QIBA Project 16(a). Comparative Study of Algorithms for the Measurement of the Volume of Lung Lesions: Assessing the Effects of Software Algorithms on Measurement Variability

1. Data analysis plan has been updated and presented to QIBA VolCT 16(a) project group
2. Data Analysis plan of Manual data set has been finalized. The three main focus in the analysis are (a)

   Analyze statistical variability on the reference data overall and pre-identified factors such as algorithm type, and anthropomorphic phantom features; (b) perform ANOVA or regression analysis to test the variability among algorithms and degree of automations; and (3) graphical display of results using box plot or ray-plots.

3. Data Analysis plan of scripted analysis: a pseudo statistical code using R-language has been worked on.
4. Describe Data Transfer Format for Manual and Scripted set have been reviewed. Our statistical team (myself and GSR named Eran Barnoy, hired under this project) has worked on importing excel file into R-program. The example is shown below:

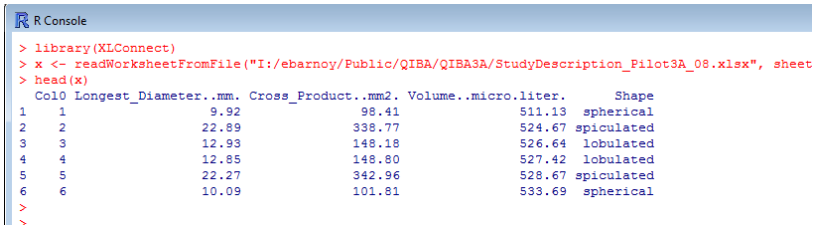
   Ex: Excel sheet:

	A	B	C	D	E
1		True anthropomorphic features			
2	LesionUID	Longest_Diameter (mm)	Cross_Product (mm2)	Volume (micro liter)	Shape
3	1	9.92	98.41	511.13	spherical
4	2	22.89	338.77	524.67	spiculated
5	3	12.93	148.18	526.64	lobulated
6	4	12.85	148.8	527.42	lobulated
7	5	22.27	342.96	528.67	spiculated
8	6	10.09	101.81	533.69	spherical
9	7	31.88	510.72	4207.83	elliptical
10	8	20.17	406.83	4232.05	spherical
11	9	20.15	406.02	4286.76	spherical
12	10	31.59	502.91	4315.84	elliptical

   R code:

```
x <-
readWorksheetFromFile("I:/ebarnoy/Public/QIBA/QIBA3A/StudyDescription_Pilot3A_08.xlsx", sheet=5, startRow=2, startCol=1, endRow=12, endCol=5, header=TRUE)
```

   Data stored in R:



```
R Console
> library(XLConnect)
> x <- readWorksheetFromFile("I:/ebarnoy/Public/QIBA/QIBA3A/StudyDescription_Pilot3A_08.xlsx", sheet
> head(x)
  Col0 Longest_Diameter..mm. Cross_Product..mm2. Volume..micro.liter.      Shape
1    1                 9.92               98.41               511.13  spherical
2    2                22.89              338.77               524.67 spiculated
3    3                12.93              148.18               526.64  lobulated
4    4                12.85              148.80               527.42  lobulated
5    5                22.27              342.96               528.67 spiculated
6    6                10.09              101.81               533.69  spherical
>
```

5. Data analysis is in pending. Expect to receive the real data sets in mid-January 2012. The statistical team has worked on statistical coding based on test data set.
   a. Manual Data Set: estimate the bias

b. Manual Data Set: estimate the variability

6. Quality Check and run a test case from a test scripted data using statistical code have been progressed. An example is shown below:

Statistical data regarding the Volumes can be imported and plotted in box-plots:

```
boxplot(master$ReadOutValue, master$True.Volume, xaxt="n")
axis(side=1, at=1:2, labels=c("ReadOut","True"), las=1)
title(main="Volumes of True and Readout Phantoms",
ylab="Volume")
```