Automated processing of web-based research data using proc http and macro variable lists

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What is REDCap?

- A web based data collection system installed at 7,000 academic institutions globally.

- Dynamic data environment. Presents some challenges.

- Metadata driven with a rich API

- Using PROC HTTP to interact with REDCap's API I can retrieve project metadata and automate the process of data set creation, including formats and labels

Participant ID (EDM-XXX) TST-999

Calgary

Data Collection Instrument	Screening	Surgery	1 Month Visit	2 Month Visit	3 Month Visit	6 Month Visit	12 Month Visit / End of Study
Visit Details	🟢	🔴	🔴	🔴	🔴	🔴	🔴
Inclusion And Exclusion	🟢						
Demographics	🟢			🔴			
Vital Signs	🟢		🔴	🔴	🔴	🔴	🔴
Investigations	🟢		🔴	🔴	🔴		🔴
Physical Examination	🟢				🔴	🔴	🔴
Surgery		🔴					
AE/CM Review		🔴	🔴	🔴	🔴	🔴	🔴
Medication		🔴	🔴	🔴			🔴
Nerve Conduction Studies	🟢				🔴	🔴	🔴

Key Concepts

- PROC HTTP

- SAS macros

- PROC SQL and Macro variable lists

- PROC FORMAT cntlin=

- Data step processing with infile and input statements

What is HTTP?

- HTTP is one of the protocols that's used to transfer data over the internet.

- It is a complex protocol involving response-request cycles

- http supports a number of different 'methods' including GET and POST.

PROC HTTP

- http client - issues HTTP requests and exposes the responses to the SAS programming environment.
- Significant changes in 2019 (9.4M6) make it much easier to work with.

Example

```
filename out "out.html";

proc http
    url="example.com"
    out=out;
run;

%put &SYS_PROCHTTP_STATUS_CODE;
```

The Process

- Retrieve study metadata
- Map REDCap concepts to SAS concepts
- Create format library
- Loop through the map
  - Import each study form in turn.
  - Create individual data sets, one per form
  - Apply informats, formats & labels

Demonstration

- Quick look at clinical trial data in REDCap.

- Example PROC HTTP usage.

- A big lump of ugly code!

Thank you!