Appropriate use of Design Effects and Sample Weights in Complex Health Survey Data: A Review of Articles Published using Data from Add Health, MTF, and YRBS

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Background: Complex Sample Survey Data

- Useful when investigating risk and protective factors associated with health-related outcomes.
- Increase use of these data among public health researchers.
- Appropriate use of such data requires methodological skills that many researchers were not trained in as graduate students.

Background: Complex Sample Survey Data

- If sampling weights are not incorporated into statistical analyses the sample is not representative of the intended population and point estimates of parameters are biased.

Background: Complex Sample Survey Data

- If the design effects of complex survey data are not accounted for (i.e., differential sampling, clustering, stratification) and the data are analyzed with statistical techniques that assume simple random sampling, standard errors are often too small.

Purpose

- To assess the prevalence of researchers reporting the use of statistical techniques that take into account the sampling structure of complex health survey data and sample weights in published peer-reviewed articles using data from:
  - National Longitudinal Study of Adolescent Health (Add Health)
  - Monitoring the Future (MTF)
  - Youth Risk Behavior Surveillance System (YRBS)

Method

- Population of interest consisted of scientific, peer-reviewed articles published using data from Add Health, MTF, and YRBS during the 10-year period of January 1995 to December 2005.
- Searched ERIC, PsychINFO, PubMed, and Web of Science using different key terms specific to each survey.

Method

- To be selected, an article must have:
  - (1) presented findings based on original empirical research using data from at least one of the three adolescent health surveys of interest.
  - (2) been published in a scientific, peer-reviewed journal.
- After reading the abstract for each article generated from our searches, 481 articles met our inclusion criteria.

Method

- All articles were available in PDF format and were reviewed both electronically (using the "search" function) and manually.
- Key words used in the search function:
  - weight
  - complex
  - sampling
  - SUDAAN
  - Stata
  - surveyreg
  - surveyfreq
  - surveymeans
  - surveylogistic

Method

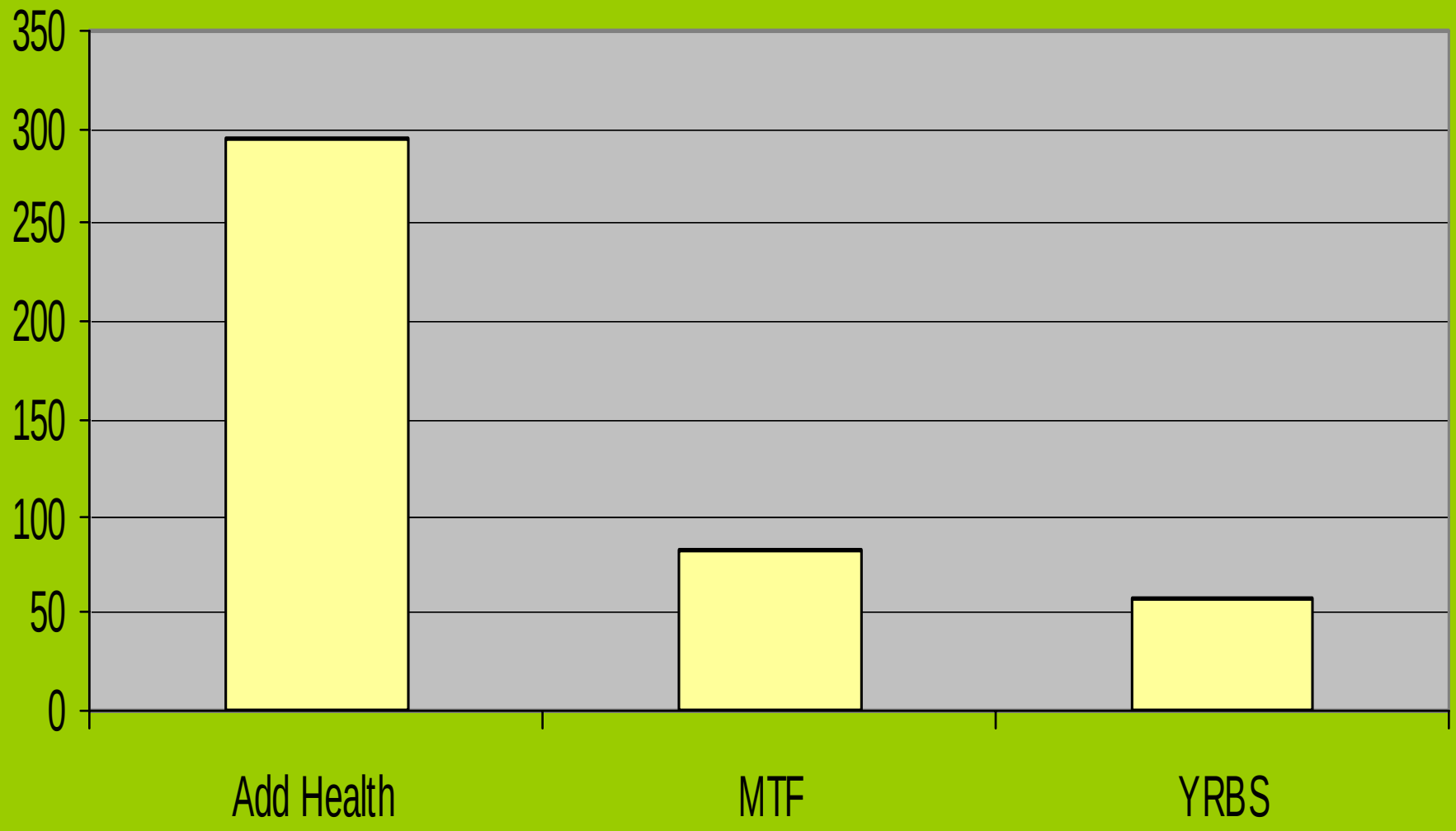
- Articles were initially reviewed and coded independently by a single researcher.
- For reliability checks, a random sample of 10% of articles were reviewed by a second researcher.
- Researchers met as a group to discuss all of the articles included in the reliability checks.

Findings

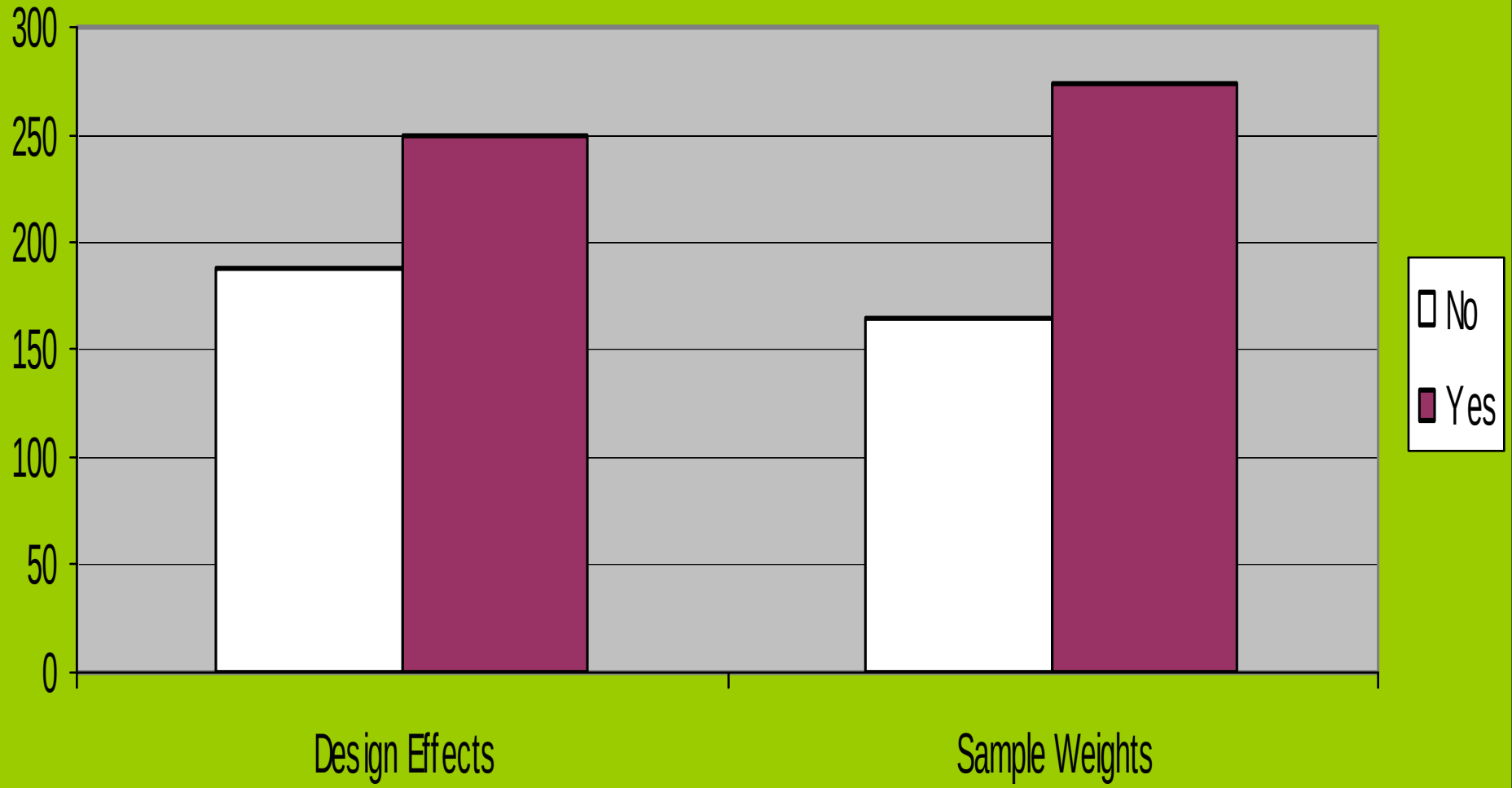
- Original N = 481 was reduced to 437.
- Inter-rater reliability: 89% for design effects and 96% for sample weights.

	Add Health	MTF	YRBS
Original N	303	92	86
Excluded N	8	8	28
Final N	295	84	58

Number of Articles Reviewed Per Data Source



Number of Articles that Reported Use for All Data Sources



Informative Illustrative Quotes

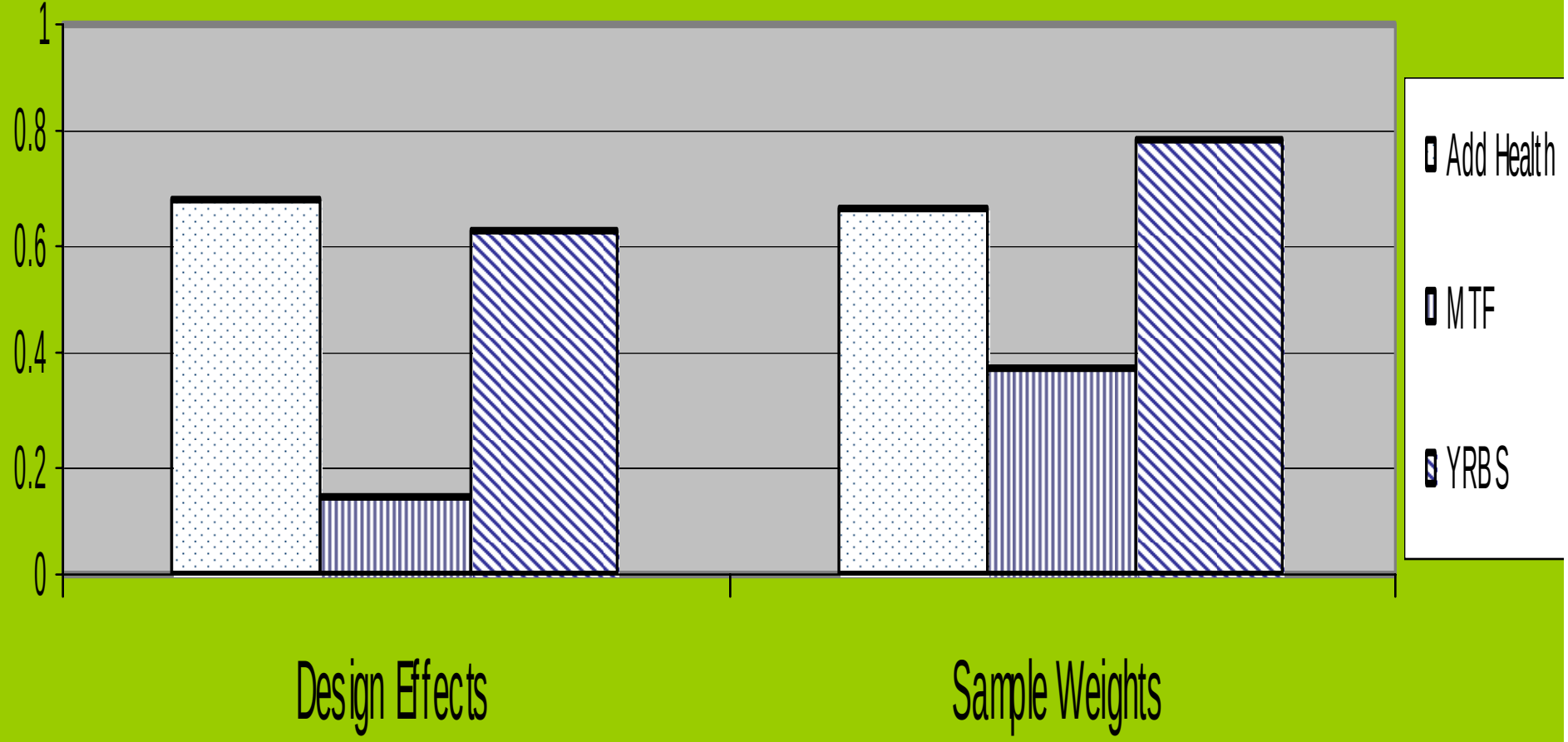
- *Sampling weights have been applied in all analyses and study design effects have been incorporated in the calculation of variance estimates using the MULTILOG procedure in SUDAAN survey software.*

- *All analyses were estimated with sampling weights that corrected for nonresponse and sample design. Standard errors were adjusted for clustering at the school level (schools were the primary sampling unit) using Stata's (version 8.0) SVYLOGIT command.*

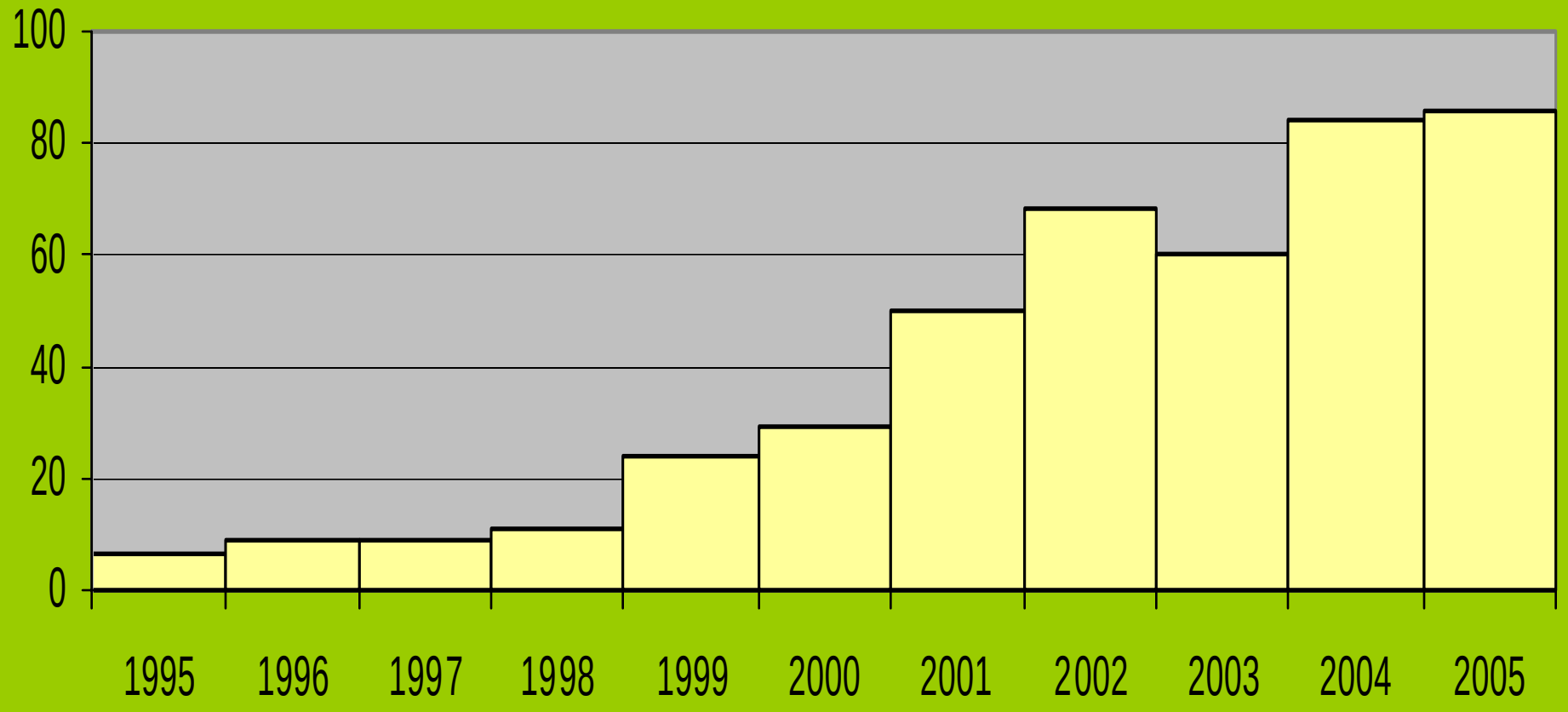
Vague Illustrative Quotes

- *We restricted our sample to the 13,568 participants ……for whom sample weights were available.*
- *Weighted frequencies, bivariate Pearson Chisquare analyses, Student's t-testing, and logistic regressions were performed using SUDAAN.*

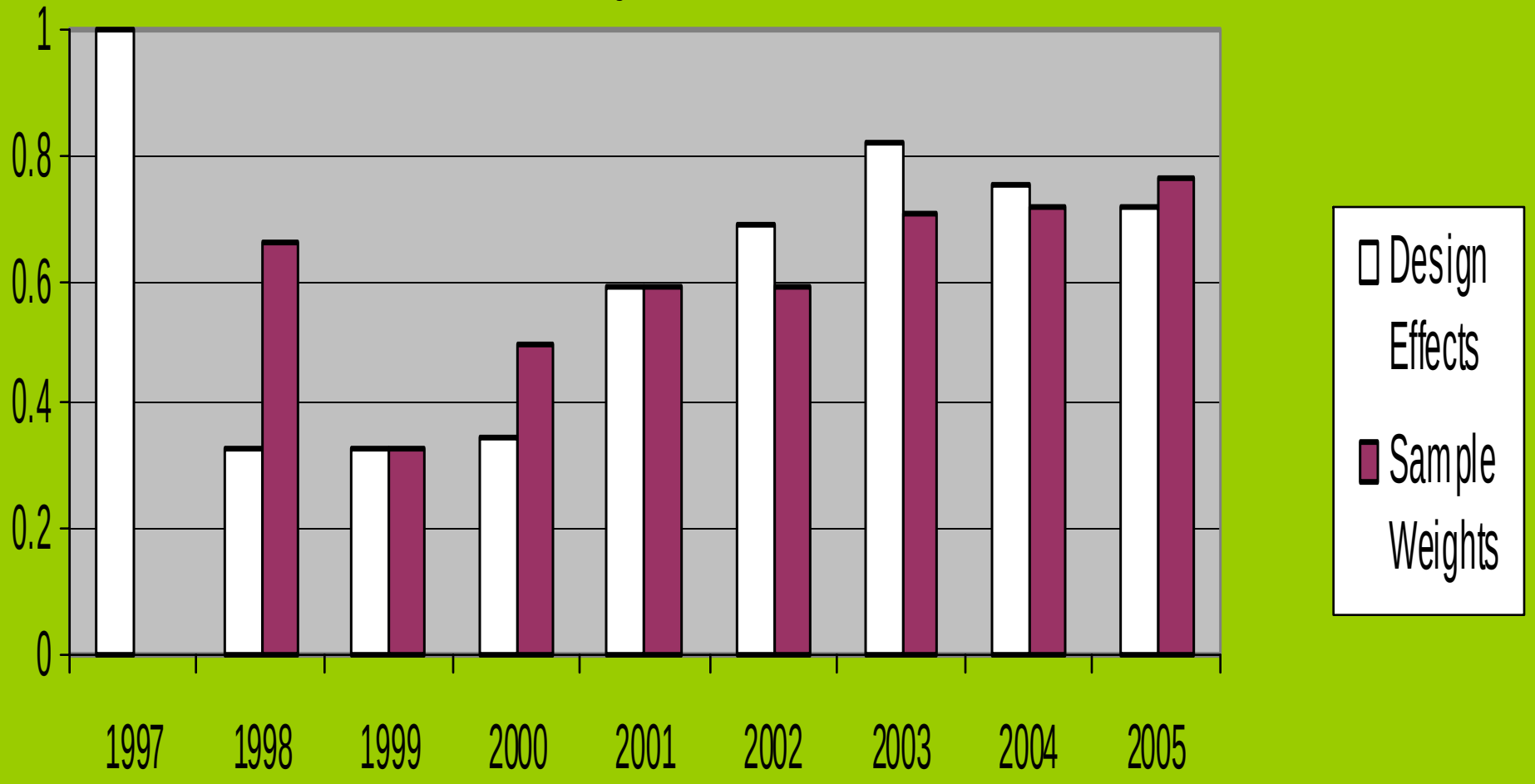
Proportion of Articles that Reported Use by Data Source



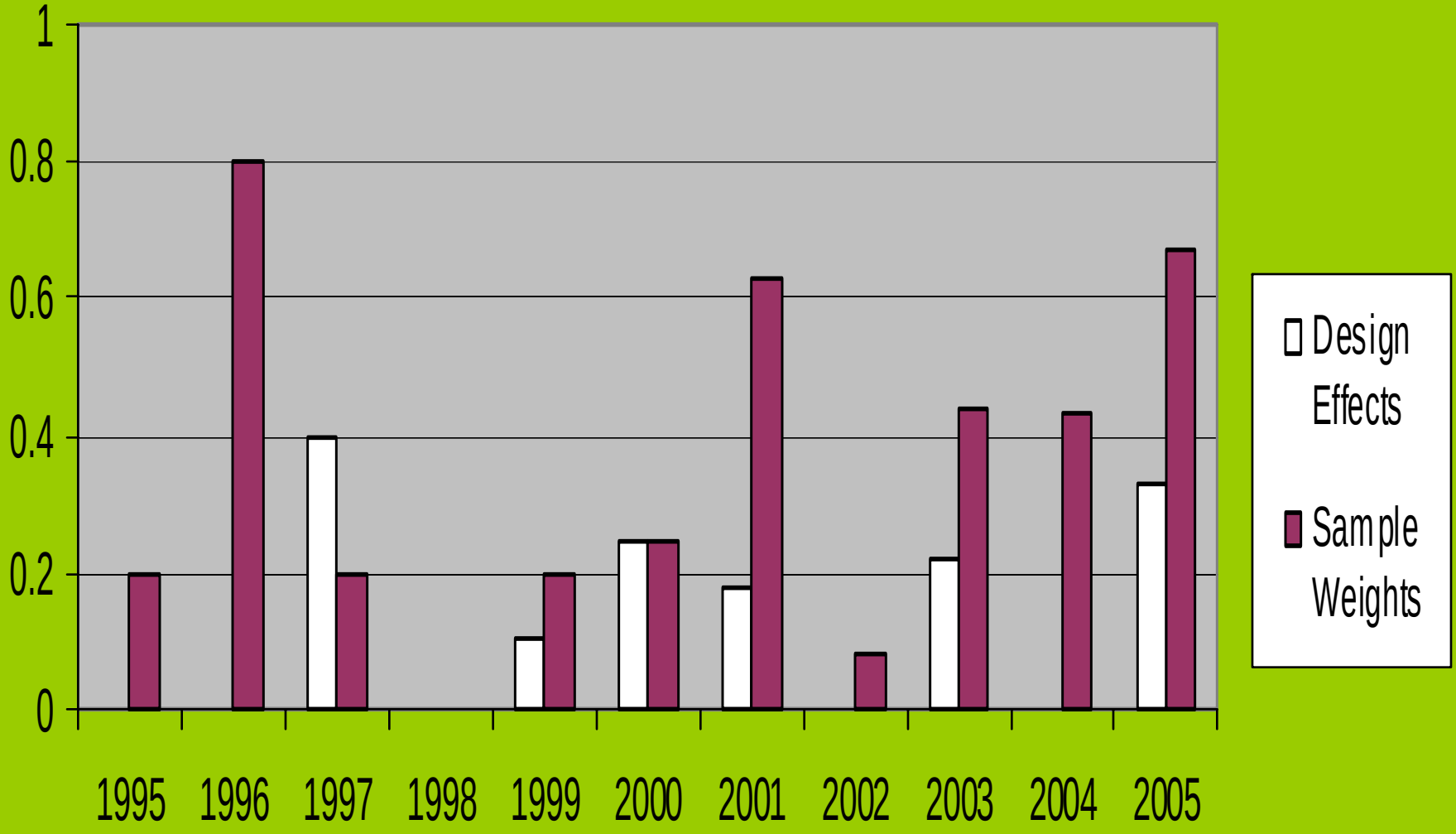
Number of Articles Reviewed Per Publication Year for All Data Sources



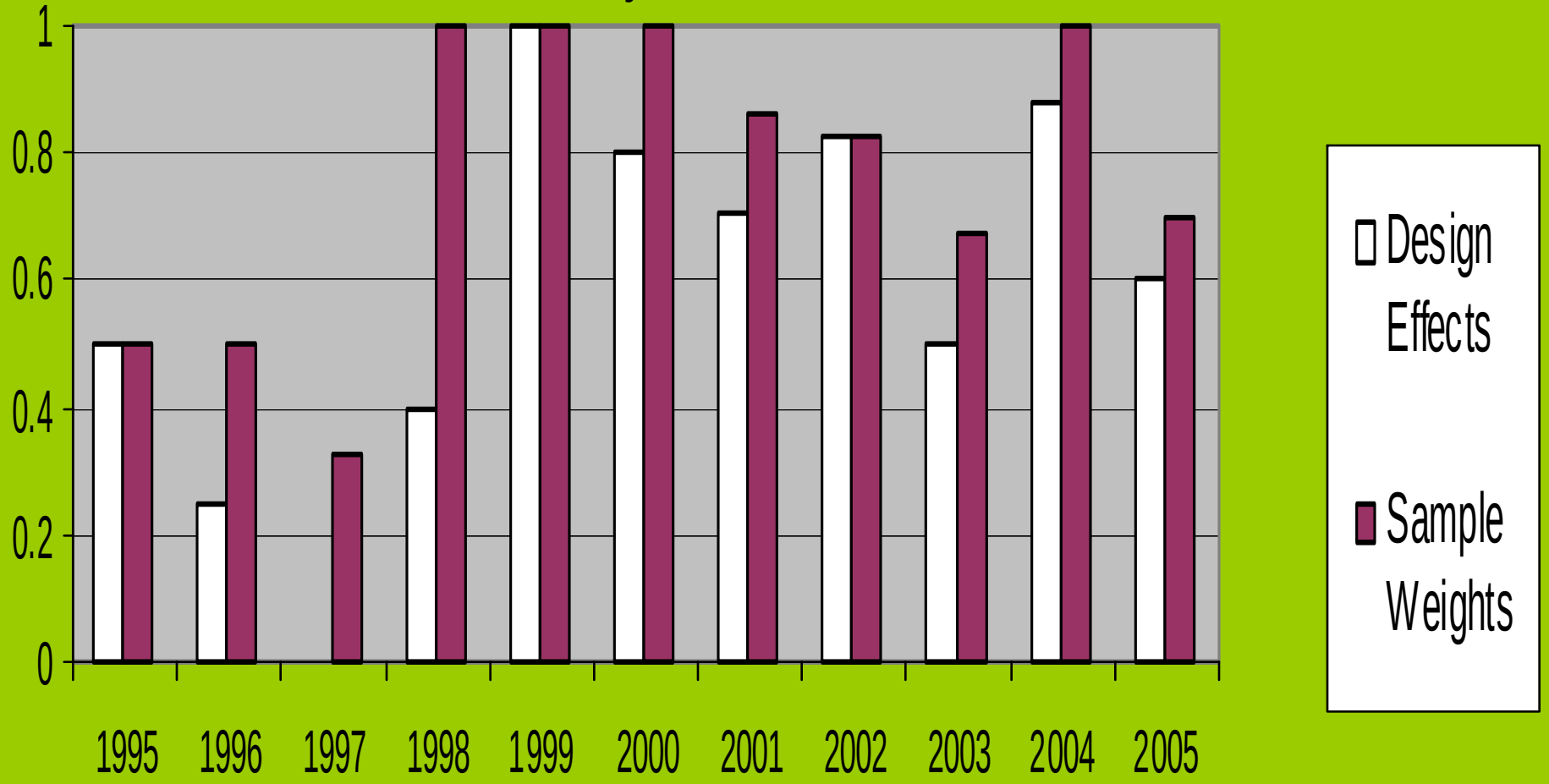
Proportion of Add Health Articles that Reported Use by Publication Year



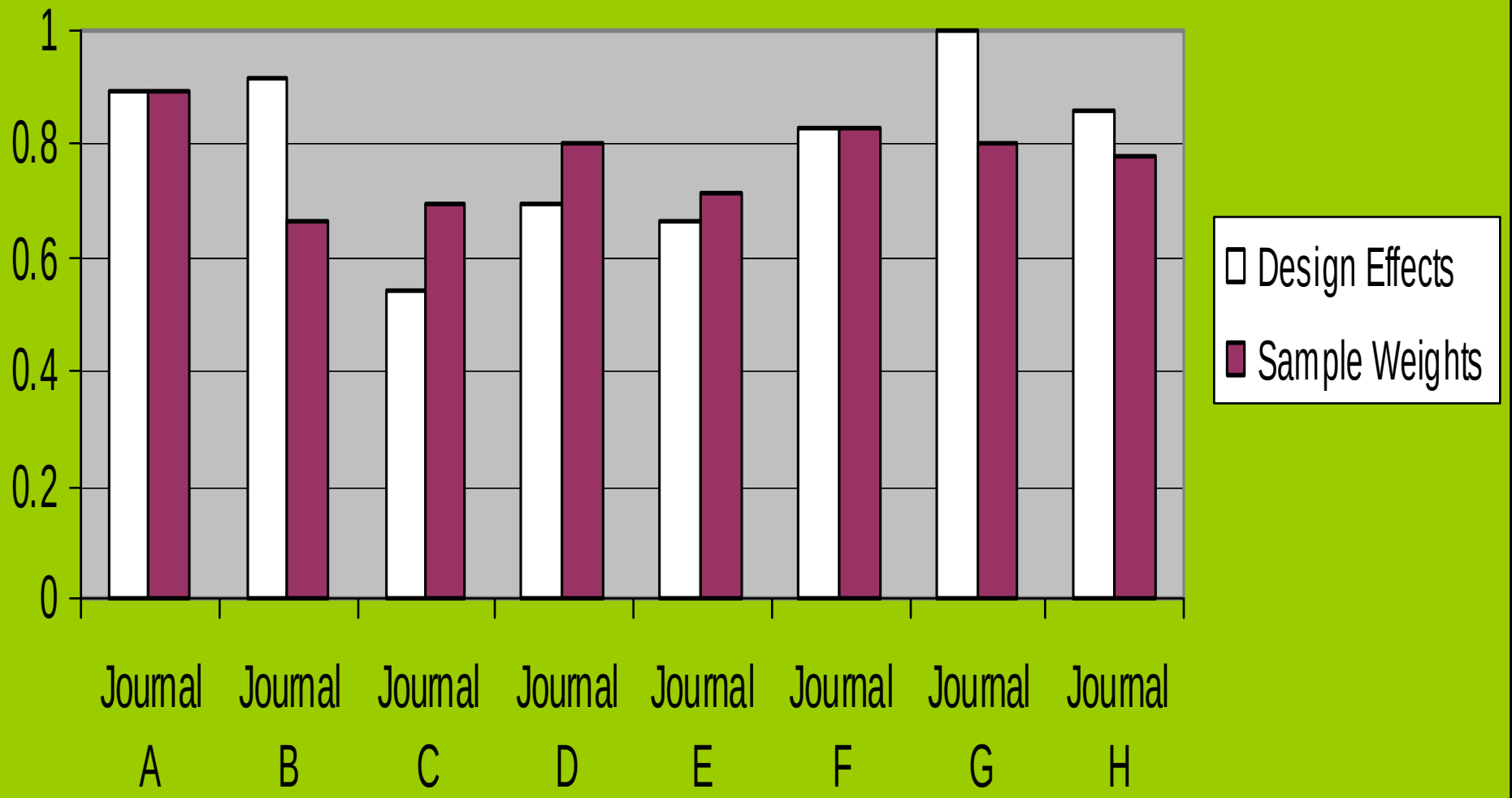
Proportion of MTF Articles that Reported Use by Publication Year



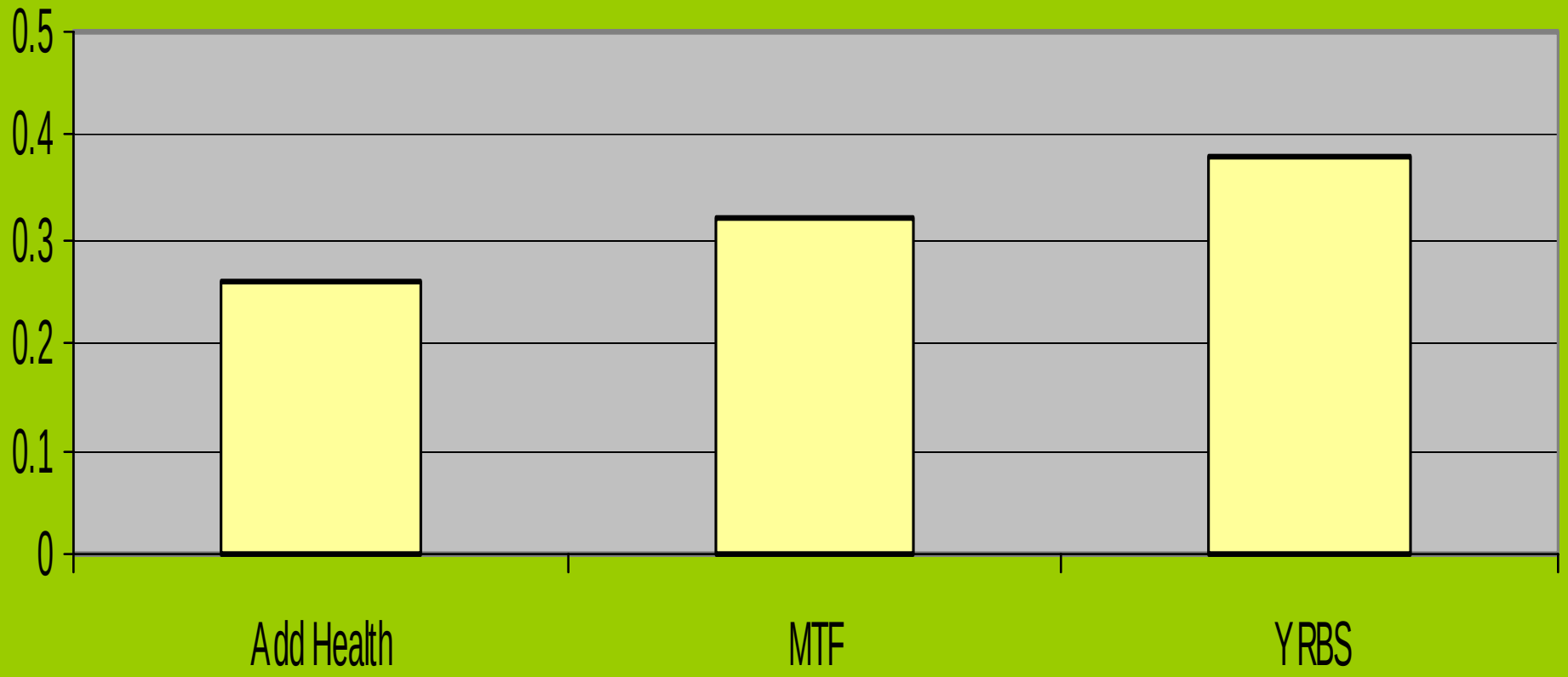
Proportion of YRBS Articles that Reported Use by Publication Year



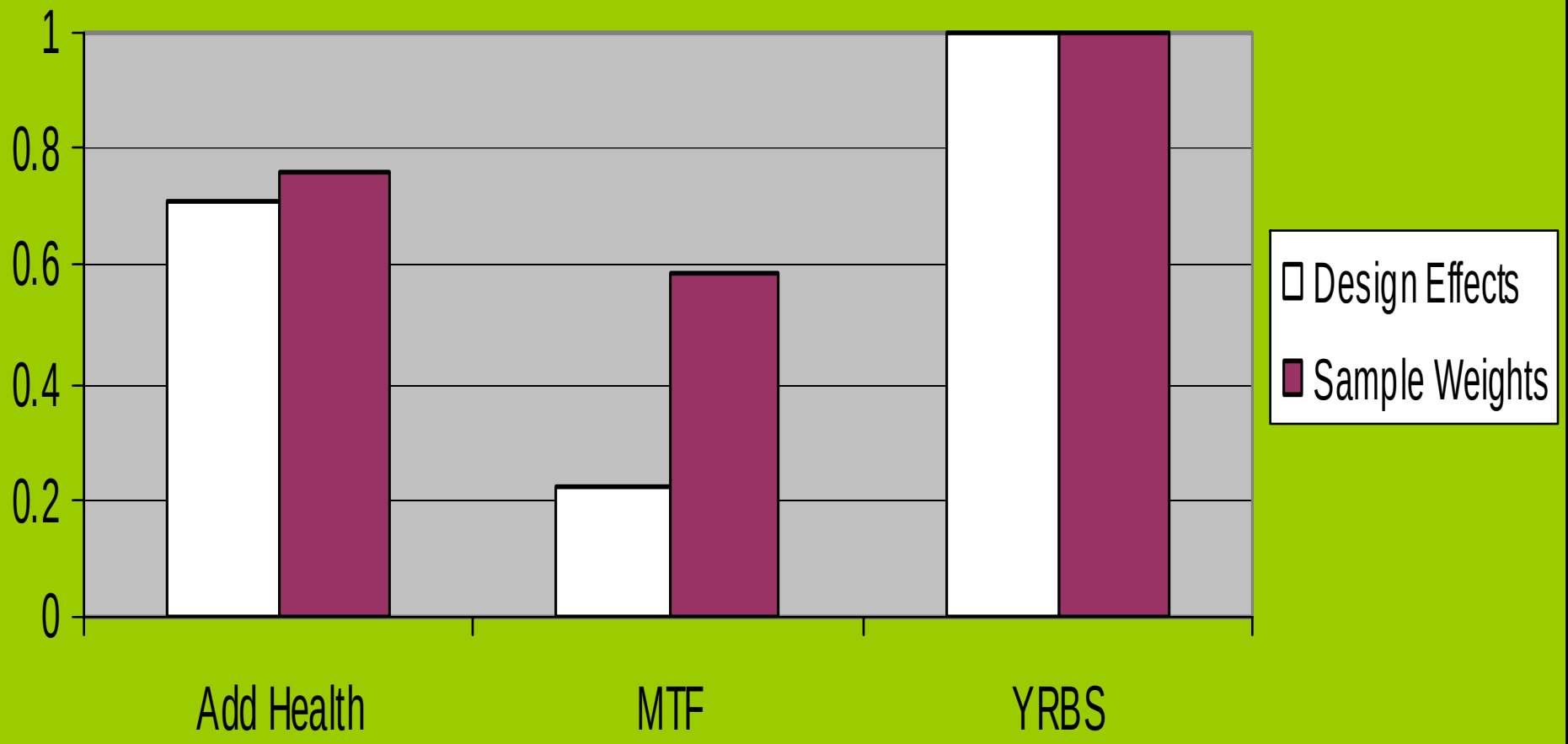
Proportion of Articles that Reported Use by Popular Journal



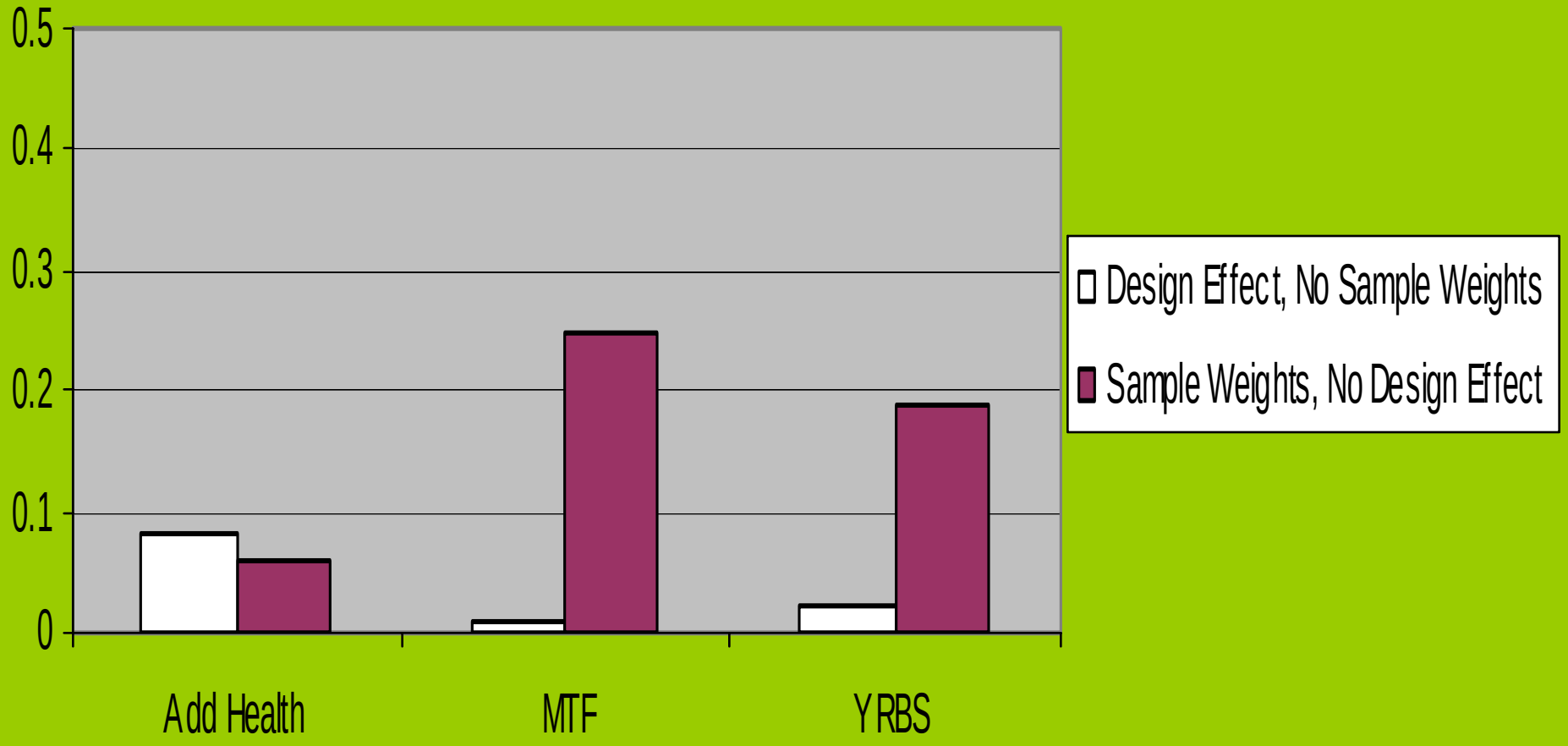
Proportion of Articles that were Published by Internal Affiliates by Data Source



Proportion of Articles Published by Internal Affiliates that Reported Use by Data Source



Proportion of Articles that Reported Discordant Use by Data Source



Discussion

- Room for improvement in the reporting use of design effects and sample weights when disseminating research based on data from Add Health, MTF, and YRBS.
  - Variation in reporting practices across the three data sources.
  - Variation in the proportion of articles published by internal affiliates.

Discussion

- Unclear if researchers are simply not reporting this information or if they are truly not accounting for design effects and using sample weights in their analyses.
  - Cast a shadow of doubt on the accuracy of published secondary data analyses.

Discussion

- Responsibilities for improvement are shared across:
  - Authors
  - Reviewers
  - Editors
  - Professors/Teachers
  - Students
  - Consumers