Surveys & Statistics:
lessons for avoiding survey design mistakes
Who & Where

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Andrea Ketchum

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What & Why

- Assessment
  - Data management practices
  - Health sciences researchers

- Library initiatives
  - Education
  - Additional support
How

- IRB approved survey
- 25 questions
  - Pilot-tested
  - Distributed multiple ways
  - Available for 3 weeks
  - 237 respondents*

- Statistics
  - Descriptive
  - Fisher’s exact test (p≤0.05)
Demographic Questions

- What School(s)?
- What Department(s)?
- Primary Research Role?
- Type of Research?
Lessons Learned

I Saw Some STUFF! and learned Some THINGS!
and I know now what I must do!

By TheEndxTypeANIME
Lessons Learned

- Specific questions vs trends
Lessons Learned

- Specific questions vs trends
- Recruitment
Lessons Learned

- Specific questions vs trends
- Recruitment
- Question design
Lessons Learned

• Inconsistent wording

*8. Where do you save your working data?

Check all that apply.

- Hard drive
- External hard drive
- Flash drive
- Lab server
- Departmental server
- Campus server (such as CTSI)
- Commercial service (such as Amazon Cloud or DropBox)
- Commercial service supported by the University (such as Box)
- Don’t know
- Other (please specify)

*9. Where are backup copies of your data saved?

Check all that apply.

- Hard drive
- External hard drive
- Flash drive
- Lab server
- Departmental server
- Campus server (such as CTSI)
- Commercial service (such as Amazon Cloud or DropBox)
- Commercial service supported by the University (such as Box)
- No backup
- Don’t know
Lessons Learned

• Survey length

*21. Do you take additional precautions when you store or share sensitive information?

- Yes
- No
- I don’t collect sensitive information
- What is sensitive information?
Lessons Learned

- Specific questions vs trends
- Recruitment
- Question design
  - Inconsistent wording
  - Survey length
  - Coding issues
Lessons Learned

• “check all that apply”

*9. Where are backup copies of your data saved?

Check all that apply.

- Hard drive
- External hard drive
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- Lab server
- Departmental server
- Campus server (such as CTSI)
- Commercial service (such as Amazon Cloud or DropBox)
- Commercial service supported by the University (such as Box)
- No backup
- Don't know
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| What school | What department | What type of research do you perform | Please specify the types of data that you normally collect during the course of research projects. Check Does your data?
| Open-End | Open-End Response | Other (please specify) | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | What is a new tool?
| Medical student | Medical research | Principal investigator | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | What is a new tool?
| GSPH | Epidemiology | Other (please specify) | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | Psychiatry | Principal investigator | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | Geriatric Medicine | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| GSPH | Biostatistics | Co-investigator | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | Health Sciences | Other (please specify) | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| School of Medicine | Biomedical Administration | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| GSPH | IDM | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Graduate | Infectious Disease | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | Department | Principal investigator | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| University | Neurology | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| School of Medicine | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | Pathology | Principal investigator | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Graduate | School’s Office | Administrator | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | OBGYN-R | Administrator | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | Orthopaedics | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Magee | MR | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | PM&R | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | Ob/Gyn | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Health Sciences | GPCL | Lab Manager | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| Medicine | Psychiatry | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| School of Medicine | Cardiology | Post doc | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
| School of Pharmacy | Post doc | Pharmaceutical Sciences | Human subject | Animal | Bench | Text (such as .docx, .pdf) | Spreadsheets (such as .xlsx, .csv) | Databases | Software code | Yes
Data Directly from Survey

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<td>What school/department</td>
<td>Your primary role in research</td>
<td>What type of research do you perform? Please specify the types of data you normally collect during the course of research projects.</td>
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<td>Which of the following metadata or descriptive information does your lab/research group assign to your data files? Check all that apply.</td>
<td>Where do you save your working data? Check all that apply.</td>
<td>You select</td>
<td>How do you guarantee the security of your data? Check all that apply.</td>
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## Data Dictionary

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| Where are backup copies of your data saved? Check all that apply. | Save_Backup1 = Hard drive  
Save_Backup 2 = External hard drive  
Save_Backup 3 = Flash drive  
Save_Backup4 = Lab server  
Save_Backup5 = Departmental server  
Save_Backup6 = Campus server (such as CTSI)  
Save_Backup7 = Commercial service (such as Amazon Cloud or DropBox)  
Save_Backup 8 = Commercial service supported by the University (such as Box)  
Save_Backup9 = No back  
Save_Backup10 = Don’t know | 0 = No  
1 = Yes  
-6 = No Data |
## Re-Coded Data

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Lessons Learned

- knowledge/attitude probing

*13. In the past two years, have you searched for publicly available raw data to use in your research?

Check all that apply

- [ ] Yes
- [ ] No
- [ ] No, I am only interested in results from the published literature
- [ ] I would, but I do not know where to look

| 13 | In the past two years, have you searched for publicly available raw data to use in your research? | Search Public | 0 = No | 1 = Yes | 2 = No, I am only interested in results from the published literature | 3 = I would, but I do not know where to look | -6 = No Data |
## Lessons Learned

### *1. What school(s) do you work in?*

- School1
- School2
- School3
- School4
- School5
  (Multiple columns if selected more than one school)

### *2. What department(s) do you work in?*

- Department1
- Department2
- Department3
- Department4
  (Multiple columns if selected more than one department)

1 = Arts and Sciences
2 = CTSI
3 = Genomics and Proteomics Core Laboratories
4 = Health and Rehabilitation Science
5 = Medicine
6 = MWRI
7 = Nursing
8 = Office of Research
9 = Pharmacy
10 = Graduate School Public Health
11 = UPCI
12 = Engineering
13 = Dental
-6 = No Data

Health sciences or School of Health and Sciences = recoded based on department when appropriate to fit into school

University of Pittsburgh = recoded based on department when appropriate to fit into school

UPMC/Magee = recoded based on department when appropriate to fit into school

ATC = Acute/Tertiary Care in Nursing

BCHS = Behavioral and Community Health Sciences

CCM = Critical Care Medicine

CSD = Communication Science & Disorders
25. Please describe a data management issue you have experienced in the past two years. Such a problem might be investigators not willing to share data, lost data due to server crash, difficulty finding data due to inconsistent file naming, lack of understanding of Data Management Plan requirements, etc...
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<td>Many large data files stuck on a microscope computer not connected our lab network. I had to buy an external hard drive to get them. Also, the microscope program typically names files without helpful identifiers by default and to change the naming system to my own is a tedious process, which I must remember to do before I start taking images.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lost of analyzed data due to upgrade of server, raw data still preserved</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lost data of a recent published manuscript. I was not given the data because it could be no longer retrieved.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lost data due to translational software failure and internet data exchange crash</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lost data due to server crash inconsistent file naming</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large animal data based needed for machine learning by two separate research groups and one patient database on a HIPPA secure server with honest broker oversight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of space on servers for backing up data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of space due to genomics data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I've lost data due to server crashes, I don't think I understand long-term storage of data</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Lessons Learned

- Specific questions vs trends
- Recruitment
- Question design
  - Inconsistent wording
  - Survey length
  - Coding issues
    - “check all that apply”
    - knowledge/attitude probing
    - free text
- Expectations
Statistician Data

Distribution of Naming by Res_Type

Res_Type

0
1
2

Naming

1
2
3
4
5
6
7
### Statistician Data

**The FREQ Procedure**

#### Table of Naming by Res_Type

<table>
<thead>
<tr>
<th>Naming(Naming)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>7</td>
<td>16</td>
<td>0</td>
<td>4</td>
<td>19</td>
<td>17</td>
<td>104</td>
</tr>
<tr>
<td>1</td>
<td>54</td>
<td>5</td>
<td>4</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>10</td>
<td>88</td>
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<td></td>
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<td>5.1532</td>
<td>8.3243</td>
<td>3.1712</td>
<td>4.3604</td>
<td>10.306</td>
<td>12.288</td>
<td>39.64</td>
</tr>
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<td>17</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>30</td>
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<tr>
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<td>1.7568</td>
<td>2.8378</td>
<td>1.0811</td>
<td>1.4865</td>
<td>3.5135</td>
<td>4.1892</td>
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<tr>
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<td>13</td>
<td>21</td>
<td>8</td>
<td>11</td>
<td>26</td>
<td>31</td>
<td>222</td>
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<tr>
<td></td>
<td>50.45</td>
<td>5.86</td>
<td>9.46</td>
<td>3.60</td>
<td>4.95</td>
<td>11.71</td>
<td>13.96</td>
<td>100.08</td>
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</tbody>
</table>

Frequency Missing = 15

#### Statistics for Table of Naming by Res_Type

<table>
<thead>
<tr>
<th>Statistic</th>
<th>DF</th>
<th>Value</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>12</td>
<td>31.4956</td>
<td>0.0017</td>
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<tr>
<td>Likelihood Ratio Chi-Square</td>
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<td>35.8618</td>
<td>0.0003</td>
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<tr>
<td>Mantel-Haenszel Chi-Square</td>
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<td>0.0546</td>
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<tr>
<td>Phi Coefficient</td>
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<tr>
<td>Contingency Coefficient</td>
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<td>0.3520</td>
<td></td>
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<tr>
<td>Cramer's V</td>
<td></td>
<td>0.2660</td>
<td></td>
</tr>
</tbody>
</table>

**WARNING:** 43% of the cells have expected counts less than 5. Chi-Square may not be a valid test.
<table>
<thead>
<tr>
<th>Statistician</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data8</td>
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</tr>
<tr>
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<tr>
<td>Meta2</td>
<td>0.2307</td>
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<td>0.0039</td>
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<tr>
<td>Meta4</td>
<td>0.0040</td>
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<td>Meta5</td>
<td>0.4593</td>
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<tr>
<td>Meta6</td>
<td>1.0000</td>
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<td>Meta7</td>
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<td>Meta10</td>
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<td>Meta11</td>
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<tr>
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<td>Save_Backup5</td>
<td>0.4107</td>
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</tbody>
</table>
TAKE HOME MESSAGE
You Must Remember This

- **Statistician**
  - consult with & listen to
  - be clear on expectations

- **Input & Output**
  - survey design
  - data format
Thanks!

University of Pittsburgh
Health Sciences Library System

- Statistical support via the National Institutes of Health Grant #UL1TR000005