Documenting and describing data

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UK Data Archive

Practical research data management
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Overview

A crucial part of making data user-friendly, shareable and with long-lasting usability is to ensure they can be understood and interpreted by any user. This requires clear and detailed data description, annotation and contextual information.

Areas to be covered

• What is documentation?
• Why documentation is important
• What information should be captured?
• Study-level documentation and context
• Data-level documentation
• Anonymisation
• Metadata
What is documentation?

- Data does not mean anything without documentation
  - A survey dataset becomes just a block of meaningless numbers
  - An interview becomes a block of contextless text

- Data documentation might include:
  - A survey questionnaire
  - An interview schedule
  - Records of interviewees and their demographic characteristics in a qualitative study
  - Variable labels in a table
  - Published articles that provides background information
  - Description of the methodology used to collect the data
  - Consent forms and information sheets
  - A ReadMe file
Why document your data?

- Enables you to understand and interpret data when you return to it
- It is needed to make data independently understandable and reusable
- Helps avoid incorrect use or misinterpretation

- If using your data for the first time, what would a new user need to know to make sense of it?

- The UK Data Archive uses data documentation to:
  - supplement a data collection with documents such as a user guide(s) and data listing
  - ensure accurate processing and archiving
  - create a catalogue record for a published data collection
What information should be captured?

**Contextual information about the project and data**
- background, project history, aims, objectives and hypotheses
- publications based on data collection

**Data collection methodology and processes**
- data collection process and sampling
- instruments used - questionnaires, showcards and interview schedules
- temporal/geographic coverage
- data validation – cleaning and error-checking
- compilation of derived variables
- secondary data sources used

**Any useful documentation such as:**
- final report, published reports, user guide, working paper, publications and lab books
What information should be captured?

**Information on dataset structure**
- inventory of data files
- relationships between those files
- records and cases...

**Variable-level documentation**
- labels, codes, classifications
- missing values
- derivations and aggregations

**Data confidentiality, access and use conditions**
- anonymisation carried out
- consent conditions or procedures
- access or use conditions of data
Documentation should be considered early on

- Good data documentation and metadata depends on what you as the creator can provide

- Start gathering meaningful information from as early on in the research process as possible

- This consideration forms an important part of data management planning
Quantitative study

- Smaller-scale study – single user guide may contain compiled survey questionnaire, methodology information
- Example from Understanding Society, a bigger study - many documents presented separately:

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<th>File Name</th>
<th>Size (KB)</th>
</tr>
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<tbody>
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<td>6614_ukhls_2013_revisions.pdf</td>
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<td>6614_w3_youthquestionnaire_gb Britain annotated.pdf</td>
<td>1459</td>
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<tr>
<td>Wave 1 Project Instructions for Interviewers</td>
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</tr>
<tr>
<td>Wave 1 Showcards</td>
<td>6614_wave1_showcards.pdf</td>
<td>199</td>
</tr>
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</table>
Qualitative study – user guide and doc

- A user guide could contain a variety of documents that provide context: interview schedule, transcription notes and even photos.
In practice: transcript format

Study Name:  
Depositor:  
Interviewer:  

Interview number:  
Interview ID: Firstname Lastname  
Date of interview:  

Information about interviewee  
Date of birth:  
Gender:  
Geographic region:  

Marital status:  
Occupation:  

Y=Interviewee  
I=Interviewer  

Y:  I came here in late 1968.  
I:  You came here in late 1968? Many years already.  
Y:  31 years already. 31 years already.  
I:  (laugh) It is really a long time. Why did you choose to come to England at that time?  
Y:  I met my husband and after we got married in Hong Kong, I applied to come to England.  
I:  You met your husband in Hong Kong?  
Y:  Yes.  
I:  He was working here [in England] already?
Qualitative study – data listing

- Data listing provides an at-a-glance summary of interview sets

### Study Number 5407
Health and Social Consequences of the Foot and Mouth Disease Epidemic in North Cumbria, 2001
Mort, M.

The panel respondents for the study were divided into six population groups. The data list for the diary and interviews has been colour-coded accordingly for clarity, using the depositor's original colours:

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<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
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<td>Date of Birth</td>
<td>Gender</td>
<td>Occupation</td>
<td>Interview summary</td>
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<td>1975</td>
<td>M</td>
<td>Veterinary Surgeon</td>
<td>Family and background, career and work, arrangements during FMD epidemic and perceptions of situation</td>
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<td>PM03</td>
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<td>1966</td>
<td>F</td>
<td>Veterinary Surgeon</td>
<td>Family and background, career and work, arrangements during FMD epidemic and perceptions of situation</td>
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<tr>
<td>PM07</td>
<td>Group 6: Animal / Human Health Professionals</td>
<td>1964</td>
<td>F</td>
<td>Veterinary practice manager</td>
<td>Family and background, career and work, arrangements during FMD epidemic and perceptions of situation</td>
</tr>
</tbody>
</table>
Data-level documentation

• Aim to embed this documentation in your data file:

• Some examples:
  • SPSS: variable attributes documented in Variable View (label, code, data type, missing values)
  • MS Excel: document properties, worksheet labels (where multiple)
• Qualitative data/text documents:
  • interview transcript speech demarcation (speaker tags)
  • document header with brief details of interview date, place, interviewer name, interviewee details and context
### Embedded data-level metadata in SPSS file

<table>
<thead>
<tr>
<th>Name</th>
<th>Type</th>
<th>Width</th>
<th>Decimals</th>
<th>Label</th>
<th>Values</th>
<th>Missing</th>
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</thead>
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<td>Which of the qualifications on this card do you have? 10</td>
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<td>0</td>
<td>Activity status for last week</td>
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<tr>
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<td>Manager/Foreman</td>
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<tr>
<td>178</td>
<td>everjob</td>
<td>2</td>
<td>0</td>
<td>Ever had paid employment or self-employed</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
<tr>
<td>179</td>
<td>ftptime</td>
<td>2</td>
<td>0</td>
<td>Full-time or part-time</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
<tr>
<td>180</td>
<td>howlong</td>
<td>2</td>
<td>0</td>
<td>How long have you been looking</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
<tr>
<td>181</td>
<td>wkstr12</td>
<td>2</td>
<td>0</td>
<td>Able to start work within 2 weeks (Government training scheme)</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
<tr>
<td>182</td>
<td>wklook4</td>
<td>2</td>
<td>0</td>
<td>Looking paid work/govt scheme last 4 weeks</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
<tr>
<td>183</td>
<td>nemploi</td>
<td>2</td>
<td>0</td>
<td>Number employed at place of work</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
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<tr>
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<td>nssec</td>
<td>5</td>
<td>1</td>
<td>NS-SEC - long version (harmonised)</td>
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<td></td>
</tr>
<tr>
<td>185</td>
<td>othpaid</td>
<td>2</td>
<td>0</td>
<td>Ever had other employment (waiting to start work)</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
<tr>
<td>186</td>
<td>payage</td>
<td>3</td>
<td>0</td>
<td>Age when last had a paid job</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
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<tr>
<td>187</td>
<td>paylast</td>
<td>4</td>
<td>0</td>
<td>Year left last paid job</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
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<tr>
<td>188</td>
<td>paymon</td>
<td>2</td>
<td>0</td>
<td>Month last left paid job</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
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<tr>
<td>189</td>
<td>sclass</td>
<td>2</td>
<td>0</td>
<td>Social Class</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
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<tr>
<td>190</td>
<td>seq</td>
<td>2</td>
<td>0</td>
<td>Socio-Economic Group</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
<tr>
<td>191</td>
<td>snemploi</td>
<td>2</td>
<td>0</td>
<td>Self employed, how many employees</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
<tr>
<td>192</td>
<td>age</td>
<td>3</td>
<td>0</td>
<td>Age last birthday</td>
<td>{-9, No ans... -99 - -1}</td>
<td></td>
</tr>
</tbody>
</table>
Data-level documentation: variable names

- All structured, tabular data should have cases/records and variables adequately documented with names, labels and descriptions.
- Variable names might include:
  - Question number system related to questions in a survey/questionnaire
    e.g. Q1a, Q1b, Q2, Q3a
  - Numerical order system
    e.g. V1, V2, V3
  - Meaningful abbreviations or combinations of abbreviations referring to meaning of the variable
    e.g. oz%=percentage ozone, GOR=Government Office Region, motoc=mother occupation, fatoc=father occupation
  - For interoperability across platforms - variable names should be max 8 characters and without spaces
Data-level documentation: variable labels

• Similar principles for variable labels:
  • be brief, maximum of 80 characters
  • include unit of measurement where applicable
  • reference the question number of a survey or questionnaire
    e.g. variable 'q11hexw' with label 'Q11: hours spent taking physical exercise in a typical week' - the label gives the unit of measurement and a reference to the question number (Q11b)

• Codes of, and reasons for, missing data
  • avoid blanks, system-missing or '0' values
    e.g. '99=not recorded', '98=not provided (no answer)', '97=not applicable', '96=not known', '95=error'

• Coding or classification schemes used, with a bibliographic ref
  e.g. Standard Occupational Classification 2000 - a list of codes to classify respondents' jobs; ISO 3166 alpha-2 country codes - an international standard of 2-letter country codes
Identity disclosure

A person’s identity can be disclosed through:

• direct identifiers
  
  e.g. name, address, postcode, telephone number, voice, picture

  often NOT essential research information (administrative)

• indirect identifiers – possible disclosure in combination with other information
  
  e.g. occupation, geography, unique or exceptional values (outliers) or characteristics
Anonymising quantitative data - tips

• remove direct identifiers
e.g. names, address, institution, photo

• reduce the precision/detail of a variable through aggregation
e.g. birth year vs. date of birth, occupational categories, area rather than village

• generalise meaning of detailed text variable
e.g. occupational expertise

• restrict upper lower ranges of a variable to hide outliers
e.g. income, age

• combining variables
e.g. creating non-disclosive rural/urban variable from place variables
Anonymising qualitative data

• plan or apply editing at time of transcription
  except: longitudinal studies - anonymise when data collection complete (linkages)

• avoid blanking out; use pseudonyms or replacements

• avoid over-anonymising - removing/aggregating information in text can distort data or make it misleading

• consistency within research team and throughout project

• Identify replacements, e.g. with [brackets]

• keep anonymisation log of all replacements, aggregations or removals made – keep separate from anonymised data files
### Example: Anonymisation log interview transcripts

<table>
<thead>
<tr>
<th>Interview / Page</th>
<th>Original</th>
<th>Changed to</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Int1</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>Spain</td>
<td>European country</td>
</tr>
<tr>
<td>p1</td>
<td>E-print Ltd</td>
<td>Printing company</td>
</tr>
<tr>
<td>p2</td>
<td>20(^{th}) June</td>
<td>June</td>
</tr>
<tr>
<td>p2</td>
<td>Amy</td>
<td>Moira</td>
</tr>
<tr>
<td><strong>Int2</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p1</td>
<td>Francis</td>
<td>my friend</td>
</tr>
</tbody>
</table>
“Light touch” anonymisation possible

Ex 1. Health and Social Consequences of the Foot and Mouth Disease Epidemic in North Cumbria, 2001-2003 (study 5407 in UK Data Archive collection) by M. Mort, Lancaster University, Institute for Health Research.

Date of Interview: 21/02/02

Interview with Lucas Roberts, DEFRA field officer
Date of birth: 2 May 1965
Gender: Male
Occupation: Frontline worker
Location: Plumpton, North Cumbria

Lucas was living at home with his parents. "but I'm hoping to move out soon" so we met at his parents' small neat house. We sat in a very comfortable sitting room with an open fire and Lucas made me coffee and offered shortbread. Although at first Lucas seemed a little nervous, quick to speech and very watchful he seemed to relax as we spoke and to forget about the tape.

I will just start by asking you to tell me a little bit about yourself and your background.

Well it is an agricultural background. I grew up on the farm where my brother is now. After I left school I did work on the farm but went to college and did exams, did land use recreation, sort of countryside/environmental management course. So I obviously left agriculture, did the course and came back [to the farm] at weekends.
Metadata – data about data

• Similar to documentation in that it provides context and description, but is much more structured

• Standard data collection metadata includes:
  • Components of a bibliographic reference
  • Core information that a search engine indexes to make the data findable

• International standards/schemes
  • Data Documentation Initiative (DDI)
  • ISO19115 (geographic)
  • Dublin Core
  • Metadata Encoding and Transmission Standard (METS)
  • Preservation Metadata Maintenance Activity (PREMIS)