



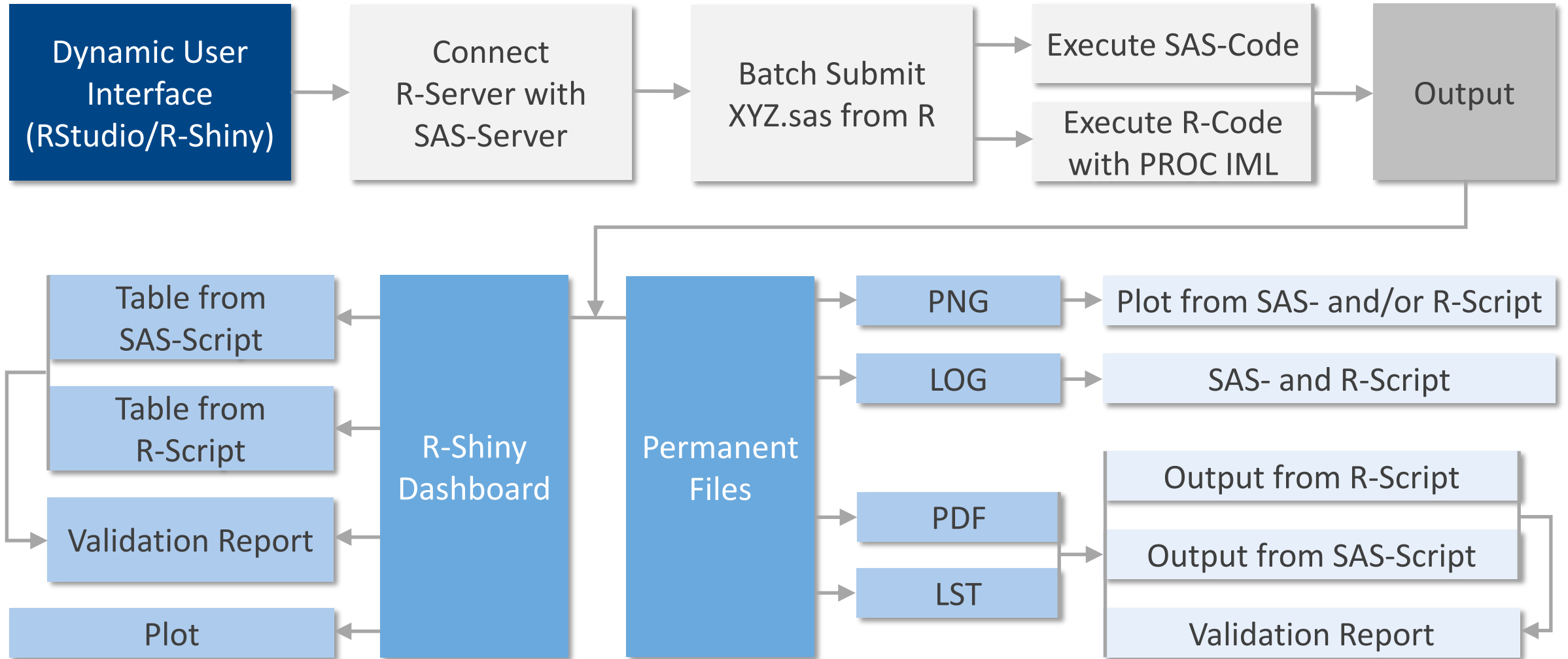
A R-Shiny Application: Platform Independent Tool to Produce a Statistical Manuscript with R and Validation with SAS

PHUSE EU Connect 2020 Software Demonstration – SD10
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Technical Requirements

- R / RStudio/ R-Shiny
- SAS 9.4

Workflow



Prototype of the Workflow

Mainanalytics GmbH

Overview

Analysis Type ▼

Analysis Type

None ▼

None

2-Way Tests

Survival Analysis

Logistics Regression

Hy's law

Select
Analysis Type

A blue arrow pointing from the 'Select Analysis Type' box towards the '2-Way Tests' option in the dropdown menu.

Prototype of the Workflow

Mainanalytics GmbH

Overview

Analysis Type



Analysis Type

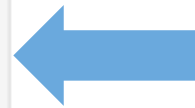
2-Way Tests



Names of the Analysis

None
Chi-Squared Test
Fisher Exact test
CMH Test
T-test
Z-test
Wilcoxon Rank Sum Test

Select
Analysis Name



Prototype of the Workflow

Mainanalytics GmbH

Overview

Analysis Type ▾

Analysis Type

2-Way Tests ▾

Names of the Analysis

Chi-Squared Test ▾

Types of Chi-Square Test

| ▴

Pearson Chi-Square Test

Pearson Chi-Square Test with Yates's correction for continuity



Select Type of the
specific Analysis

Prototype of the Workflow

Mainanalytics GmbH

Overview

Analysis Type ▼

Analysis Type

2-Way Tests ▼

Names of the Analysis

Chi-Squared Test ▼

Types of Chi-Square Test

Pearson Chi-Square Test with Yates's correction for continuity ▼

Select Dataset*

adsl.xpt ▲

Select

adae.xpt

adlbc.xpt

adlbh.xpt

adlbhy.xpt

adsl.xpt

adtte.xpt

advx.xpt

Select
Dataset

Prototype of the Workflow

Mainanalytics GmbH

Overview

Analysis Type

Analysis Type

2-Way Tests

Names of the Analysis

Chi-Squared Test

Types of Chi-Square Test

Pearson Chi-Square Test with Yates's correction for continuity

Select Dataset*

adsl.xpt

Select Population

EFFFL

Select Population Value

Y

Select Parameter 1*

AGEGR1

Select Parameter 2*

TRT01A

ARM

TRT01P

TRT01PN

TRT01A

TRT01AN

TRTSDT

Select Parameter 2*

TRT01A

ARM

TRT01P

TRT01PN

TRT01A

TRT01AN

TRTSDT

Select Parameters

Prototype of the Workflow

Mainanalytics GmbH

Overview

Analysis Type ▾

Analysis Type

2-Way Tests ▾

Names of the Analysis

Chi-Squared Test ▾

Types of Chi-Square Test

Pearson Chi-Square Test with Yates's correction for continuity ▾

Select Dataset*

adsl.xpt ▾

Select Population

EFFFL ▾

Select Population Value

Y

Select Parameter 1*

AGEGR1 ▾

Select Parameter 2*

TRT01A ▾

Submit

Reset inputs

Click Submit
Button

Prototype of the Workflow

Mainanalytics GmbH

Overview

Analysis Type

Analysis Type

2-Way Tests

Names of the Analysis

Chi-Squared Test

Types of Chi-Square Test

Pearson Chi-Square Test with Yates's correction for continuity

Select Dataset*

adsl.xpt

Select Population

EFFFL

Select Population Value

Y

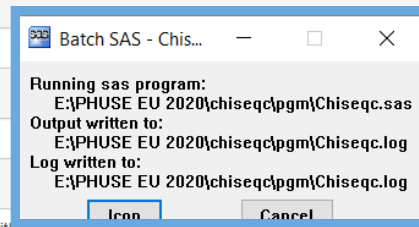
Select Parameter 1*

AGEGR1

Select Parameter 2*

TRT01A

Submit Reset inputs



Prototype of the Workflow

```
callSAS <- function (f, path=getwd(), workDir=sprintf("E:", sys.info()["user"])) {  
  if (grep(".sas$", f)) {  
    exeFile <- "E:\\Apps\\SASHome\\SASFoundation\\9.4\\sas.exe"  
    sasFile <- sprintf("%s\\%s", path, f)  
    logFile <- sprintf("%s\\%s", path, gsub(".sas$", ".log", f))  
    cmd <- sprintf("\\%s\\" -sysin \\%s\\" -log \\%s\\" -print \\%s\\",  
                  exeFile,  
                  sasFile,  
                  logFile,  
                  logFile  
                  )  
    system(cmd, invisible=FALSE)  
    cat(readLines(sasFile), sep="\n")  
    if (length(grep("^ERROR:", readLines(logFile))) > 0) {  
      warning(sprintf("\nERROR: See line %s in %s.", grep("^ERROR:", readLines(logFile)), logFile))  
    } else {  
      message(sprintf("No errors\nSee %s for details.", logFile))  
    }  
  }  
}  
#Example of using Function  
callSAS(xyz.sas)|
```

During Batch
Submission



Connect R-Shiny
Server with
SAS-Server



Prototype of the Workflow

AutoSave ☐ Off chqcfinal_param - test

File Home Insert Page Layout Formulas Data Review View Help

Paste

Clipboard

Calibri 11

B *I* U

Font

Alignment

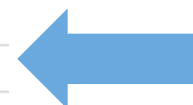
B10

	A	B
1	Pass_Parameters	Pass_Parameters_Name
2	Dataset	ADSL
3	Population	EFFFL
4	Population Values	Y
5	Variable 1	AGEGR1
6	Variable 2	TRT01A
7		

During Batch
Submission



SAS Read all
Parameters



Prototype of the Workflow

```
proc iml;

run ExportDatasetToR("work.&dnm.", "mydata");
varnm1="%varnm1";
varnm2="%varnm2";
submit varnm1 varnm2 / R;

b <- dplyr:: select(mydata, "%varnm1")
c <- dplyr:: select(mydata, "%varnm2")

tbl <- data.frame(b,c)
tblx = table(tbl)
a <- chisq.test(tblx, correct = TRUE)

      b<- a$observed
      c<- a$expected

      d<- a$p.value
      e<- a$statistic
      f<- a$parameter

      chqfinal11<-as.data.frame(b)
      chqfinal12<-as.data.frame(c)

      chqfinal2<-as.data.frame(cbind(d,e,f))
      colnames(chqfinal2) <- c("P-Value", "chiseq value", "Degree of Freedom")
endsubmit;
run ImportDataSetFromR("WORK.chqfinal11", "chqfinal11");
run ImportDataSetFromR("WORK.chqfinal12", "chqfinal12");
run ImportDataSetFromR("WORK.chqfinal2", "chqfinal2");
quit;
```

During Batch
Submission



Execute R
Method



Prototype of the Workflow

```
proc freq data=&dnm.;  
  tables &varnm1.*&varnm2. / chisq nopercnt norow nocol  
    deviation expected all;  
  output out=chitest1 n nmiss pchi lrchi;  
  ods output crosstabfreqs=cross;  
run;
```

During Batch
Submission



Execute SAS
Method



Prototype of the Workflow

Table: Comparison of the results

Compare Results between SAS and R Output	
1	No unequal values were found. All values compared are exactly equal.

Showing 1 to 1 of 1 entries

Previous 1 Next

Show 10 entries

Search:

Table: Pearson Chi-Square Test with Yates's correction from R

	Pooled Age Group 1	Parameter	Placebo	Xanomeline High Dose	Xanomeline Low Dose	P-value / Chi-Seg Value / Degree of Freedom
1	65-80	Observed / Expected	40 / 45.5769	50 / 42.6923	45 / 46.7308	
2	<65	Observed / Expected	13 / 10.1282	10 / 9.4872	7 / 10.3846	
3	>80	Observed / Expected	26 / 23.2949	14 / 21.8205	29 / 23.8846	
4						0.0861 / 8.1551 / 4

Showing 1 to 4 of 4 entries

Previous 1 Next

Show 10 entries

Search:

Table: Pearson Chi-Square Test with Yates's correction from SAS

	Pooled Age Group 1	Parameter	Placebo	Xanomeline High Dose	Xanomeline Low Dose	P-value / Chi-Seg Value / Degree of Freedom
1	65-80	Observed / Expected	40 / 45.5769	50 / 42.6923	45 / 46.7308	
2	<65	Observed / Expected	13 / 10.1282	10 / 9.4872	7 / 10.3846	
3	>80	Observed / Expected	26 / 23.2949	14 / 21.8205	29 / 23.8846	
4						0.0861 / 8.1551 / 4

Showing 1 to 4 of 4 entries

Previous 1 Next

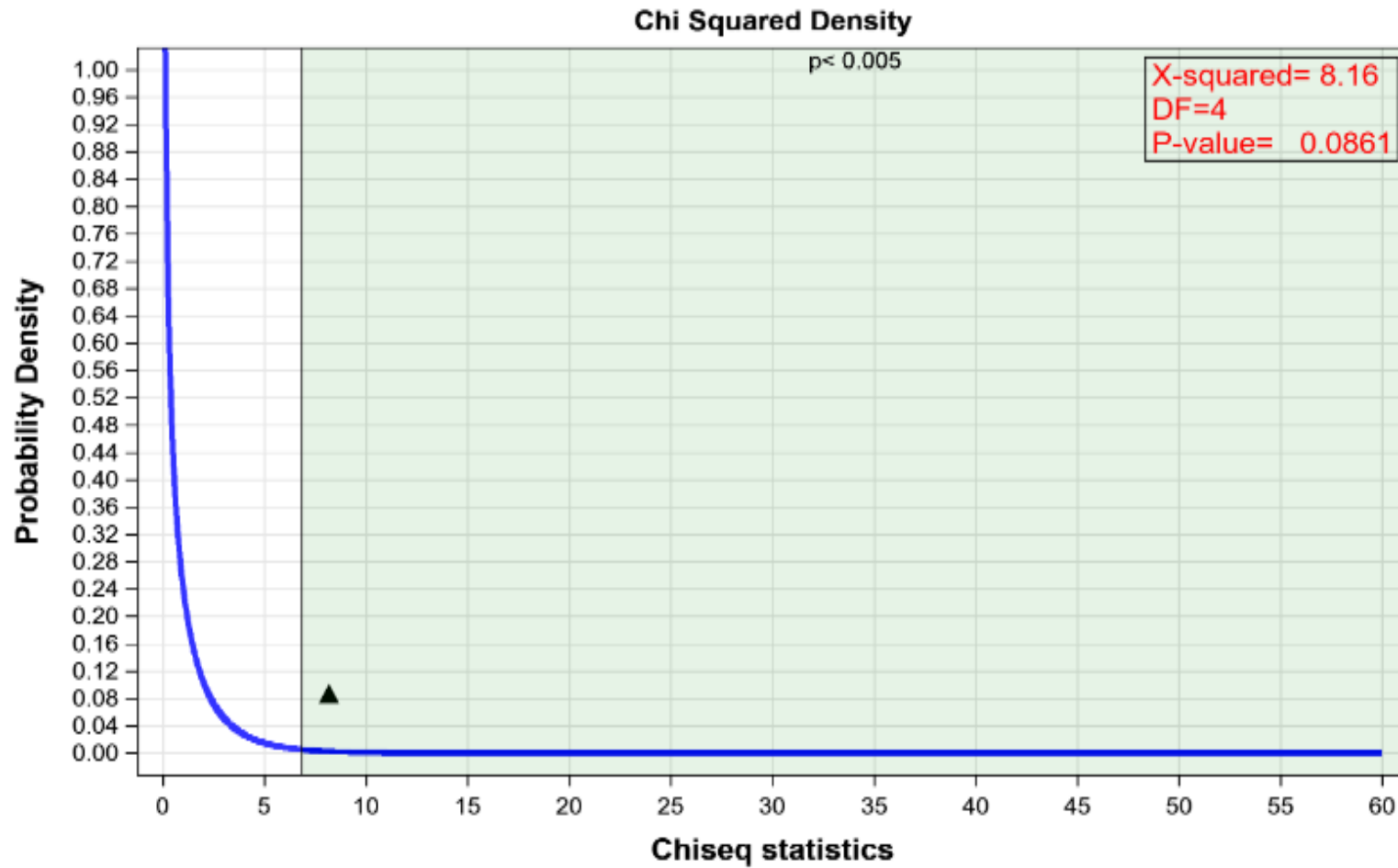
Output



R-Shiny Dashboard



Prototype of the Workflow



Output

R-Shiny
Dashboard

Prototype of the Workflow

› This PC › Apps (E:) › PHUSE EU 2020 › chiseqc › lst

Name	Date modified	Type	Size
chiseqc_density	9/3/2020 6:35 PM	PNG File	125 KB
Compare	9/3/2020 6:35 PM	SAS Output	1 KB
R	9/3/2020 6:35 PM	SAS Output	2 KB
SAS	9/3/2020 6:35 PM	SAS Output	2 KB

› This PC › Apps (E:) › PHUSE EU 2020 › chiseqc › pdf

Name	Date modified	Type	Size
Compare	9/3/2020 6:35 PM	PDF File	192 KB
R	9/3/2020 6:35 PM	PDF File	216 KB
SAS	9/3/2020 6:35 PM	PDF File	215 KB

› This PC › Apps (E:) › PHUSE EU 2020 › chiseqc › ds

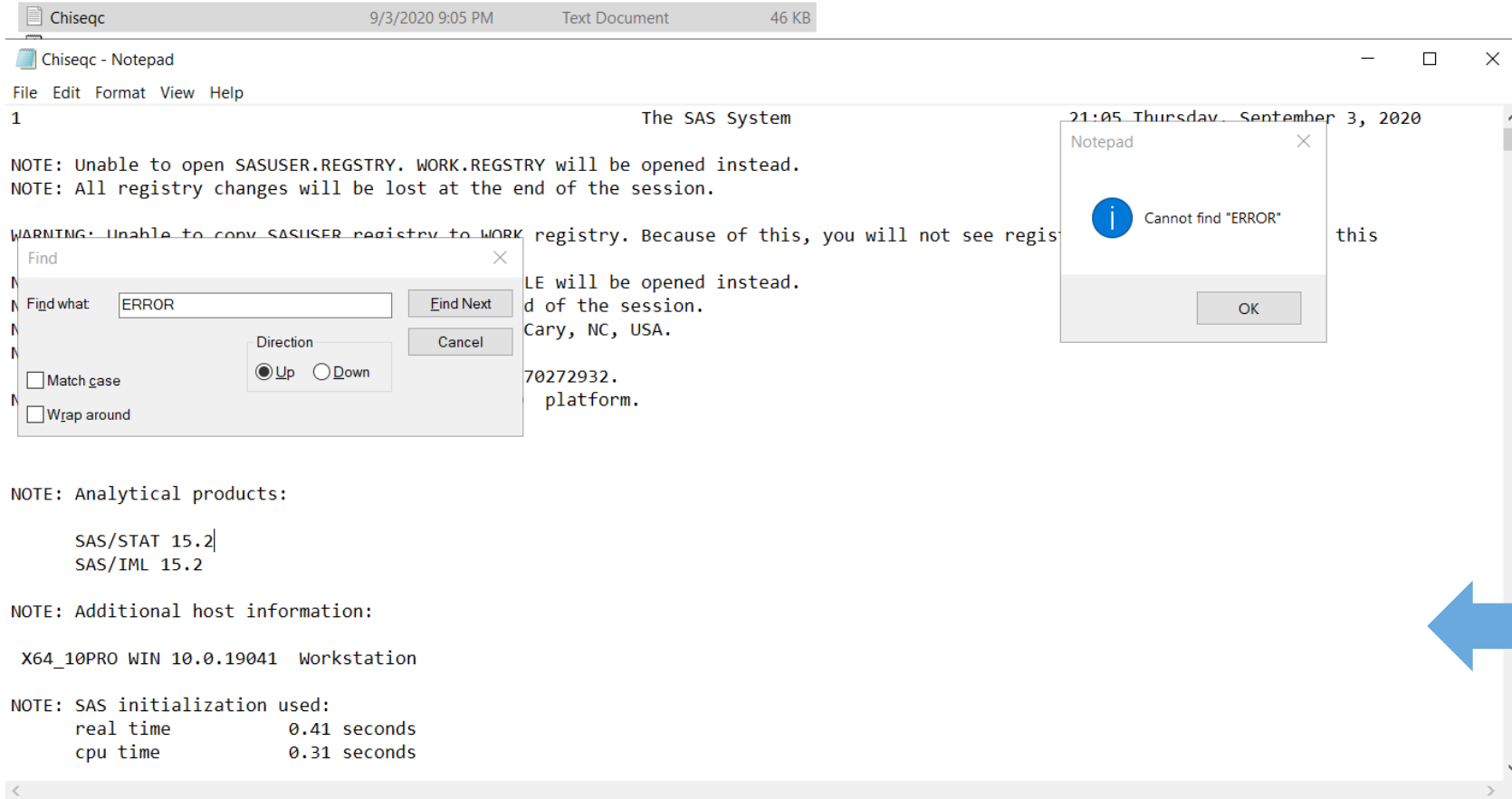
Name	Date modified	Type	Size
chiseqcfinal_compare	9/3/2020 6:35 PM	SAS Data Set	128 KB
chiseqcfinal_r	9/3/2020 6:35 PM	SAS Data Set	160 KB
chiseqcfinal_sas	9/3/2020 6:35 PM	SAS Data Set	160 KB

Output

LST/PNG/PDF/
SAS7BDAT



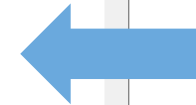
Prototype of the Workflow



Traceability



LOG



Demonstration 1

- Pearson Chi-Square Test



Demonstration 2

- Wilcoxon Rank Sum Test

Demonstration 3

- Survival Analysis



Key Benefits



- Create analysis results interactively
- Receive results from a different platform
- Produce validation report
- Generate log file to ensure data traceability
- Results can be directly used for clinical trial reporting, e.g. for a manuscript, ad hoc analysis or for medical journals
- Any sort of analysis which could be done with SAS and R can be easily integrated within this tool

Thank you for your attention

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