

## **VACUUMING THROUGH THE COLD CASE BACKLOG: A REVIEW OF NOTABLE CASES UTILIZING THE MICROBIAL VACUUM SYSTEM (M-VAC®)**

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Due to advancements in DNA technology, scientists are now able to obtain profiles from samples with lower amounts of DNA than ever before. This increase in sensitivity has led to a higher volume of samples that are being submitted to forensic laboratories with requests to process the samples for “touch” DNA. “Touch” DNA refers to samples where biological fluids are not detected, but there are skin cells that may be left behind due to contact with an item. Often, it is difficult for a sufficient amount of DNA to be collected in order to generate a profile. One of the most common and accepted collection methods in the forensic community has been to vigorously swab an item with a cotton swab and to forward the swab for DNA analysis. In 2014, the M-Vac® system was validated at DNA Labs International (DLI) in an attempt to improve recovery from “touch” DNA samples.

The M-Vac® utilizes similar principles to a wet vacuum. First, using the M-Vac®’s sampling head, a sterile buffer is sprayed onto the surface of the item. The buffer is then re-collected by applying a vacuum pressure over the sprayed area of the item. The re-collected buffer now contains suspended particles including the DNA that was previously present on the item. The buffer is then poured through a sterile filter under vacuum pressure where the biological material binds to the filter and becomes concentrated. After allowing the filter to dry, the filter can then be sampled and extracted.

Since the M-Vac® was brought online at DLI, it has been used to process a wide variety of sample types including clothing, ropes, cars, bed sheets, and comforters. One of the most common problems that forensic scientists encounter are intimate or indigenous items that belong to an individual in which there is often a great amount of DNA from the owner, but very little from other individuals that came into contact with the item. Furthermore, items with large surface areas or where it is unknown where the perpetrator touched the item are case circumstances where the M-Vac® thrives. Overall, the M-Vac® collection system is a very useful tool for screening evidence. Several notable cases where the M-Vac® was used to improve DNA recovery will be discussed.