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Kabul Air Quality Analysis Report

Research Objective: According to data released by World Bank, the mean PM10 (particulate matter) for the city of Kabul Afghanistan in 2012 was 46. Suppose that because of efforts to improve air quality in Kabul, increases in modernization and efforts to establish environmentally friendly businesses, city leaders believe PM rates have decreased. To test this notion, city leaders randomly sample 25 readings over a one-year period. The readings are shown below. Set alpha to 0.10.

Kabul PM Data:

36, 54, 55, 53, 57, 47, 42, 40, 45, 38, 53, 45, 47, 22, 25, 46, 34, 62, 54, 55, 44, 34, 51, 54, 27

Problem Definition –

Compute whether the cities claims that the air quality has significantly increased.

Hypothesis –

$H_0: \mu \geq 46$

$H_1: \mu < 46$

Decision Rule –

If the T test statistic is less than -1.318 reject the null.

Test –

One-Sample T: AirQuality

Descriptive Statistics

N	Mean	StDev	SE Mean	90% Upper Bound for μ
25	44.80	10.62	2.12	47.60

μ: mean of AirQuality

Test

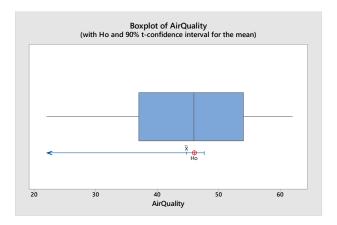| Null hypothesis	$H_0: \mu = 46$
Alternative hypothesis	$H_1: \mu < 46$

T-Value	P-Value
-0.56	0.289

Conclusion –

1) T test statistic for critical ratio is -0.56 and is greater than the T critical value of -1.318. Fail to reject null, type 2 beta error may have been made.
2) The hypothesized value of Mu = 46 does fall within the confidence interval upper bound of 47.60 particulate matter.
3) P-value .289 is > α .10 = Fail to Reject Null.

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Interpretation –

The results show that the cities air quality has not significantly increased.

Assumptions –

Mean and median lie within the Inter Quartile Range and the variability on both sides are not equal as shown by the lengths of the whisker lines. The graph is skewed to the left. The characteristics will become clearer and further stand out as the sample size increases.

Boxplot of AirQuality
(with Ho and 90% t-confidence interval for the mean)