DNP Project Statistical Methods Algorithm

Use this algorithm to design the approach for data collection and analysis for your DNP project. Evaluate which option(s) most align with the desired project outcomes. Utilize no more than two and no less than one statistical analysis tool(s). Use the table below to map out the statistical test(s) you will use to analyze collected data. *

Project Objectives:	Planned data collection approach to achieve objective (if applicable):	Data Analysis (if applicable): choose option A, B, or C
Objective 1:		
Objective 2:		
Objective 3:		

*Some objectives don't require data collection to determine if the objective was met. For example, educating staff would not require data collection. Determining compliance or rates of infection would require data collection. If no data collection is required, write "n/a" in the column for data collection/analysis.

Option	**Outcome**	**Considerations**
Option A: Paired samples t-test OR Wilcoxon signed rank test	Type of data: Numerical scores or rates that can be assigned to participant or provider location and measured before and after the intervention. Looking at paired data. Examples: 1. Pre/post observations on the same person for each data set (examples: cultural competence survey, intent to stay survey, etc.) 2. Compliance rates per provider, reviewing the same number of charts before and after per provider	Evaluate the assumptions of each test to determine which test to use. • Paired samples t-test: use to compare means, assumption of approximately normal distribution for the differences. • Wilcoxon signed rank test: use when assumption of normality is not met. Compare ordering of the data.
Option B: Chi-Square Test OR Fisher's exact test	Type of data: Counts of participants, providers, or charts that can be assigned to	Evaluate the assumptions of each test to determine which test to use.

	a particular category, such as compliant/not compliant, or injured/not injured. Examining the difference between expected and observed outcomes. Examples: 1. Compare provider compliance rates on a protocol before and after training (provider not identified individually, and compliance is yes/no) 2. Compare rates of hospital acquired infections after intervention if the intervention was not present before. Compare rates pre-intervention to rates post intervention.	• Chi-Square Test: use to compare observed vs expected values. At least 5 expected values for each combination of the two variables should be present. If this is not met then use Fisher's exact test.
Option C: Descriptive statistics with Confidence interval (CI)	Descriptive statistics used to describe phenomenon from a sample of a population. Confidence intervals reflect uncertainty about how the estimate applies to the population as a whole. Examples: 1. Out of 30 telemedicine patients who screen positive for depression, how many of them received appropriate referral for psychiatry? x/30= xx%	Descriptive statistics example: Often displayed in table and graph to show rates. • Mean and standard deviation/95% CI for each group (approximately normal continuous (ordinal or ratio) data) • Percent with 95% confidence interval, making sure to include the sample size. • Frequency table, preferably including counts and percentages in some format.

Option A

Paired samples t-test: Utilized to compare means between two similar samples. Generally, you pair the same group of people's test results before and after an intervention such as pre-posttest. Example: Pre-test and post-test

Assumptions of Paired samples t-test:

1. Independence: two separate observations are being compared.
2. Normality: Normal distribution between pairs
3. No extreme outliers

If any assumption is violated, then this would be an invalid test.
If a different group of people is examined before and after, see option B.

Wilcoxon signed rank test: Utilized to compare two separate observations between two similar samples when the assumption of normality is not present. Wilcoxon signed rank test should be used over a t-test if there will be outliers in the data. Where a t-test examines the means between two data sets, the Wilcoxon signed rank test examines the ordering of the data instead of the means of the data. An example where this may be more helpful is if there will be various disciplines of medicine with widely varied educational background taking the same survey. Example: Likert scale

Assumptions of Wilcoxon signed rank test:

1. The dependent variable is ordinal and continuous.
2. Independent variable being compared is matched or related, or the same subjects are examined before and after.
3. Distribution of differences is symmetrical between groups.

Option B

Chi-square test: Examines observed vs expected values.

Example: Implement a new protocol and examine an outcome, such as protocol compliance; ** a specific categorical outcome or nominal outcome that is expected after implementation. Example: BMI screening, asthma action plan

Assumptions of Chi-square Test:

1. Data should be randomly sampled from the population of interest.
2. Comparing two categorical or nominal variables.
3. At least 5 expected values for each combination of the two variables. (If fewer than 5, consider Fisher's exact test)

**When evaluating compliance with multiple variables, be sure to define level of compliance when using YES/NO for consistency. For example, if a protocol requires 5 steps and you determine the provider is compliant if they achieve 4/5 steps, please define this ahead of time to collect consistent results from the chart audit.

Fisher's exact test: Examines observed vs expected values. Use as an alternative to the Chi-square test if a combination of two variables has less than 5 in expected value.

1. Data should be randomly sampled from the population of interest.
2. Comparing two categorical or nominal variables.

Example of what data might look like:

	Compliant	Not Compliant
Before		
After		

Option C

Descriptive statistics with Confidence Interval testing: Descriptive statistics summarize data collected in a sample population. Common approaches to descriptive statistics include mean and standard deviation.

Confidence interval testing is used to determine if a true population mean has been assessed.

Example: descriptive statistics (% compliant before vs after, with 95% confidence interval, estimable here: http://vassarstats.net/prop1.html)

Assumptions:

1. Random sampling
2. Normal distribution of sample.