



A proposal for intervention and event partial date time imputation

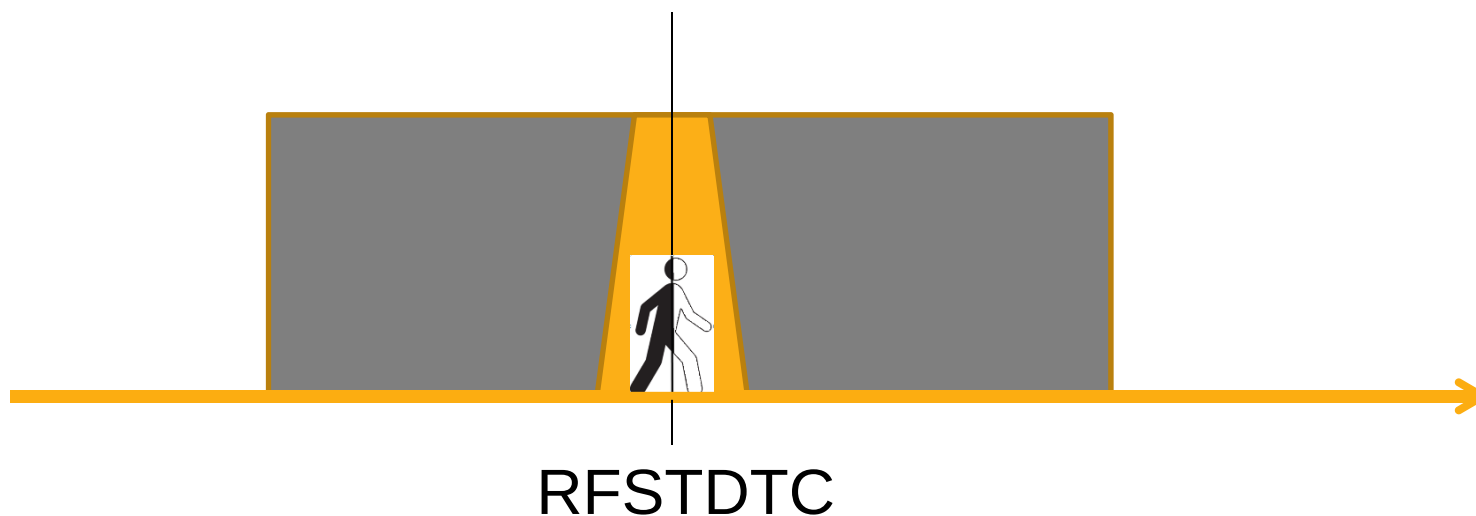
Chunpeng Zhao

Background

- Partial date times represent a potential source of bias in a clinical trial.
- Every effort should be undertaken to avoid incomplete date/times
- However, in reality, there will almost always be some partial date/times
- Unfortunately, no universally applicable methods of handling partial date/times can be recommended.

Proposal approach of intervention or event date/time imputation

- Conservative rules prefer patients' safety concern
 - Imputed start date/time: as close to reference start date/time as possible
 - Duration of intervention or event: as long as possible
- More complete original date/time is more reliable



End date/time imputation

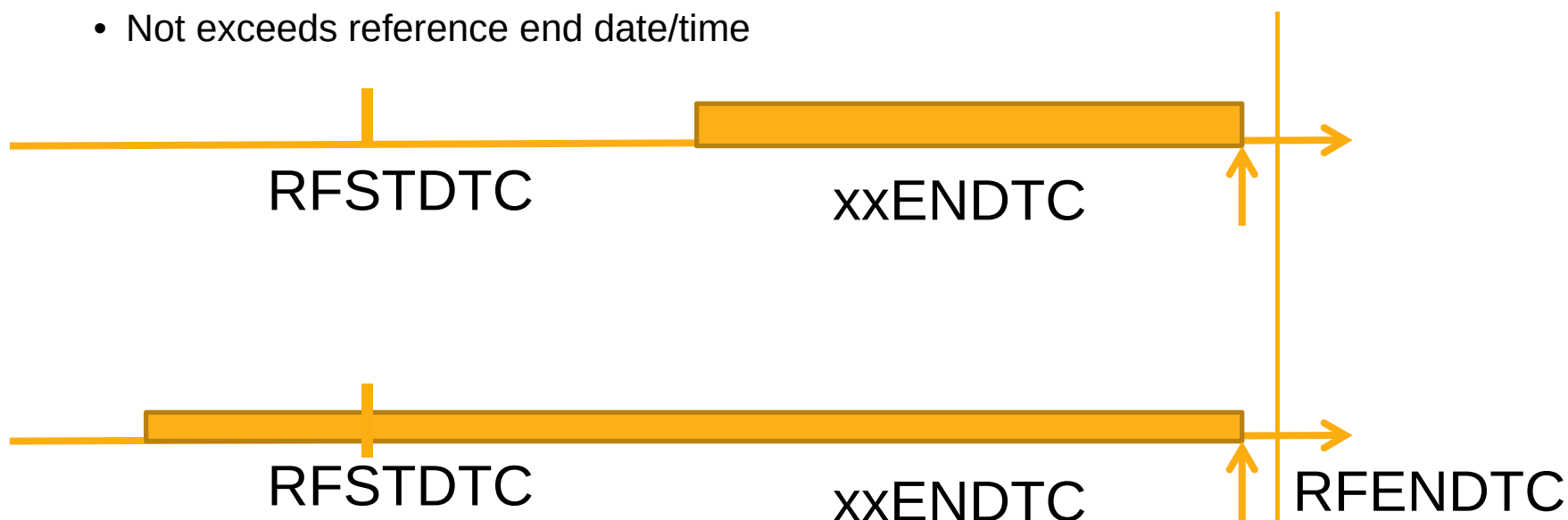
- Duration of intervention or event: as long as possible
 - Incomplete end date/time is before reference start date/time
 - As close to reference start date/time as possible



End date/time imputation

continue

- Duration of intervention or event: as long as possible
 - Incomplete end date/time is after reference start date/time or uncertain
 - As far from reference start date/time as possible
 - Not exceeds reference end date/time



Start date/time imputation

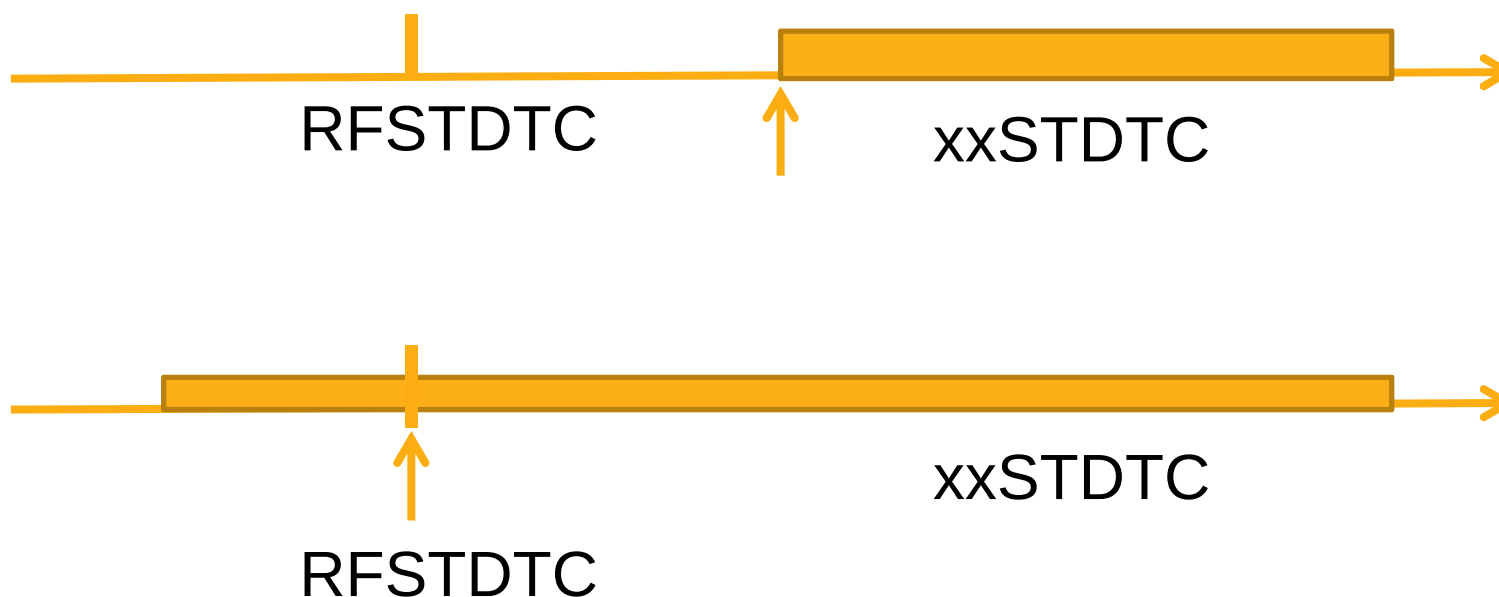
- Rule 1: Imputed start date/time: as close to reference start date/time as possible
- Rule 2: Duration of intervention or event: as long as possible
- Incomplete start date/time is before reference start date/time
 - Tradeoff between Rule 1 and Rule 2
 - Mid date/time in possible period(Expected value)
 - Mid of day: 12:00
 - Mid of month: 15th
 - Mid of year: July 01st



Start date/time imputation

continue

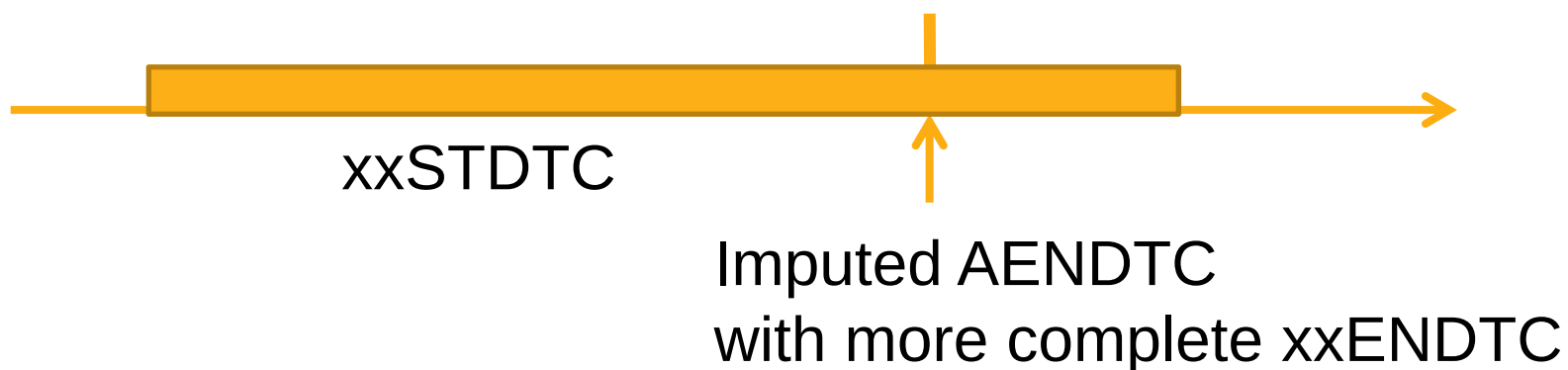
- Incomplete start date/time is after reference start date/time or uncertain
 - Imputed start date/time: as close to reference start date/time as possible
 - As close to reference start date/time as possible



Start date/time imputation

continue

- More complete date/time is more reliable
 - If imputed start date/time is after or on more complete end date/time then
 - The same with End date and with “00:00” time part
- Never hide data issue through imputation



SAS functions for end date/time imputation

ENDATIMP Function:

- Return value: Imputed end date/time (E8601DT)
- Syntax: `ENDATIMP (ENDTC $, RFSTDTC $, RFENDTC $, AENDTF $, AENTMF $) $`
- Required Arguments
 - Inputs:
 - ENDTC: Original end date/time (E8601DT)
 - RFSTDTC: Reference start date/time (E8601DT)
 - RFENDTC: Reference end date/time (E8601DT)
 - Outputs:
 - AENDTF: Analysis End Date Imputation Flag
 - AENTMF: Analysis End Time Imputation Flag

SAS functions for start date/time imputation

STDATIMP Function:

- Return value: Imputed start date/time (E8601DT)
- Syntax: STDATIMP (STDTC \$, RFSTDTC \$, ENDTC \$, AENDTC \$, ASTDTF \$, ASTTMF \$) \$
- Required Arguments
 - Inputs:
 - STDTC: Original start date/time (E8601DT)
 - RFSTDTC: Reference start date/time (E8601DT)
 - ENDTC: Original end date/time (E8601DT)
 - AENDTC: imputed end date/time (E8601DT)
 - Outputs:
 - ASTDTF: Analysis Start Date Imputation Flag
 - ASTTMF: Analysis Start Time Imputation Flag

Examples

```
%datimp_v2
data dsn1;
  length
    AENDTC $20
    AENDTF AENTMF $1
    ASTDTC $20
    ASTDTF ASTTMF $1
  ;
  set dsn0;
  call missing(AENDTF, AENTMF, ASTDTF, ASTTMF);
  AENDTC=endatimp(ENDTC, RFSTDTC, RFENDTC, AENDTF, AENTMF);
  ASTDTC=stdatimp(STDTC, RFSTDTC, ENDTC, AENDTC, ASTDTF, ASTTMF);

/*Impute start date/time without end date/time collection*/
  ASTDTC=stdatimp(STDTC, RFSTDTC, STDTC, STDTC, ASTDTF, ASTTMF);
run;
```



datimp_v2.sas

Results

xxSTDTC	xxENDTC	RFSTDTC	RFENDTC	ASTDTC	ASTDTF	ASTTMF	AENDTC	AENDTF	AENTMF
2015		2016-09-05 T05:09	2016-10-01 T10:01	2015-07-01 T00:00	M	H			
2016-09		2016-09-05 T05:09	2016-10-01 T10:01	2016-09-05 T05:09	D	H			
2016	2016-09-03T05	2016-09-05 T05:09	2016-10-01 T10:01	2016-09-03 T00:00	M	H	2016-09-03 T05:59		M
2016-09-12T10	2016	2016-09-05 T05:09	2016-10-01 T10:01	2016-09-12 T10:00		M	2016-10-01 T10:01	M	H
2015	2016	2016-09-05 T05:09	2016-10-01 T10:01	2015-07-01 T00:00	M	H	2016-10-01 T10:01	M	H
2016-09-06	2016-09	2016-09-05 T05:09	2016-10-01 T10:01	2016-09-06 T00:00		H	2016-09-30 T23:59	D	H

