DNA CAPACITY ENHANCEMENT AND BACKLOG REDUCTION PROGRAM
BUDGET NARRATIVE
FY2016

The Sedgwick County Regional Forensic Science Center (RFSC) is an independent local government agency which serves as the Crime Laboratory for all of Sedgwick County, Kansas Law Enforcement agencies. Currently, the Forensic Biology/DNA Section of the Forensic Science Laboratory Division of the RFSC has three full time positions filled with qualified case-working scientists. The vacancy for the fourth scientist has been filled and the new employee is scheduled to begin work on June 13, 2016. The new hire will replace a fully qualified DNA scientist who is currently cross-training in Firearms. This individual will maintain proficiency in as a DNA scientist and, upon completion of training in Firearms, will resume a limited volume of DNA casework.

The Section has seen a dramatic rise in casework submissions over the last two years. A multidisciplinary task force convened in Kansas to determine the number of untested kits statewide and the study revealed that over half of the untested kits in the state reside in Sedgwick County. The heightened awareness accompanies an increase in reported sexual assaults in the jurisdiction; both factors contribute to the fact that the section has experienced a four-fold increase in sexual assault kit submissions in the last two years. Sedgwick County experiences more reported sexual assaults and violent crimes than any other County in the state of Kansas.

To address the caseload challenge the RFSC currently works with two 3130 model genetic analyzers. Both analyzers are over a decade old and the vendor that markets and supports this instrumentation has announced that service and support for these instruments will be discontinued in 2018. Therefore, the laboratory must purchase and validate a genetic analyzer that is capable of unrestricted (no annual licensing fee) 6-dye analysis that will be fully supported beyond the 2018 timeframe. The request for $**120,000.00** includes the capillary electrophoresis instrument and shipping cost for one genetic analyzer, which will replace the 3130 models. To offset the loss of instrument

redundancy, the laboratory is requesting one year extended service contract beyond that which accompanies the purchase, in the amount of **$10,000**. Should any repairs to the new instrument be required, the service contract ensures a prompt service call and repair so that casework analysis is not significantly interrupted.

The new capillary electrophoresis instrument will be validated and used to generate data in accordance with standards set forth by the FBI. In 2015, the FBI announced that an additional seven loci would be added to the CODIS Core effective January 1, 2017. The 7 loci, in addition to the original 13, will comprise the new CODIS Core loci used in the DNA database. Compliance with the FBI standards, testing at all 20 loci, is mandatory for the continued operation of a CODIS terminal and essential to meeting the duties and requirements set forth by this grant. If the laboratory processes the same number of samples as are tested today, nearly twice the amount of data will result once the laboratory completes validation for analysis of the additional CODIS Core loci. Accordingly, our laboratory recognizes the limitations of human data interpretation and conventional statistical methods. A solution for the interpretation of challenging DNA profiles are probabilistic methods enabled by computer software. Continuous probabilistic genotyping systems, such as STRmix™, enable laboratories to streamline the interpretation and review of mixture samples. Since 2011, laboratories nationwide have been moving toward probabilistic methods because they are in compliance with mandates set forth by the National Commission on Forensic Science for improving DNA mixture interpretation. Having recognized data interpretation as a significant bottleneck, this laboratory has requested to purchase licensing for STRmix™, and the associated hardware, comprehensive training, validation support, and maintenance necessary to implement the fully continuous genotyping system. One advantage to STRmix™ over other software is that most DNA mixtures can be processed with a basic PC. The vendor asserts that many mixtures can be analyzed from the desktop workstations of the four full time scientists. However, the vendor also concedes that three and four person mixtures with a high degree of drop-out could take an extensive amount of time for a standard PC to process. Because of this, the vendor recommends that labs be equipped with one 64 core “super computer” that can be used to process complex three and four person

mixtures. The estimated cost of this computer is **$5000.** The use of the workstation and would be shared among all analysts, but is also essential for use by part-time (cross-trained) scientists who will not have a copy of the software on his/her PC. To accommodate statistical analysis at the workstations assigned to the four full time analysts and the shared 64 core computer, five licenses are requested, at $16,000 each, totaling **$80,000**.

Because the validation of the STRmix™ system is data driven, the cost of validation chemistry is substantial and development of a clear and direct validation plan will ensure the most cost- and time-efficient validation. Therefore, it is essential that the laboratory purchase the recommended 80 hours of technical and validation support for **$16,000**. Finally, version updates to this software are provided at a charge that is 20% that of the licensing cost. Therefore, **$16,000** is requested for the annual maintenance and version updates required to run the software after initial validation. Version updates will be critical to the continued use of the software as the vendor advances the system's capabilities. It will also ensure that the laboratory will be able to use the software on future computer workstation builds and in advanced operating systems.

The need to implement a probabilistic approach is recognized statewide. The Kansas Bureau of investigation is also pursuing the same software and has agreed to partner with Sedgwick County and share the in-house comprehensive training that they've requested under this same grant. While the training will still require out-of-county travel and lodging, the KBI facility is within driving distance and the mileage for two cars to/from Topeka is far less costly than airfare to destination training sessions in coastal regions. Therefore, the request includes five days of travel for five qualified scientists to attend the state-wide training. This includes mileage for two vehicles calculated at the 2016 standard rate of $0.54 per mile ($299.16) and hotel calculated at the GSA rate ($89 per night, totaling $2225. The per diem rate includes two travel days ($38.25 each) and three full days ($51 each) for a total of $229.50 per person. Since the budget detail does not allow differentiation between full and travel day per diem, a daily rate of $45.90 was used to arrive at the proper total for five analysts over the five day period on the

worksheet. This was then divided by 5 days to arrive at a per diem estimate of $45.90/person per day; therefore, the total per diem for the five analysts is $1147.50. This will achieve comprehensive training for all qualified analysts for **$3672**. This is travel is significantly less costly than would be the case if each analyst separately attended destination training sessions that required individual registration ($300 x 5) plus airfare ($500 x 5).

Simultaneously with the validation of the additional CODIS loci, the RFSC is validating an advanced quantification kit which enables the lab to achieve accurate and more sensitive results in less time. This advanced generation of kits also assesses the quality, or degradation state, of the total human and human male DNA. Unlike the previously validated chemistries, these kits also have increased sensitivity and are more predictive of whether a sample will produce an autosomal STR profile. This means that time and resources are not wasted on attempting autosomal STR testing on samples that will not produce interpretable results. This chemistry may also be used for rapid detection of male DNA in sexual assault kit exhibits, thus negating the need for classical and lengthy body fluid characterization and microscopic analysis of cell types. The laboratory began validating this quantification system with a single copy of the HID Real Time PCR Analysis Software, which is used to extract and evaluate the data. Accordingly, the software was installed on the instrument PC, which is not networked or printer enabled. Once implemented, the analytical software will need to be readily available to staff scientists for data evaluation, printing, casework review, and discovery preparation. Therefore, the laboratory has requested four additional copies of the software, which are $10,000 each, totaling **$40,000**.

The last aspect of the acquisition program includes an external audit to assess our laboratory against the FBA Quality Assurance Standards. As an ASCLD-LAB accredited lab, the RFSC was previously subject to a 5 year inspection cycle. However, that cycle was re-adjusted to a 4 year cycle, putting us out of sync with our ASCLD-LAB inspection that includes an audit against the FBI QAS. In addition to aligning our external audit schedule with our accreditation calendar, the intermittent audit will also

provide an external evaluation of newly implemented processes and protocols, such as the new generation quantification system and the CODIS-compliant expanded core loci chemistry validation. The budget detail reflects a request for two auditors to travel to Wichita Kansas. This proposal accounts for two travel days, and two days on site. Hotel costs were in accordance with the GSA recommendation for the region, at $89/night. For two individuals staying 3 nights, this totals $534. The per diem includes two travel days ($38.25 each) and two full days ($51 each), totaling $357 total for both auditors over the course of the trip. Since the per diem for a single auditor is $187.50 and the budget detail does not allow differentiation between full and travel day per diem, a daily rate of $44.63 was used to arrive at the proper total on the worksheet. Finally, airfare is estimated at $500 per person, which is standard for well-planned travel to/from Wichita's Eisenhower National Airport. This travel cost for the audit totals $2069. To compensate the assessors, the proposal includes an audit fee at a rate of $650 per day for each consultant, includes 2 full days on site, totaling $2600. While the cost of the audit is split between consultant expenses and travel, note that the the total estimated amount for the external audit is **$4669**.

This request details the acquisition program that will allow the RFSC to replace instrumentation that is no longer supported, enhance our capacity to evaluate quantification data, and to obtain the software, hardware, and training for the implementation of fully continuous probabilistic statistical analysis system. The external audit will ensure laboratory compliance with the FBI QAS, and is required for continued CODIS user eligibility. The purchase acquisition will follow standard Sedgwick County [KS] purchasing polices. Funding of this equipment acquisition program will allow the RFSC to maintain the current level of forensic services.