

Assessing Information Needs: Purchasing Equipment in a Clinical Microbiology Lab

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## The Decision Maker…

Steven Jones is the Supervisor of a clinical microbiology lab located in the Tampa Bay area. He has been granted permission to purchase a piece of capital equipment during the next fiscal year when funds unexpectedly became free due to a change made by another laboratory department. The laboratory he works for plans capital purchases five years out, and Mr. Jones is not scheduled to acquire capital equipment for 2 more years. Several pieces of capital equipment in his lab are at or near their expected lifespan, although all are in relatively good working order. Since acquisition of capital equipment occurs infrequently, Mr. Smith wishes to make a well analyzed decision as to which piece of equipment to acquire.

## Decisions…

Mr. Jones has narrowed his choice to three pieces of equipment. Funding is available for only one piece of equipment, and any unused funds will be made available to other laboratory departments. The items Mr. Jones has narrowed his choices to are:

1. A Microscan® bacterial analyzer: this is an analyzer which identifies isolated bacterial organisms; it will replace a like-analyzer that is 7 years old.
2. A blood culture incubator and detector: this is an incubator which grows bacteria (if present) in blood samples and detects their presence; the current blood culture incubator is 8 years old.
3. A fluorescent microscope with a CCD camera: this a microscope used to detect viruses grown in cultures obtained from patient specimens; it will replace a fluorescent microscope that is 5 years which does not include a camera for recording images.

## Methods…

Mr. Jones was asked to identify at least four factors to consider in determining which instrument to purchase. In fact, he identified five: the cost of the instrument, the number of specimens tested each year on each instrument (test volume), how rapidly each instrument produces results (throughput), the magnitude of the instrument’s results on patient care (impact on care), and the current age of the instruments to be replaced. Mr. Jones, along with a staff pathologist in charge of infectious disease testing, were asked to rate the importance of each factor for each possible decision on a scale of one to seven. Ratings for test volume, throughput, and impact on care were directly related to their importance (higher ratings were assigned to higher performance). Ratings for cost and age of equipment to replace were indirectly related to their importance (higher cost and age of equipment received lower values). The mean and range for each factor across each decision to be made were calculated. Of these values, the median values were calculated. These data were categorized in the following manner:

|  |  |  |
| --- | --- | --- |
|   | **Small range of ratings across issues** | **Wide range of ratings across issues** |
|   |
|   |
| **High average rating of importance** | *Essential information. Collect now.* | *Rapid data collection set. Plan data collection now.* |
|
|
| **Low average rating of importance** | *Low priority items.* | *Periodic data set. Collect when needed.* |
|
|

Using this matrix, decisions were prioritized.

## Results…

The importance of the five decision factors was recorded and analyzed as described above. The results are as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | Decisions |  |  |
|  |  | Purchase Miroscan® | Purchase Blood Culture Incubator | Purchase Fluorescent Microscope |  |  |
|  | Average | Range |
| Cost | 3 | 4 | 6 | 4.33 | 3 |
| Test Volume | 7 | 6 | 4 | 5.67 | 3 |
| Throughput | 5 | 7 | 2 | 4.67 | 5 |
| Impact on Care | 6 | 7 | 3 | 5.33 | 4 |
| Current Equip. Age | 6 | 5 | 7 | 6.00 | 2 |
|  |  |  |  | Median | 5.33 | 3 |

This analysis was used to prioritize the decisions:

|  |  |  |  |
| --- | --- | --- | --- |
| *Essential information. Collect now.* | *Rapid data collection set. Plan data collection now.* | *Low priority items.* | *Periodic data set. Collect when needed.* |
|
|
| Current Equp. Age | Test Volume |   | Cost |
|
|  | Impact on Care |  | Throughput |
|

Based on the results, the most important factor to consider is the age of the current equipment. Secondary to equipment age, Mr. Jones should immediately begin collecting data on the volume of tests performed and the impact of equipment on patient care. The results indicate that cost and the relative throughput of patient testing are least important and should be collected only if needed (i.e. if a decision cannot be made using the other factors).

## Introspection…

This method of assessing information needs creates way of prioritizing factors required to make a decision. Although the analysis of the data eliminates subjectivity, the data used to complete the analysis is still prone to subjectivity, particularly when non-numerical categories such as “impact on care” are considered. A more accurate analysis may be derived when pure numerical data are used (e.g. cost, age of equipment to replace, etc.). Interestingly, cost was identified as a less important factor to consider. This is consistent, in this case, with the fact that enough funds were available to purchase only one item regardless of how inexpensive the item was. If at least one item was inexpensive enough to allow the purchase of a second item, then perhaps the data would have reflected a more important status for cost. In this case, the model confirmed the low-impact value of cost. Overall, the model used rated the factors in a predictive and reasonable manner.