

INCREASING LABORATORY EFFICIENCY AND REDUCING COSTS THROUGH IMPROVEMENTS IN SUCCESS RATES

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Background

CODIS laboratories are processing an increasing number of offender samples each year due to new legislation that expands samples collected to all arrestees. In addition, many States are facing severe budget deficits which decreases their capacity to process samples. Therefore, increasing efficiency and decreasing costs must be considered as an integral component of effective laboratory management. The role of sample and substrate types as well as the extraction method can have a dramatic impact on overall success rates. In addition, the costs associated with recollection are immeasurable if it delays the identification/apprehension of a dangerous offender. In many instances, the offender is no longer in the prison system and this further delays the comparison of genetic data.

Bode Technology has processed over 1 million offender samples from numerous agencies and, therefore, is in a unique position to determine the key drivers of success rates. In this study we analyzed the impact of success rates on increasing efficiency and reducing costs while processing over 200,000 offender samples during a 2 year period. Multiple variables were examined during this study such as sample type, substrate type, batch size, productivity, and extraction costs. In addition, we examined the overall failure rate associated with each substrate type and the costs associated with recollection. A high first pass success rate achieves the following: 1) decreased turnaround time; 2) decreased cost; 3) increased quality and 4) decreased data review.

Methodology

To measure this effect in a systematic manner, success rates of over 200,000 samples were tracked before and after implementation of an improved, more costly robotic extraction method. Samples were processed and analyzed according to contract specifications and results were compared. The data was further broken down by sample, substrate type, and extraction method. Efficiency was measured by changes in productivity and total material costs were calculated using detailed accounting reports.

Results and Discussion

The implementation of an improved, more costly extraction method led to a lower overall cost/sample. The decrease in total cost was attributable to a higher quality DNA extract, a higher first pass success rate, an increase in productivity and a decrease in amplification costs. A similar effect was observed by increasing the batch size and using a direct transfer substrate, such as the Bode Buccal Collector or a cotton tip swab. Success rates improved for both initial and subsequent runs which led to a decrease in the total number of amplifications and an increase in productivity. Overall, the average success rate for all substrates was greater than 99.5%. The highest failure rate was seen with saliva samples transferred to FTA. Techniques to improve the success rate of secondary transferred samples will also be discussed. Full results of this study will be presented.

In order for the forensic community to overcome the challenge of an increased workload, driven primarily through the expansion of CODIS, laboratories must become more efficient. This presentation will demonstrate that increased efficiency can be achieved through a focus on success that considers the entire process, including substrate, reagent costs, personnel, and considerations of the impact of recollection.