Designing an Effective Mold Sampling Strategy

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Define the project goal

• Are you being asked to characterize the risk due to mold?

• Is there a health complaint?
Develop TESTABLE Hypotheses

- A hypothesis predicts results of an experiment
- Focuses investigation
- Develop before sampling
- Present to client
A Good Hypothesis:

- Clear, concise, well-defined
- Results in a Yes or No answer
- Can be proven by direct measurements
Four Components of a Hypothesis

- Subject group
- Treatment
- Measurement
- Control
Hypothesis Examples

Good:
The building’s airborne mold spore concentration of water intrusion species exceeds 1000 spores/m$^3$.

Bad:
The building has dangerous levels of mold contamination.

Mold in the employee’s workspace is the cause of the individual’s illness.
Experimental Design

Replication is essential
- Spatially
- Temporally
- Number of samples
- Experimental unit

Statistical Analyses

Controls
What is an appropriate control?
Is an outdoor control necessary?

- Depends on the hypotheses
- Interpretation difficult

A January day in Syracuse
Example

- Client: Employee claims mold in office is causing chronic runny nose – please investigate.

- You should ask: Has person been tested for mold allergies?
Hypotheses

1) The airborne mold spore concentration of water intrusion species exceeds 1000 spores/m$^3$ in the person’s work space.

2) Mold spores of species of specific concern due to allergies are present in the work space.
Experimental Design

• Replicated samples in work space – speciation and enumeration
• Control – field blank
• Statistically compare numerical data with standard
• Are critical species present?
<table>
<thead>
<tr>
<th>Species</th>
<th>Work Space</th>
<th>Blank</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. fumigatus</td>
<td>70, 225, 100</td>
<td>0</td>
</tr>
<tr>
<td>A. versicolor</td>
<td>800, 1000, 275</td>
<td>0</td>
</tr>
<tr>
<td>E. nigrum</td>
<td>2, 10, 0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>872, 1235, 375</strong></td>
<td><strong>0</strong></td>
</tr>
</tbody>
</table>
Analysis of Total Spores
Mean = 827
Std = 431
T-test at P = 0.05
Result: $T = 0.97$ (critical value = 2.92)

Accept hypothesis that total spore number exceeds 1000 spores/m³

Allergenic species detected in low numbers
ACKNOWLEDGEMENTS

New York Indoor Environmental Quality Center, Inc.
THANK YOU!
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