Development of a New Model for Laboratory Testing to Improve Efficiency and Reduce Costs

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Overview
- Laboratory protocols typically require experiments to be performed in triplicate to ensure validity and reliability of results
- Each round of experiments requires three sets of supplies and equipment
- For our research, a round of experiments consists of a selected clinical isolate of bacteria, along with a selected concentration of antiseptic, completed in triplicate
- New model uses a more targeted approach for selecting the concentrations of antiseptics tested
  - Minimum inhibitory concentration (MIC - the minimum concentration of antiseptic required to inhibit further bacterial growth) is tested
  - A higher concentration is tested
  - If experimental outcome is similar (remains bacteriostatic), a higher concentration is selected
  - If experimental outcome is opposite (becomes bactericidal), an intermediate concentration is selected

Key Findings
- Saved over $100 for each experiment that was eliminated using the new model
- Eliminated approximately 1/3 of experiments required to achieve complete results
- Targeted approach can be used to reduce the number of experiments required to achieve similar experimental outcome
- Over $615 in cost savings

Experiment Schedule Using Old Model
- Concentrations tested (in triplicate):
  - Minimum inhibitory concentration (MIC)
  - 2 times MIC
  - 3 times MIC
  - 4 times MIC
  - 5 times MIC
  - Intermediate concentrations to determine point at which antiseptic changed from bacteriostatic to bactericidal
- 18 experiments in total

Experiment Schedule Using New Model
- Concentrations tested (in triplicate):
  - Minimum inhibitory concentration (MIC)
  - 3 times MIC
  - 2 times MIC
  - Intermediate concentrations
- 12 experiments in total

Experiment Results Using Old Model

Experiment Results Using New Model

Summary
- Scientific integrity was maintained
- Unnecessary redundancies were eliminated
- Economic efficiencies were realized