To ensure the assumptions of logistic regression are met, several tests and techniques can be applied:

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1. Linearity of Independent Variables and Log-Odds

- **Test**: **Box-Tidwell test** for checking linearity in logistic regression.

- **Alternative Approach**: Examine the relationships between each continuous predictor and the log-odds of the outcome. If non-linearity is found, consider applying **polynomial terms** or **log-transformations** on predictors to achieve linearity.

- **Visualization**: Plot each continuous predictor against the log-odds or against the predicted probabilities to visually assess linearity.

2. Independent Observations

- **Test**: **Durbin-Watson test** (primarily for time-series data) helps detect autocorrelation among residuals.

- **Alternative Approach**: In datasets that aren't time-series, ensure data points are unique, and check for independence by removing any duplicated entries or related data points, as dependence among observations can distort results.

- **Consideration**: If observations are not independent (e.g., repeated measures on the same subject), consider using a **generalized estimating equation (GEE)** or **mixed-effects model**.

3. No Multicollinearity Among Predictors

- **Test**: Calculate **Variance Inflation Factor (VIF)** for each predictor (VIF > 5-10 may indicate multicollinearity).

- **Alternative Approach**: **Correlation matrix** can also help identify highly correlated variables. When multicollinearity is present, consider removing or combining predictors, or using **principal component analysis (PCA)** to reduce dimensionality.

4. Binary Outcome Variable

- **Test**: None needed if the outcome is binary.

- **Alternative Approach**: If the outcome has more than two classes, consider using **multinomial logistic regression** or **ordinal logistic regression** for ordered categories.

5. Large Sample Size

- **Test**: **Power analysis** to determine the minimum sample size required based on expected effect sizes and desired confidence levels.

- **Alternative Approach**: If sample size is small, consider regularization techniques like **Lasso or Ridge** regression to help with overfitting issues or try **resampling methods** like cross-validation to assess model stability.

6. Absence of Strong Outliers

- **Test**: **Standardized residuals** or **Cook's distance** can identify influential points.

- **Alternative Approach**: For detected outliers, decide whether to remove them, transform the data, or use robust logistic regression models that reduce sensitivity to outliers.

7. Appropriate Data Scaling

- **Test**: None required for scaling.

- **Alternative Approach**: Although scaling isn't mandatory, standardizing predictors (especially when using regularization) improves model stability. Standard scaling (z-score) or min-max scaling can be applied.