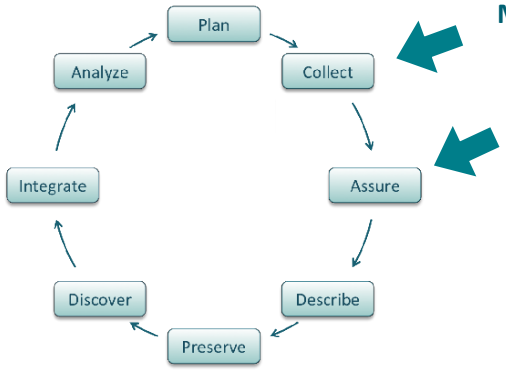
DataONE

Lesson 5: Data Quality Control and Assurance

View all Education Modules at https://www.dataone.org/education-modules

Quality assurance & quality control

Activities that prevent errors from entering or remaining in a data set. These activities ensure data quality before it is collected, entered, or analyzed, and monitor and maintain the quality of the data throughout the study's data life cycle.



Main steps for QA/QC activities in data life cycle

Types of errors

Errors of commission:

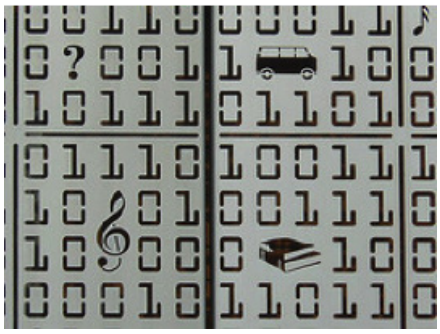
- Incorrect/inaccurate data is entered
- Examples: malfunctioning instrument or mistyped data

Errors of omission:

- Data or metadata is not recorded
- Examples: inadequate documentation, GPS unit runs out of power, forgotten measurements

Data contamination

Process or phenomenon, other than the one of interest that affects a value and results in erroneous values.



CC image by Michael Coghlan, Flickr

QA/QC Best Practices: Before data collection

Define standards to be used during the project, including:

- data formats
- code
- measurement units
- metadata to be captured

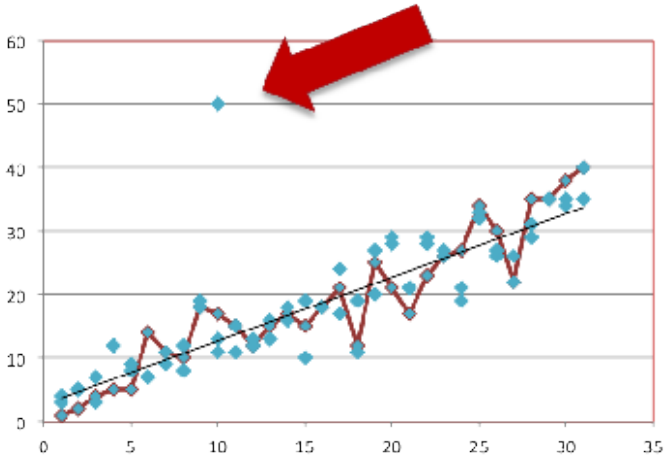
Assign responsibility for data quality

QA/QC Best Practices: During data collection

- Consider double entry, where data is keyed in by two different people, agreement checked by computer, and mistakes corrected
- Transcribe the data by listening to a recording of yourself reading the data or by using a text-speech program
- Design data storage well:
    - minimize how many times a piece of data must be entered
    - use consistent terminology
    - atomize data: enter one piece of data per cell
- Document changes to data to avoid duplicate error checking and to allow revision if necessary

QA/QC Best Practices: After data collection

- Make sure data line up in proper columns
- Make sure there are no missing, impossible, or anomalous values
- Peform statistical summaries, like means and standard errors
- Look for outliers, or extreme values, to identify possible data contamination.
    - This can be done with graphs, maps, or statistical methods.



Local contact information