Target: Enhance In-House Analysis and Reporting Capabilities

- Better
  - Standardized output (datasets and tables)
  - Reduced error (increased quality)
  - Internal control/flexibility
- Quicker
  - Copy from library and reduce QC time
- Easier
  - No writing programs “from scratch”
  - Similar programming structure makes sharing work easier
  - Training new staff with consistent process/tools

Project Methodology

- Annotated Standard Table/Listing (TL) shells
- Program templates for standard TLs and associated derived datasets
  - Minimal change for users
  - Clearly commented direction
  - Invoke standard macros (including setup, title and reporting macros)
- User Guide

Annotated Shells

Title Macro Design

- Consolidation: one file for each study to hold “cosmetic” attributes of data contents in tables and listings
  - Footnotes
  - Titles
  - These are non-data elements

Template Program Design

- General Structure:
  - Program header
  - Establish environment
  - Invoke standard macros
  - Invoke study-specific work
- Why not just use macros?
  - Users have freedom – and responsibility – of the statistical program
  - Complete programs easier to maintain

Sample Code: Header

```sas
%title Macro Design:
```

Sample Code: Environment

```sas
%call_setup;
%mend call_setup;
```

Sample Code: Data Transformation

```sas
%macro call_setup;
  /*
  * This template can be used for either crossover or parallel
  */
  %let DATACUT = level01 ;
  %let STRATC = STRATC / group noprint;
  %let RANDSEQ = / display width=5 format=3.0 left
  %let STRATCC = / display width=5 format=3.0 left
  %let BLOCK = / display width=5 format=3.0 left
  %let TRTR = / display width=5 format=3.0 left
  %let TRTRC = / display width=5 format=3.0 left
  %let SUBJ = / display width=5 format=3.0 left
  %let SITE = / display width=5 format=3.0 left
  %let randomization = / display width=5 format=3.0 left
  /*
  * Use macro invocations
  */
  put &DATACUT, &STAGE, &OUTPUT_TYPE;
  %let RTMP = randomization
  %let RMISS = %str( &RTMP); %let RMISS = %str( &RTMP);
  %let RMISS = %str( &RTMP);
  /*
  * Combine SUBJNO and SITE
  */
  set INDATA;
```

Real Observed Benefits

- Operational since mid-2011, used in 14 studies
- Reduced programming time
  - typically around 75%
  - one example: 17 tables in hour by one person
- Non-SAS “experts” can use template programs easily
- Standards compliance is achieved
- Less time spent on QC

What Has Made This Project a Success?

- Talented and experienced developers
- User community is not large (~9 people) and supported by 3 developers
- Timing is right: coincided with release of updated standards
- Timing is right: some users are statisticians and not “programmers” – they welcome use of template programs
- Experienced users don’t start from scratch when they work; template programs offer a substitution for “old” user programs