

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

Linda A. Hanson, MBA, AB, College of Nursing,
Pamela V. O'Neal, PhD, RN, College of Nursing

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



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

Acknowledgements

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Key Findings

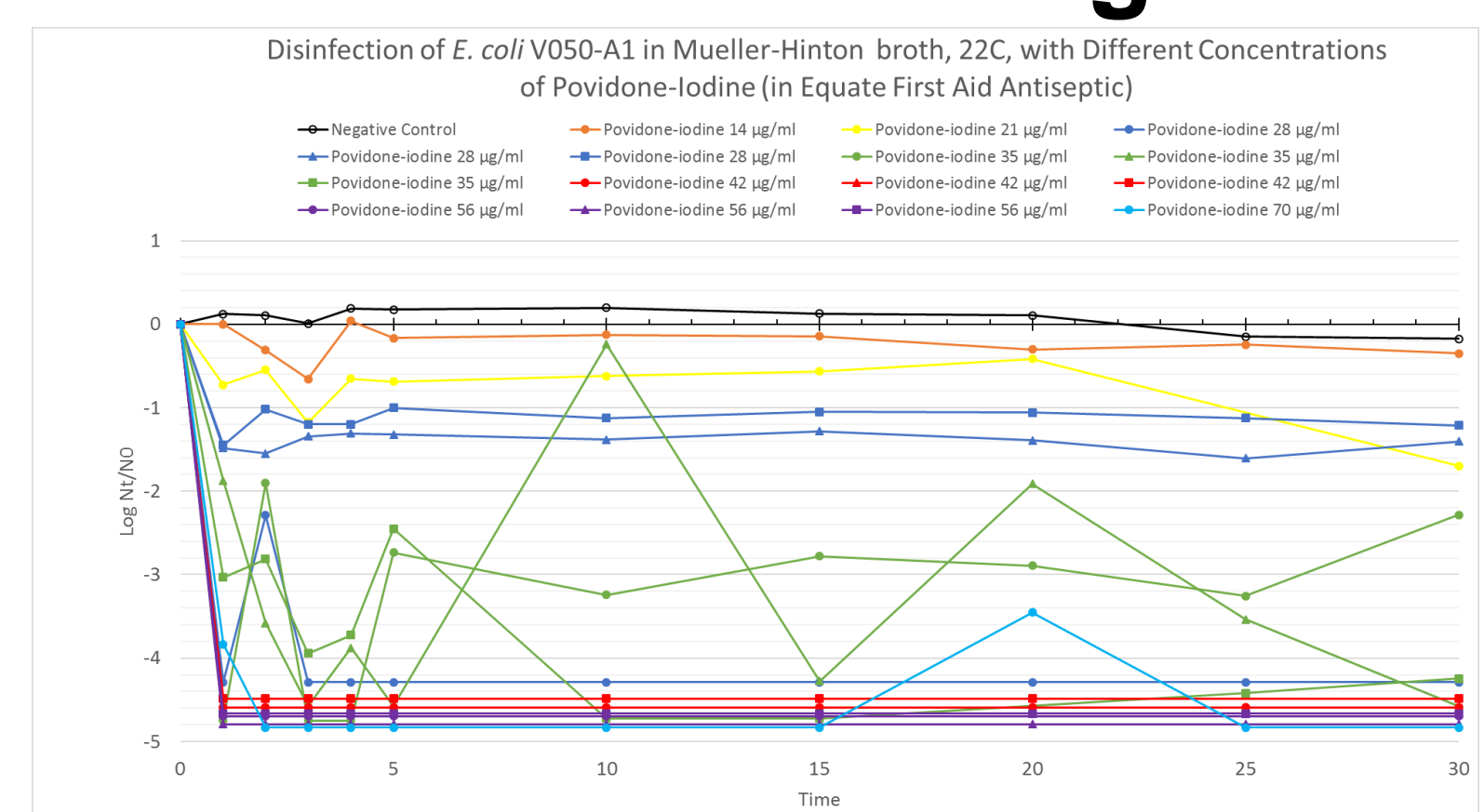
- Saved over \$100 for each experiment that was eliminated using the new model
- Eliminated approximately 1/3 of experiments required to achieve complete results

Item	Price per unit (\$)	Number needed for experiment	Cost per experiment (\$)
Petri dishes	0.26	35	9.03
Mueller-Hinton Broth Powder	0.20	36	7.03
Noble Agar Powder	0.43	35	14.98
Pipettor tips P1000	0.07	12	0.81
Pipettor tips P5000	0.23	3	0.69
Pipettor tips P200	0.06	66	4.14
Borosilicate tubes	0.12	12	1.50
Falcon tube	0.26	1	0.26
Microfuge tubes	0.13	33	4.16
MH broth tube	0.55	1	0.55
Total Supplies Costs			\$43.15
		Hours	
Labor Costs	12.00	5	\$60.00
Total Costs Per Experiment			\$103.15

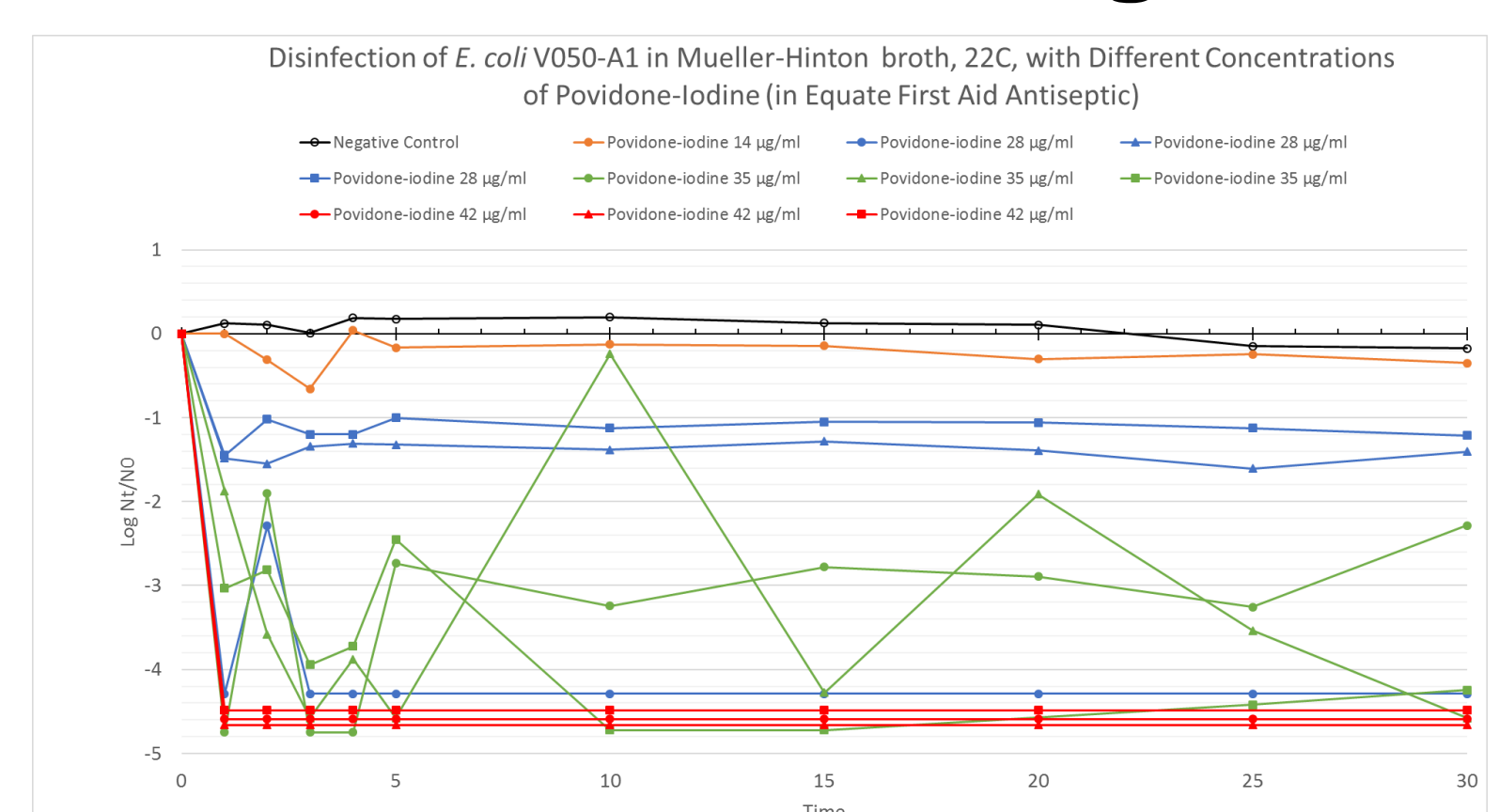
Explanation/Impact

- Targeted approach can be used to reduce the number of experiments required to achieve similar experimental outcome
- Over \$615 in cost savings

Experiment Results Using Old Model



Experiment Results Using New Model



Summary

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