| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **UCL Statistics for Data Sets with Non-Detects** | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | User Selected Options | | | | | | | | | | | |
| 4 | Date/Time of Computation | | | 7/30/2013 1:37:40 PM | | | | | | | | |
| 5 | From File | | | WorkSheet.xls | | | | | | | | |
| 6 | Full Precision | | | OFF | | | | | | | | |
| 7 | Confidence Coefficient | | | 95% | | | | | | | | |
| 8 | mber of Bootstrap Operations | | | 2000 | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 10 | **PAHs** | | | | | | | | | | | |
| 11 | | | | | | | | | | | | |
| 12 | **General Statistics** | | | | | | | | | | | |
| 13 | Total Number of Observations | | | | | 68 | Number of Distinct Observations | | | | | 65 |
| 14 | Number of Detects | | | | | 57 | Number of Non-Detects | | | | | 11 |
| 15 | Number of Distinct Detects | | | | | 57 | Number of Distinct Non-Detects | | | | | 8 |
| 16 | Minimum Detect | | | | | 6.12 | Minimum Non-Detect | | | | | 1.5 |
| 17 | Maximum Detect | | | | | 198.2 | Maximum Non-Detect | | | | | 10 |
| 18 | Variance Detects | | | | | 2217 | Percent Non-Detects | | | | | 16.18% |
| 19 | Mean Detects | | | | | 74.84 | SD Detects | | | | | 47.09 |
| 20 | Median Detects | | | | | 67.1 | CV Detects | | | | | 0.629 |
| 21 | Skewness Detects | | | | | 0.743 | Kurtosis Detects | | | | | 0.0146 |
| 22 | Mean of Logged Detects | | | | | 4.072 | SD of Logged Detects | | | | | 0.785 |
| 23 | | | | | | | | | | | | |
| 24 | **Normal GOF Test on Detects Only** | | | | | | | | | | | |
| 25 | Shapiro Wilk Test Statistic | | | | | 0.937 | **Normal GOF Test on Detected Observations Only** | | | | | |
| 26 | 5% Shapiro Wilk P Value | | | | | 0.00741 | Detected Data Not Normal at 5% Significance Level | | | | | |
| 27 | Lilliefors Test Statistic | | | | | 0.0912 | **Lilliefors GOF Test** | | | | | |
| 28 | 5% Lilliefors Critical Value | | | | | 0.117 | Detected Data appear Normal at 5% Significance Level | | | | | |
| 29 | **Detected Data appear Approximate Normal at 5% Significance Level** | | | | | | | | | | | |
| 30 | | | | | | | | | | | | |
| 31 | **Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs** | | | | | | | | | | | |
| 32 | Mean | | | | | 63.01 | Standard Error of Mean | | | | | 6.179 |
| 33 | SD | | | | | 50.5 | 95% KM (BCA) UCL | | | | | 73.43 |
| 34 | 95% KM (t) UCL | | | | | 73.32 | 95% KM (Percentile Bootstrap) UCL | | | | | 73.05 |
| 35 | 95% KM (z) UCL | | | | | 73.18 | 95% KM Bootstrap t UCL | | | | | 73.72 |
| 36 | 90% KM Chebyshev UCL | | | | | 81.55 | 95% KM Chebyshev UCL | | | | | 89.95 |
| 37 | 97.5% KM Chebyshev UCL | | | | | 101.6 | 99% KM Chebyshev UCL | | | | | 124.5 |
| 38 | | | | | | | | | | | | |
| 39 | **Gamma GOF Tests on Detected Observations Only** | | | | | | | | | | | |
| 40 | A-D Test Statistic | | | | | 0.244 | **Anderson-Darling GOF Test** | | | | | |
| 41 | 5% A-D Critical Value | | | | | 0.762 | etected data appear Gamma Distributed at 5% Significance Lev | | | | | |
| 42 | K-S Test Statistic | | | | | 0.0571 | **Kolmogrov-Smirnoff GOF** | | | | | |
| 43 | 5% K-S Critical Value | | | | | 0.119 | etected data appear Gamma Distributed at 5% Significance Lev | | | | | |
| 44 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 45 | | | | | | | | | | | | |
| 46 | **Gamma Statistics on Detected Data Only** | | | | | | | | | | | |
| 47 | k hat (MLE) | | | | | 2.203 | k star (bias corrected MLE) | | | | | 2.099 |
| 48 | Theta hat (MLE) | | | | | 33.96 | Theta star (bias corrected MLE) | | | | | 35.65 |
| 49 | nu hat (MLE) | | | | | 251.2 | nu star (bias corrected) | | | | | 239.3 |
| 50 | MLE Mean (bias corrected) | | | | | 74.84 | MLE Sd (bias corrected) | | | | | 51.65 |
| 51 | | | | | | | | | | | | |
| 52 | **Gamma Kaplan-Meier (KM) Statistics** | | | | | | | | | | | |
| 53 | k hat (KM) | | | | | 1.557 | nu hat (KM) | | | | | 211.7 |
| 54 | Approximate Chi Square Value (211.74, α) | | | | | 179.1 | Adjusted Chi Square Value (211.74, β) | | | | | 178.4 |
| 55 | 5% Gamma Approximate KM-UCL (use when n>=50) | | | | | 74.51 | 95% Gamma Adjusted KM-UCL (use when n<50) | | | | | 74.78 |
| 56 | | | | | | | | | | | | |
| 57 | **Gamma ROS Statistics using Imputed Non-Detects** | | | | | | | | | | | |
| 58 | GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | | | | | | | |
| 59 | GROS may not be used when kstar of detected data is small such as < 0.1 | | | | | | | | | | | |
| 60 | For such situations, GROS method tends to yield inflated values of UCLs and BTVs | | | | | | | | | | | |
| 61 | For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | | | | | | | |
| 62 | Minimum | | | | | 1.469 | Mean | | | | | 63.68 |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 63 | | | | | Maximum | 198.2 | | | | | Median | 54.96 |
| 64 | | | | | SD | 50.1 | | | | | CV | 0.787 |
| 65 | | | | | k hat (MLE) | 1.172 | | | | | k star (bias corrected MLE) | 1.13 |
| 66 | | | | | Theta hat (MLE) | 54.32 | | | | | Theta star (bias corrected MLE) | 56.34 |
| 67 | | | | | nu hat (MLE) | 159.4 | | | | | nu star (bias corrected) | 153.7 |
| 68 | | | | | MLE Mean (bias corrected) | 63.68 | | | | | MLE Sd (bias corrected) | 59.9 |
| 69 | | | | | | | | | | | Adjusted Level of Significance (β) | 0.0465 |
| 70 | | | | | Approximate Chi Square Value (153.72, α) | 126.1 | | | | | Adjusted Chi Square Value (153.72, β) | 125.5 |
| 71 | | | | | 95% Gamma Approximate UCL (use when n>=50) | 77.65 | | | | | 95% Gamma Adjusted UCL (use when n<50) | 77.98 |
| 72 | | | | | | | | | | | | |
| 73 | | | | | **Lognormal GOF Test on Detected Observations Only** | | | | | | | |
| 74 | | | | | Lilliefors Test Statistic | 0.105 | | | **Lilliefors GOF Test** | | | |
| 75 | | | | | 5% Lilliefors Critical Value | 0.117 | | | Detected Data appear Lognormal at 5% Significance Level | | | |
| 76 | | | | | **Detected Data appear Approximate Lognormal at 5% Significance Level** | | | | | | | |
| 77 | | | | | | | | | | | | |
| 78 | | | | | **Lognormal ROS Statistics Using Imputed Non-Detects** | | | | | | | |
| 79 | | | | | Mean in Original Scale | 64.62 | | | | | Mean in Log Scale | 3.809 |
| 80 | | | | | SD in Original Scale | 49.01 | | | | | SD in Log Scale | 0.938 |
| 81 | | | | | 95% t UCL (assumes normality of ROS data) | 74.54 | | | | | 95% Percentile Bootstrap UCL | 74.76 |
| 82 | | | | | 95% BCA Bootstrap UCL | 75.17 | | | | | 95% Bootstrap t UCL | 74.97 |
| 83 | | | | | 95% H-UCL (Log ROS) | 90.35 | | | | | | |
| 84 | | | | | | | | | | | | |
| 85 | | | | | **UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed** | | | | | | | |
| 86 | | | | | KM Mean (logged) | 3.49 | | | | | 95% H-UCL (KM -Log) | 158.5 |
| 87 | | | | | KM SD (logged) | 1.509 | | | | | 95% Critical H Value (KM-Log) | 2.372 |
| 88 | | | | | KM Standard Error of Mean (logged) | 0.185 | | | | | | |
| 89 | | | | | | | | | | | | |
| 90 | | | | | **DL/2 Statistics** | | | | | | | |
| 91 | | | | | **DL/2 Normal** | | | | **DL/2 Log-Transformed** | | | |
| 92 | | | | | Mean in Original Scale | 63.07 | | | | | Mean in Log Scale | 3.497 |
| 93 | | | | | SD in Original Scale | 50.82 | | | | | SD in Log Scale | 1.52 |
| 94 | | | | | 95% t UCL (Assumes normality) | 73.34 | | | | | 95% H-Stat UCL | 163.2 |
| 95 | | | | | **DL/2 is not a recommended method, provided for comparisons and historical reasons** | | | | | | | |
| 96 | | | | | | | | | | | | |
| 97 | | | | | **Nonparametric Distribution Free UCL Statistics** | | | | | | | |
| 98 | | | | | **Detected Data appear Approximate Normal Distributed at 5% Significance Level** | | | | | | | |
| 99 | | | | | | | | | | | | |
| 100 | | | | | **Suggested UCL to Use** | | | | | | | |
| 101 | | | | | 95% KM (t) UCL | 73.32 | | | 95% KM (Percentile Bootstrap) UCL | | | 73.05 |
| 102 | | | | | | | | | | | | |
| 103 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 104 | Recommendations are based upon data size, data distribution, and skewness. | | | | | | | | | | | |
| 105 | These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). | | | | | | | | | | | |
| 106 | owever, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statisticia | | | | | | | | | | | |
| 107 | | | | | | | | | | | | |