

QUICK SCREENING: AN EFFICIENT AND EFFECTIVE METHOD FOR SCREENING SEX ASSAULTS KITS FOR THE PRESENCE OF MALE DNA

Kelli Raley, M.S., Courtney Campbell, M.S., Alyssa James, Michelle Baker, Dawn Gingras, Kindra Isaacson, Allison Lowder, Scott Rex, Vince Figarelli

Arizona Department of Public Safety Scientific Analysis Bureau

The Arizona Department of Public Safety Central Regional Crime Lab had a backlog of approximately 100 sex assault kits, which equated to an approximate 6 month turnaround (TA) time for incoming cases. The crime lab was asked to reduce sex assault kit TA time to two weeks, while also providing information regarding the presence of male DNA in the screening reports. The goals were to increase efficiency, reduce backlog, and improve customer service. A study was performed on QIAGEN®'s QIAsymphony® and Investigator Lyse&Spin tubes to batch cases and increase output. The study compared sampling size of prepared swabs, tube types, concentrations of DTT and elution volumes using the body fluid stain protocol with the QIAGEN® DNA Investigator Kit. Quantitation was performed with Applied Biosystems® Quantifiler® Duo Kit and 7500 Real Time PCR system. Samples were amplified with the AmpFISTR® Yfiler® PCR Amplification Kit, injected on Applied Biosystems® 3130xl Genetic Analyzer (Life Technologies™), then analyzed using Applied Biosystems® GeneMapper® ID-X software v1.3.

Based on the results of the study, the following were chosen: sample size of ½ swab in Lyse&Spin tubes, 1M DTT and 100 µL elution volume. One-half swab cutting produced a better extract than ¼ swab cutting for downstream DNA analysis. The Lyse&Spin tubes offered less manipulation, were DNA free and were not affected by freezing. 1M DTT, recommended by the manufacturer, was chosen because it theoretically lyses more cells and provides an increase in DNA yield. A 100 µL elution volume reduced the impact of female DNA inhibition, allowed for more accurate pipetting, and eliminated the use of TopElute.

A team approach, in conjunction with the improved laboratory process, was implemented to decrease TA time. This process provided more timely screening results to the customer, allowing the customer to quickly request further DNA analysis. Quick screening increased overall efficiency by better identifying which sex assault kit samples to target for downstream DNA analysis. Implementing this process reduced the TA time from 180 days to 30 days. Once the backlog is eliminated, the TA time is estimated to be two weeks.

Future validation of a “zero means zero” quantitation kit could provide more definitive screening results, thereby decreasing back end DNA analysis requests. Moreover, mainstream sperm search might be eliminated entirely and only performed when requested by attorneys.