Thoughts on the Importance of Metadata for Integrated Data

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This presentation is intended to promote ideas. The views expressed do not necessarily reflect the position of the U.S. Department of Education.
Going forward

• Federal statistics based on integrated data, regardless of the source, must be **communicated transparently** and understood to ensure that the nation is provided the best available statistical information and that the statistics can be used wisely.

• Metadata is an essential element to these efforts.
European Statistical System Data Quality Framework: Accessibility and Clarity

• “Statistics should be presented in a clear and understandable form . . . with supporting metadata and guidance.”

• Metadata should be:
  – Preserved and properly archived
  – Standardized according to systems
One Potential Element of a Quality Framework from the FCSM Working Group

• “Clarity is the extent to which easily comprehensible metadata are available, where these metadata are necessary to give a full understanding of statistical data.”
Next Steps Toward a Documentation Standard for Integrated Standard

• Standardization of metadata for output microdata files.
  ➢ Metadata Content
    – Metadata Format
Next Steps Toward a Documentation Standard: Getting Started

• How are data sources for integration identified?
• What is the original intended use of each source?
• When were they collected?
• Where are the source data located?
• Are the source data sample or universe?
• Are the source data structured or unstructured?
Next Steps Toward a Documentation Standard: Getting Started

• What steps are taken to harmonize data from multiple sources?

• How are items drawn from different sources selected (were quality control metrics applied)?

• What controlled classifications (e.g. NAICS, SOC, MSA, Agency glossary) are followed?
Next Steps Toward a Documentation Standard: Modelling

- What data are produced by the model?
- What data sources are used?
- Which variables are used from each source?
- What analytic techniques are used in the model?
- What statistics are used to evaluate the modelling effort?
Next Steps Toward a Documentation Standard: Matching/Linking

• What data sources are used?
• Which variables are used from each source?
• Which variables are used for matching or linking?
• What software/analytic approaches are used?
• What statistics are used to evaluate the success and quality of the resulting data set (e.g., what is the match or link rate)?
Next Steps Toward a Documentation Standard: Processing and Quality

• What editing or imputation techniques were applied by the original data stewards?
• How is data quality evaluated in source data?
• Are data elements edited by source or after integration?
• Are the data cleaned and edited?
• What edits and cleaning procedures are used conducted?
• How is data quality evaluated in the integrated data?
Next Steps Toward a Documentation Standard: Microdata files

- How were data from external sources identified?
- How are modelled data identified?
- Are metadata about data integration processes, outcomes, and assessments of data quality included?
- How are metadata accessed/disseminated? (e.g. API’s, JSON requests)
Thank you!

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• Supplemental slides with an example of the content of documentation for one micro data file with integrated data from multiple sources.
• **NPSAS:1989–90—NPSAS:2016**

• Cross-sectional survey based on student-level records of students enrolled in a postsecondary institution

• Uses data from multiple sources
  • institutional records,
  • government databases, and
  • student interviews

• Provides reliable national estimates of characteristics related to financial aid for postsecondary students.
Student Lists from Institutions

• Counts from lists obtained for sampling were compared to counts from IPEDS (universe)
• Lists transmitted to VBA for matching to identify veterans for oversampling
2015–16 National Postsecondary Student Aid Study (NPSAS:16) Data File Documentation

Student Records from Institutions

• Description of collection procedures

• Outcomes:
  – # and % of institutions providing records by mode
  – # and % of institutions and students by control, level, and student types

• Quality: Student records reviewed for completeness
2015–16 National Postsecondary Student Aid Study (NPSAS:16) Data File Documentation

Student Administrative Data from ED and Data from External Sources

• FAFSA data from federal loan applications (ED Central Processing System)
• Data on loans and Pell Grants (National Student Loan Data System)
• Student enrollment in all institutions attended (National Student Clearinghouse)
• SAT/ACT admissions data—scores and survey
• VBA identified veterans and VA education benefits
2015–16 National Postsecondary Student Aid Study (NPSAS:16) Data File Documentation

Student Administrative Data from ED and Data from External Sources

Documentation included details on:

– Matching procedures for each source
– Outcomes from matching for each source
– Editing described at the item level