Monitoring Financial Performance

An Approach for Forensic Crime Labs

By Paul Speaker and Arron Scott Fleming

The pressure to improve performance is felt by managers in every industry. In difficult financial times, it becomes all the more important for managers to seek continuous improvements in the performance of their organizations. Forensic laboratories are not unlike other service organizations in this regard and must continually find ways to improve performance with limited resources. Applying metrics to key areas is a method for gauging success, for recognizing areas for improvement, and for identifying potential risks. Nevertheless, routine accounting practices and standardized cost terms have been slow to permeate this industry.

Metrics and budgetary analyses can be helpful, but until recently such calculations were not possible given the lack of fiscal and casework standardization within the forensic laboratory industry. Both auditors and CPA consultants can benefit themselves and the forensic laboratory service industry by using metrics to identify risk areas and improve and communicate lab performance.

Improving Cost Management

Forensic laboratories have benefited from an exponential increase in demand for services, partially driven by the success of television shows such as *CSI* and *Dexter*. In reality, though, the vast majority of laboratories are less-than-glamorous enterprises responsible to a city, county, state, or federal government with limited fiscal resources. Their mandate is generally to correctly process as much casework in a timely fashion as resources permit, which can be a difficult task. Therefore, the suggested metrics to follow should be related to increasing the cases processed while maintaining quality for the given budget. Those same metrics potentially offer forensic managers the proof they need to support claims for additional resources or policy changes.

At the highest level, good metrics tie the mission, vision, values, and goals of an organization to some kind of measureable outcome. Good metrics direct the attention and focus of the manager to achieving these goals, and often prompt changes in fiscal and organizational policy or practice. Unfortunately, the forensic laboratory industry does not follow a standard practice with respect to the collection and publication of fiscal and casework data that might assist in the management of resources. Two recent studies, however, offer some hope to the standardization of language and the development of tools to meet the goals of crime laboratories. The first study, Quadrupol *(Project Quadrupol: Development of a Benchmarking Model for Forensic Laboratories*, March 31, 2003, OISIN II programme of the Commission of the European Union, Contract 2001/OIS/066), established the groundwork and offered a standardized definition set for measurement of the inputs and outcomes of crime laboratories in Europe. The second study, *US Foresight* (*Foresight NIJ—Measure, Preserve, Improve*), adopted the basis of the Quadrupol study and extended the standardization to include connections between casework, operational budgets, and personnel detail for laboratories across North America.

Using the language of the studies above, as well as their budget and accounting data, the authors examined the use of metrics as an analytical tool for operational measurement and improvement. First, the use of metrics across the industry is considered for comparison purposes and to introduce a standard technique to examine a laboratory's return on investment (ROI) and its component parts. Second, the use of metrics within a laboratory is considered a managerial tool to monitor efficiency and cost, as well as to communicate financial effectiveness.

Connecting Goals: Metrics Across the Industry

Public forensic laboratories are generally given the mandate to process all of the forensic requests that investigators send. Given their limited budgets, however, laboratory managers must prioritize among their requests and ration the resources at their disposal. One measure of ROI for the industry is the total number of cases processed for a given level of funding. Alternatively, the inverse of that ratio, the average cost per case, presents managers with a cost minimization problem that may be a more desirable metric.

The following formula can be used to see how a laboratory may be able to extract valuable information from common metrics such as the one above:

$$\frac{\text{CASE}}{\text{TOTEXP}} = \frac{\text{Area cases processed}}{\text{Total expenditures}}$$

These measures are defined in the Quadrupol and Foresight studies:

- Cases refers to the requests for examinations in a given forensic investigation area, and
- Total expenditures include the sum of the direct expenses (personnel, operating, and investment) and any administrative or other overhead expenses.

The authors build upon the formula using the expansion technique first developed by DuPont executive F. Donaldson Brown in 1919. This is done by transforming the ROI measure into its component parts. Brown noted that higher ROI was desirable, in general, but this could result from too much risk rather than increased efficiency. Such undesirable results should be avoided.

To ameliorate such a potential problem, additional components to consider include—

- efficiency measures such as cases processed per full-time equivalent employee,
- quality/risk management measures such as tests performed per area case,
- analytical process measures such as personnel expenditures/total expenditures, and
- market condition measures such as the average compensation per employee.

EXHIBIT 1
Static Budget Variance

Actual Results	**Static Budget**
37,881 tests	32,940 tests 1.0929 hours/test (standard)
37,260 hours	36,000 hours $79.4258 cost/hour (standard)
$2,943,332	$2,859,328

$84,004 unfavorable
Static budget variance

Given their limited budgets, laboratory managers must prioritize among their requests and ration the resources at their disposal.

By adding the additional terms, the initial formula expands to:

$$\frac{CASE}{TOTEXP} = \frac{CASE}{TOTEXP} \times \frac{LEXP}{LEXP} \times \frac{FTE}{FTE} \times \frac{TEST}{TEST}$$

The definitions from the Quadrupol and Foresight studies are as follows:

- LEXP refers to fully loaded labor expenditures and includes the sum of direct salaries, employer contributions (FICA, Medicare, workers, compensation, and unemployment compensation), retirement (including employer-only contributions toward pensions and defined contribution plans), personnel development and training (internal or external delivery, including travel), and occupational health service expenses (employer contribution only).
- FTE is the work input of a full-time employee working for one full year.
- TEST represents tests completed. A test is an analytical process, including but not limited to visual examination, instrumental analysis, presumptive evaluations, enhancement techniques, extractions, quantizations, microscopic techniques, and comparative examinations. This does not include technical or administrative reviews.

Manipulating the above formula can produce the following:

$$\frac{CASE}{TOTEXP} = \frac{\frac{TEST}{FTE} \times \frac{LEXP}{TOTEXP}}{\frac{LEXP}{FTE} \times \frac{TEST}{CASE}}$$

Or, stated another way:

$$ROI = \frac{\text{Labor productivity}}{\text{Avg. compensation}} \times \frac{\text{Labor expense ratio}}{\text{Testing intensity}}$$

Labor productivity and labor expense ratio adds a measure of efficiency and utilization, while average compensation is a market condition measure and testing intensity is a quality measure. These expressions provide a framework for the manager to gauge lab performance and to compare metrics to other laboratories. For example, the data from the Quadrupol and Foresight studies offers the following metrics for fingerprint identification for an anonymous medium-sized laboratory:

Cases Processed (CASE)	3,050
Total Expenditures (TOTEXP)	$715,000
Personnel Expenditures (LEXP)	$445,000
Full-time Equiv. Employees (FTE)	5.35
Tests Performed (TEST)	14,300

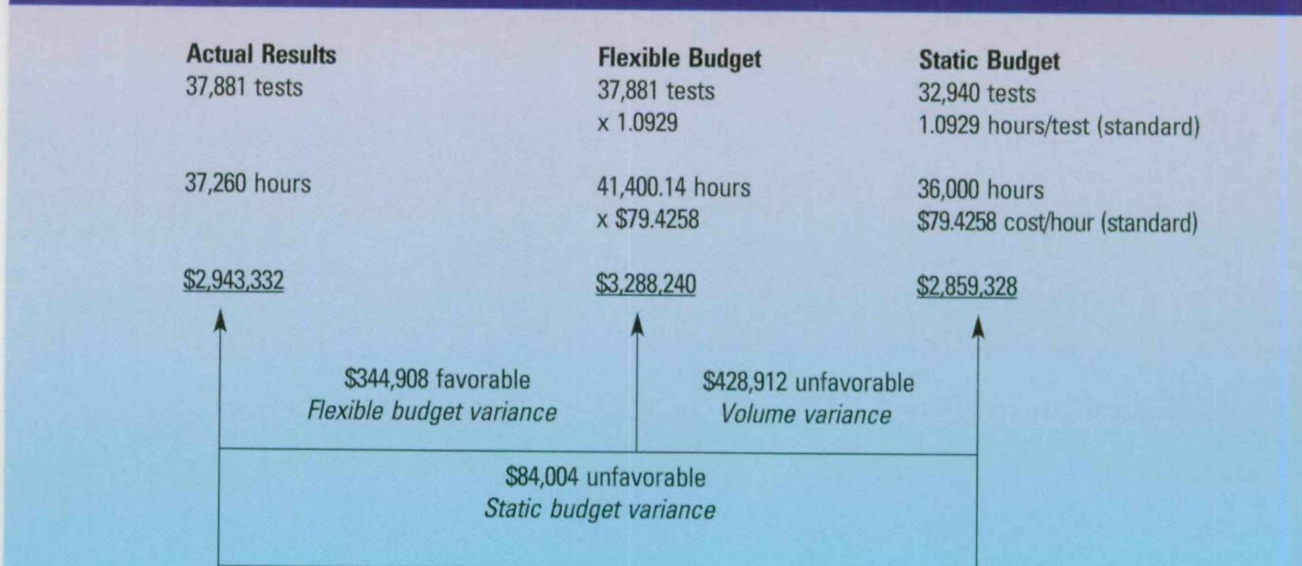
The inverse of ROI yields the average cost per case, as shown below:

$$\frac{\text{Avg. Cost}}{\text{Case}} = \frac{\text{Avg. Compensation}}{\text{Labor productivity}} \times \frac{\text{Testing intensity}}{\text{Labor expense ratio}}$$

$$\$234.48 = \frac{\$83,178}{2,673} \times \frac{4.69}{62.24\%}$$

The decomposition of the cost-per-case ratio into the four components allows managers and CPAs to better evaluate a laboratory's performance, particularly across the industry. Not only does this allow CPAs to examine and compare ROI, but they can also examine and compare average compensation, labor productivity, testing intensity, and the labor expense ratio. This can allow for better setting of goals, better communication of performance, and potentially improved performance by allowing managers to focus on specific areas that affect ROI. In addition, if a measure appears to be an outlier as compared

EXHIBIT 2
Flexible Budget



This analysis allows for improved communication and highlights the area or areas where a manager can focus on developing best practices or identifying inefficiencies or waste.

to the rest of the industry, then it may merit further investigation.

Connecting Goals: Metrics Within the Laboratory

Many managers are familiar with the budgetary process, but may be unaware of the internal metrics that can be developed from them for use as managerial tools. The measuring and monitoring of expectations (the budget) against reality (the actual results) allows a manager to more effectively and efficiently monitor performance, identify and manage areas of concern, and communicate results of operations.

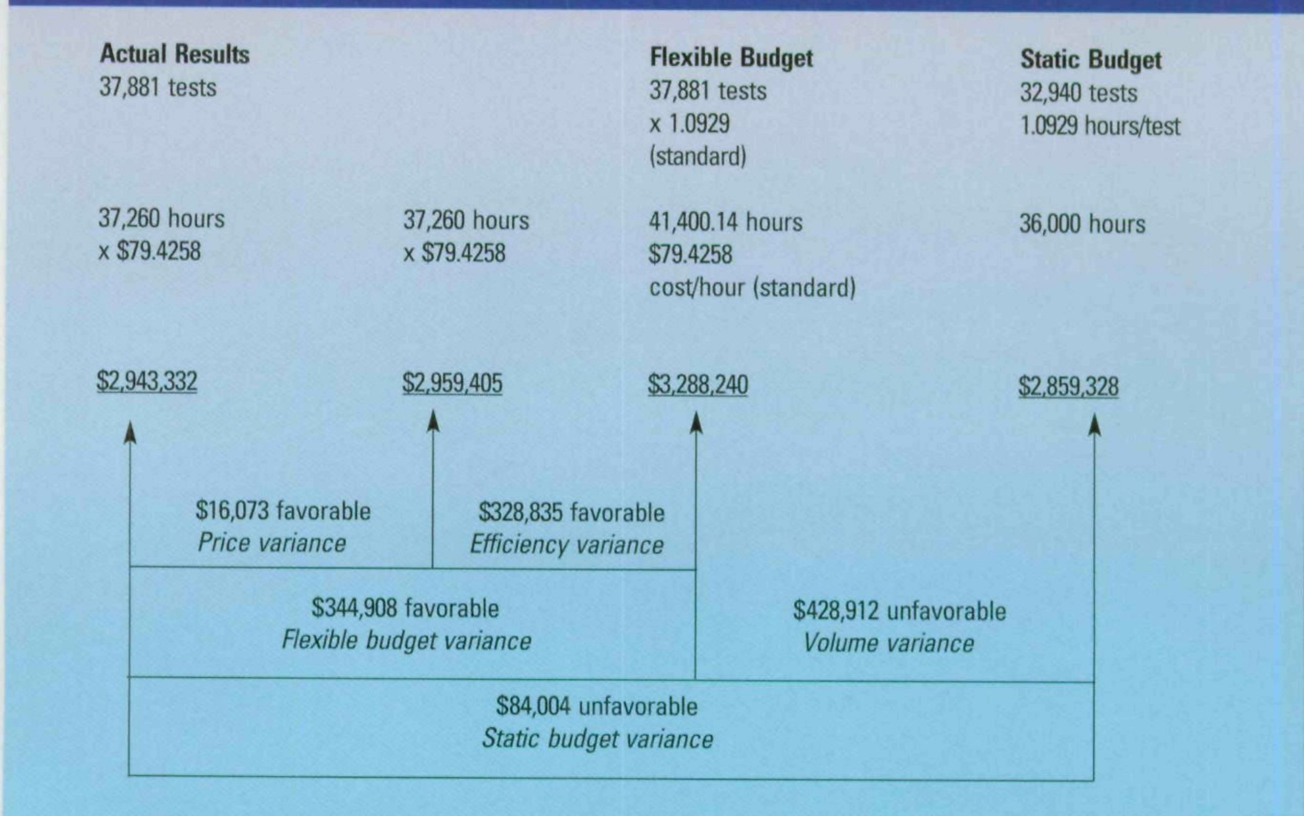
The development of the master or static budget is one that incorporates historical performance with future expectations. For example, a manager expecting to perform x number of laboratory tests in the period would expect the cost of y. Unfortunately, reality does not always follow expectations.

Example

Consider a fictional lab using cost averages from the Foresight study for DNA testing. Based upon prior-year volume, the lab has 20 FTE and expects to perform 32,940 DNA tests which will take 36,000 hours, or approximately 1.09 hours per test. Based upon past experience, and adjusted for cost increases, the lab expects to spend roughly $79.43 per hour, for a total of $2,859,328 for DNA testing. This amount is the static labor budget for this particular test for this laboratory. In reality, the lab spends $2,943,332, which exceeds the budget by $84,004.

To further analyze and determine where to focus managerial effort, the details of the actual amounts must be examined. Such an examination would find that the laboratory had an actual volume of 37,881 tests, which required 37,260 hours. The volume exceeded expectations and resulted in increased

EXHIBIT 3
Additional Analysis and Decomposition



costs. The difference between the static budget and actual results is the static budget variance, which in this case is $84,004 unfavorable. This variance is illustrated in *Exhibit 1*.

CPAs should determine how much the lab should have spent given the actual volumes. This is the flexible budget, and it shows the amount of spending given perfect accuracy of budgetary volumes. To determine the flexible budget, the actual number of tests must be multiplied by the standard number of hours allowed for each test. In this case, it is the 37,881 tests multiplied by the approximated 1.0929 hours per test standard, multiplied by the standard cost of $79.4258 cost per hour. This calculation is shown in *Exhibit 2*.

From this analysis, a manager can now decompose the static budget variance into two components: the volume variance and the flexible budget variance. The volume variance illustrates the impact of the increase or decrease of the cost object volume (in this case, the number of DNA tests), and the flexible budget variance highlights the spending variance generally controllable by managing operations. In this case, the unfavorable static budget variance is attributable to an increase in testing volume, something that may or may not be within a manager's control, but partially offset by a favorable flexible budget variance.

Additional analysis and decomposition can be helpful in examining operational costs. Inserting an additional column between the actual results and the flexible budget allows one to examine price and efficiency variances relating to labor spending. Taking the actual hours and multiplying them by the standard cost per hour provides an added dimension to the analysis, shown in *Exhibit 3*.

The analysis of the favorable price variance shows that the lab spent $78.9944 per hour versus the standard of $79.4258. It also shows that the favorable efficiency variance is driven by an increase in testing productivity, from the standard 1.0929 hours per test to the actual 1.0167 hours per test, or approximately five minutes faster per test.

A laboratory manager in the example described above could go beyond simply reporting a budget overrun. A manager using the analysis above would be able to state that while the budget was overspent by $84,004, driven by testing volume, operationally, the lab had a favorable labor price variance of $16,073 and a favorable efficiency variance of $328,835. This analysis allows for improved communication and, just as importantly, it highlights the area or areas where a manager can focus on developing best practices or identifying inefficiencies or waste. For an auditor or CPA consultant, the information can supplement the risk assessment of operations and can accentuate areas which may merit further investigation or scrutiny. ❑

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