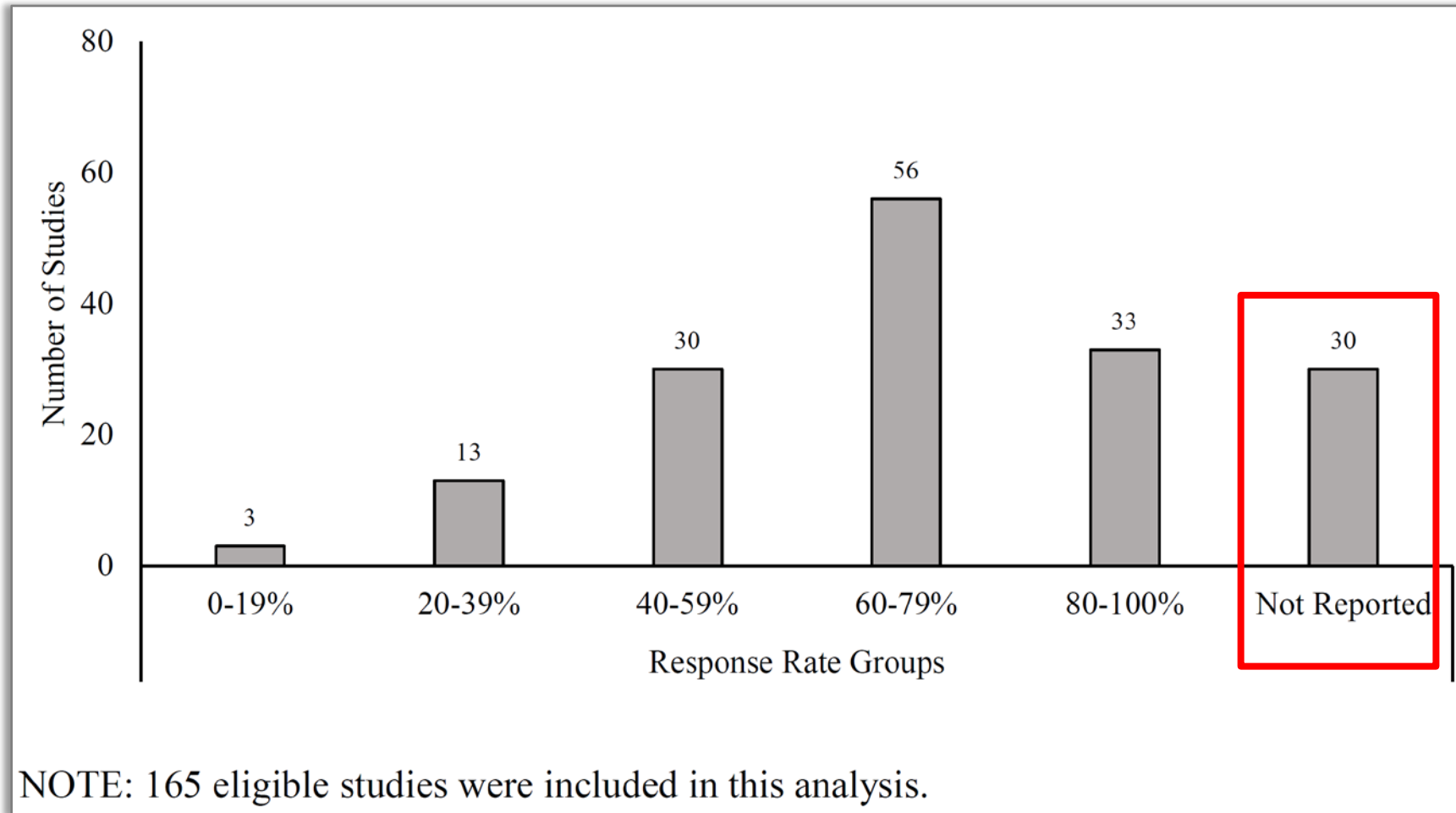
RESULTS

Characteristics of the NRB studies – number of studies published by mode of data collection



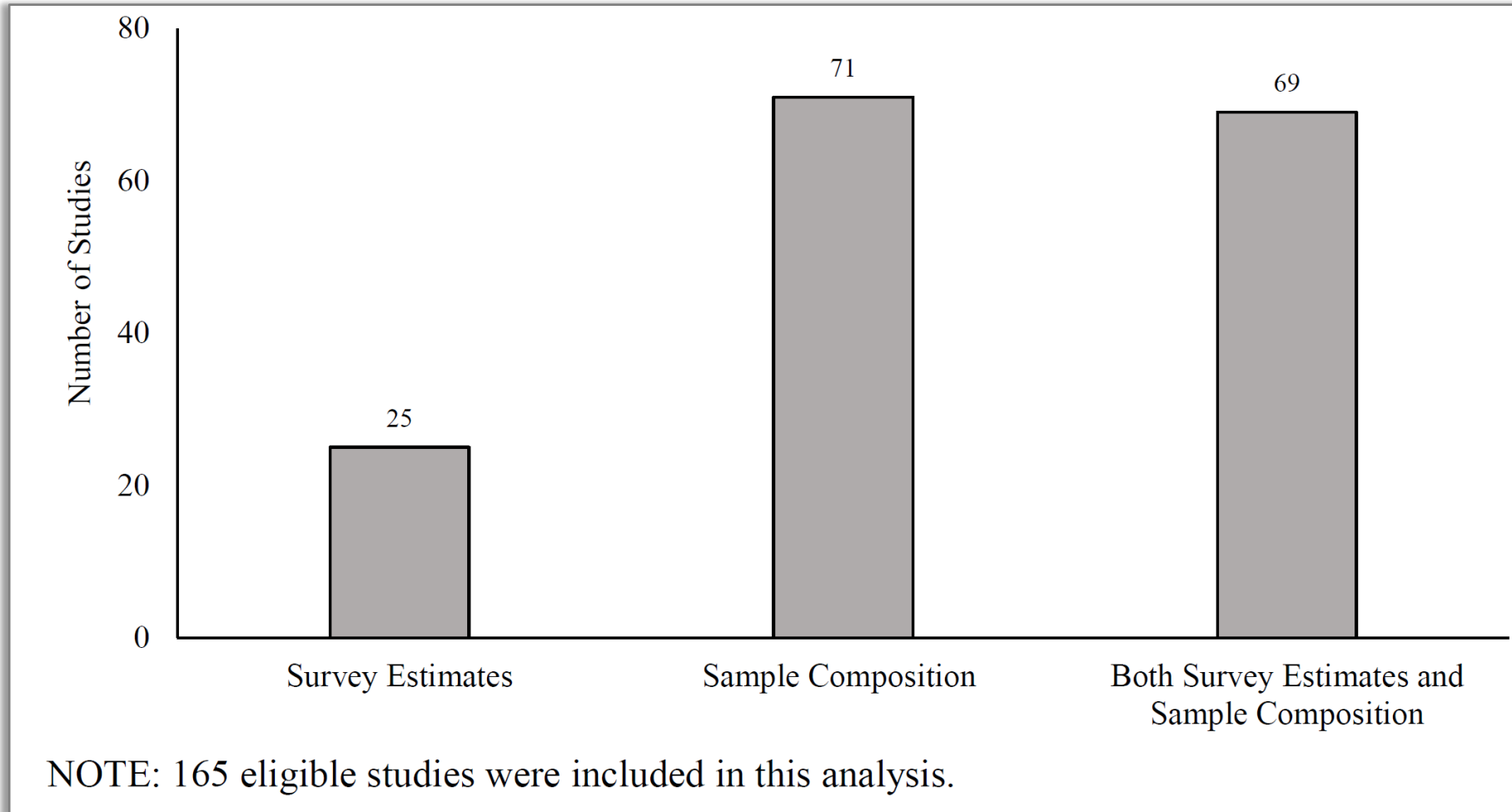
RESULTS

Characteristics of the studies – number of NRB studies published by unit RR



RESULTS

Characteristics of the studies – number of studies published by target of analysis



* **Sample Composition**
refers to the
demographics of the
sample

RESULTS

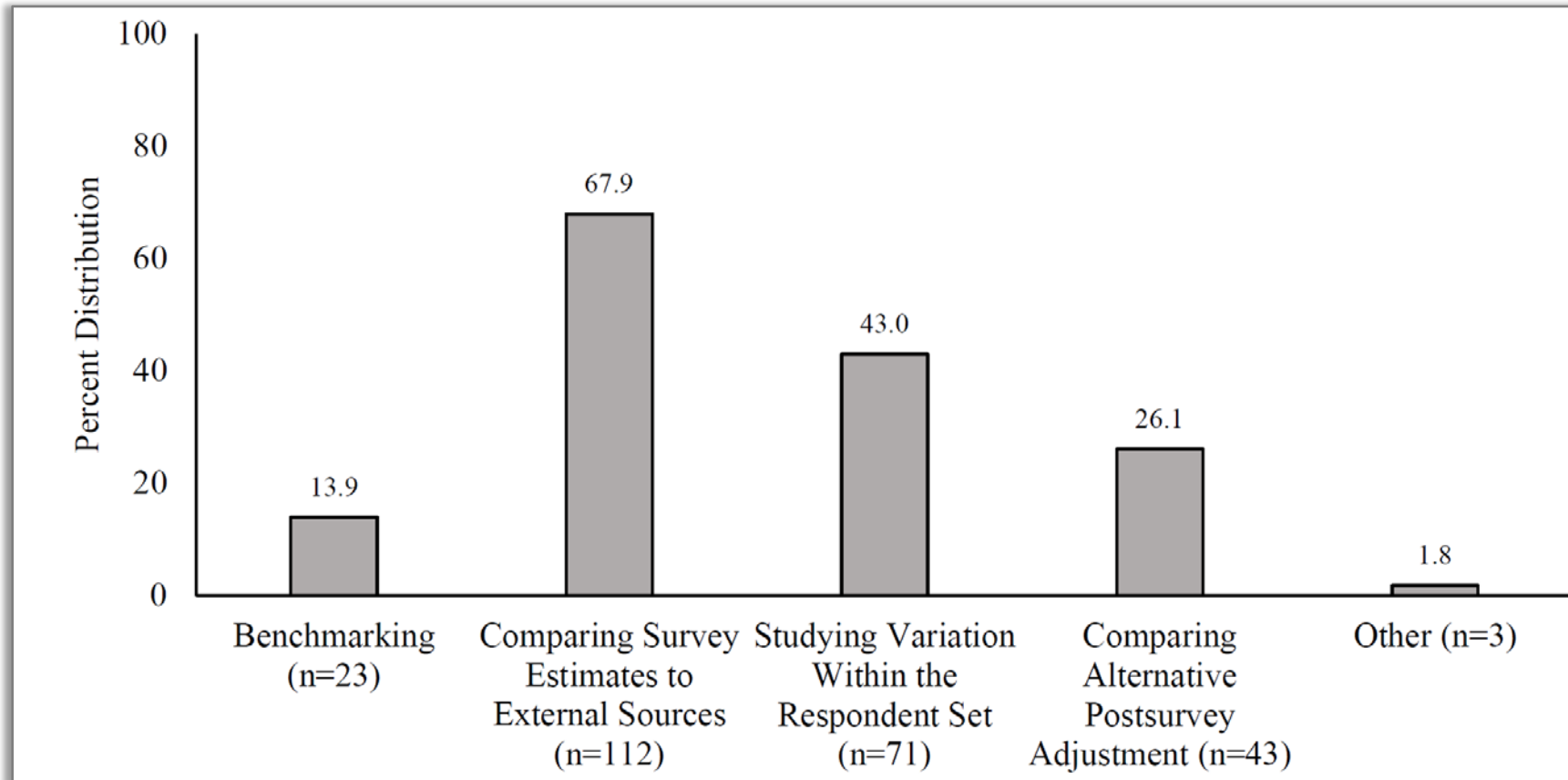
Types of nonresponse bias methods used

The types of NRB methods used to assess bias were coded into 14 distinct methodological approaches, and grouped into 4 categories using the Groves and Brick typology (Groves and Brick 2005):

1. Benchmarking
2. Making comparisons to external data
3. Studying variation within the respondent set
4. Comparing alternative post survey adjustments
 - An “Other” category was specified to capture all other methods

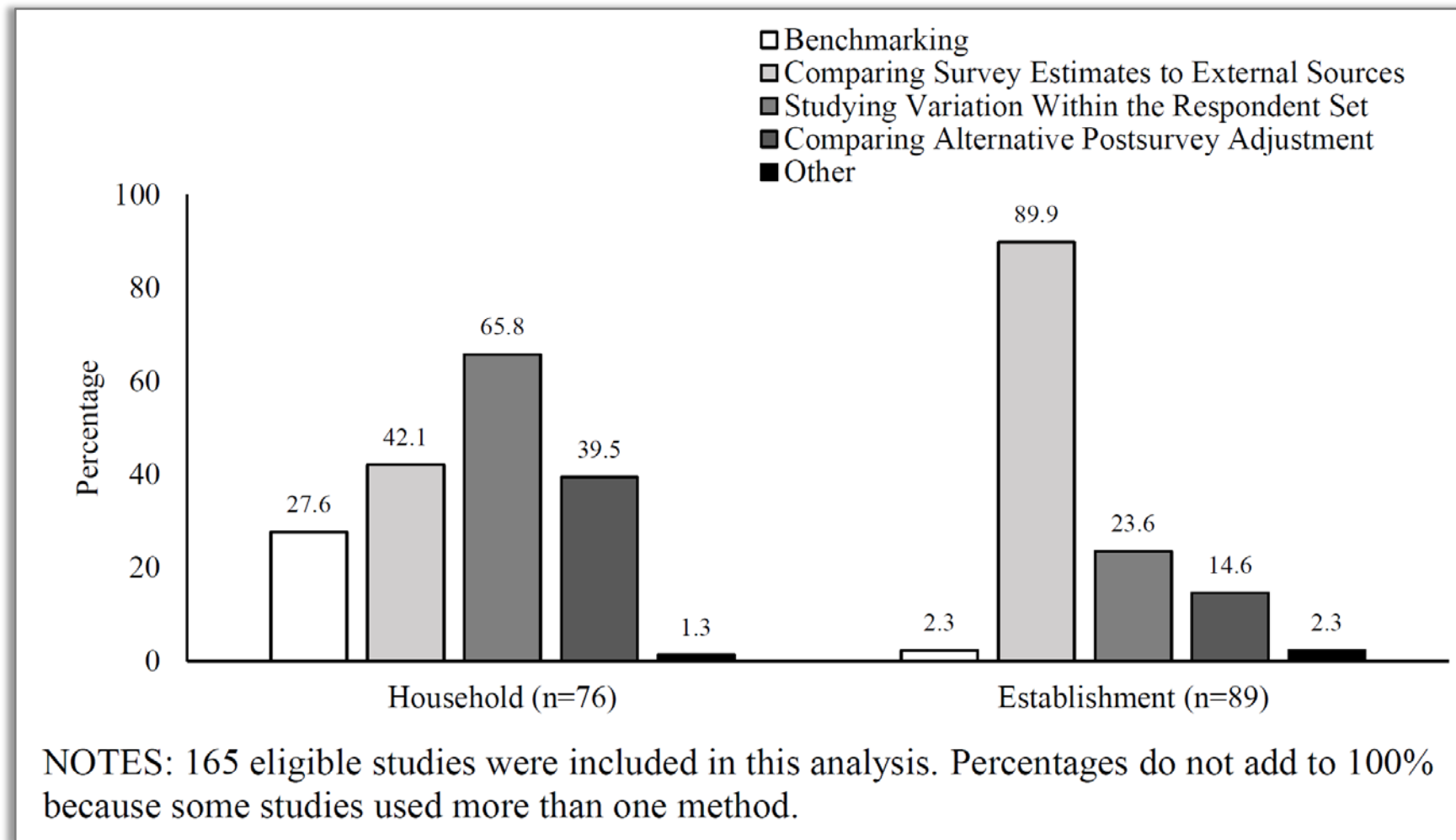
RESULTS

Types of NRB methods used – % distribution of studies employing each of the major NRB methods



RESULTS

Types of NRB methods used – NRB by survey type



RESULTS

Impact of weighting adjustments on nonresponse bias

Table 1. Report of nonresponse bias, before and after weight adjustment

	Bias Before Weighting			
	Yes (n=111)	No (n=3)	Not Discussed (n=40)	Unclear (n=11)
Bias After Weighting				
Bias Reduction	85.6%	0.0%	77.5%	27.3%
No Bias Reduction	7.2%	66.7%	10.0%	0.0%
Not Discussed	4.5%	33.3%	10.0%	27.3%
Unclear	2.7%	0.0%	2.5%	45.5%

NOTE: 165 eligible studies were included in this analysis.

SUMMARY

- First systematic review of NRB studies since the 2006 OMB Standards and Guidelines
- The largest number of studies were conducted in the period immediately following the publication of the 2006 guidelines
- The number of studies conducted varied by federal agency with the largest number coming from the NCES, BLS, and NCHS
- About an equal number of household and establishment surveys were included in this review, and the various modes of data collection were represented
- The type and mode of data collection appeared to affect the types of NRB methods employed to assess bias

DISCUSSION

- The process required to gather studies for this review highlights the difficulty of identifying NRB research involving federal surveys
- Studies were gathered through multiple avenues, including extensive literature searches and solicitations to federal statistical agencies and the greater statistical community
 - But we may be missing some
- The reports included in this review lacked standardization and followed diverse reporting formats, making the extraction of data especially challenging
 - Example: ~20% of the studies included did not report a RR and most studies did not describe the specific standardized formulas used to calculate survey RRs
- There was a tendency in many studies for authors to declare that any bias discovered is not worthy of concern or attention. And most studies reported a reduction in NRB on final estimates after weighting, but this was simply asserted in most instances and not explicitly documented in the reports

SUGGESTED NEXT STEPS BASED ON THE REVIEW

- A standardized approach to designing and reporting the findings of NRB studies and a centralized repository for them could be considered
- Employing multiple NRB study methods, as recommended by Groves and Brick, could yield fuller pictures of the impact of nonresponse on potential bias in survey estimates
- Investments in richer frame information for household surveys would facilitate more kinds of NRB analysis for this type of data collection



THANK YOU

