



D42 Managing a Forensic Biology Laboratory in the 21st Century

Jonathan Newman, BSc, Johanne Almer, MSc, Roger Frappier, MSc, Andrew Greenfield, MSc, Cecilia Hageman, LLB, PhD, and Jack Laird, MSc, Biology Section, Centre of Forensic Sciences, 25 Grosvenor Street, 4th Floor, Toronto, Ontario, Canada*

The goal of this presentation is to provide the participant with a range of strategies that may be employed by the managers of a forensic biology laboratory to ensure that services are delivered effectively and efficiently while addressing a myriad of demands and competing pressures.

Synopsis: In common with many forensic science labs, the CFS has faced a number of challenges during the last decade of the 20th century. These challenges have been multifaceted and have ranged from scientific, to legal, to fiscal.

The objectives of the presentation are to describe the various issues that have impacted the Centre of Forensic Sciences (CFS) Biology Section over the past decade and to demonstrate a more business-oriented approach to the delivery of scientific services.

Pressures: In the 1990s the effectiveness of the laboratory was addressed in judicial reviews of two different homicide investigations. The main elements of the two reports may be addressed in terms of quantity and efficiency of service delivery (Campbell report) and quality of service delivery (Kaufman report). However, both reports identified the need for additional resources.

Both reports included a number of recommendations that impacted the laboratory, some of the key issues being:

- Turnaround times
- Co-ordination of scientists and police
- Objectivity and independence
- Report writing and court testimony
- Training
- Quality Assurance
- Appropriate resources

The issues highlighted in these reports were further compounded by the increasing demands for service that resulted from an increasing awareness on the part of police services, the courts, and the general public of the potential for forensic biology to aid in the investigation of crime

The ability of the CFS Biology Section to participate in and contribute to the investigative process was further expanded when the Canadian National DNA Data Bank became operational in June 2000. This again placed additional demands on services both in terms of volume and efficiency.

Resources: In addressing these pressures and in recognition of the potential for forensic biology to be a cost effective component in police investigations, the Government of Ontario provided funding for a new DNA laboratory, an increase in the number of staff from 36 in 1995 to 72 in 2002, and for an increase in equipment.

The challenge for laboratory management is to ensure the effective utilization of additional resources to be able to increase the capacity of the laboratory in as short a period of time as possible.

Strategies: Through a process of intra lab consultations with staff, a model for the reorganization of laboratory staffing has been developed. The model included an expansion of the management group and a greater emphasis on the utilization of non-court going scientists (technologists). The following staffing ratios were devised: one manager for each group of 10-15 scientific staff, and, one screening technologist and one DNA technologist to assist each pair of court going reporting scientists. Technologists carrying out DNA analysis were deployed in a DNA Unit dedicated to the analysis of samples submitted by reporting scientists.

In addressing issues of efficiency and quality, the ability to recruit the appropriate scientists and technologists was an important first step in the evolution of the laboratory. The CFS developed a behavioral competency model for the positions of scientist and technologist. These models provided to the authors a description of the behavioral competencies required of an excellent forensic scientist and were incorporated into recruitment competitions.

In order for new staff to be trained efficiently and effectively, so as to become operational as quickly as possible, a modular approach was adopted. Managers responsible for training developed programs that incorporated lectures, practical written and oral tests, proficiency tests, and mock court exercises all delivered according to set milestones and all within the framework of mentor relationships. These programs ensured that staff members were trained according to the following timelines:

Reporting Scientists	6-9 months
DNA Technologists	3-4 months
Screening Technologists	6-8 weeks

Issues concerning clarity of information provided to clients were addressed by changing the formats and contents of reports. Standard formats for CFS reports now include:

1. Purpose statement



2. Tests conducted
3. Results
4. Conclusions
5. Information about the case scientist and other staff who assisted in the examination
6. Sample consumption information
7. Continuity
8. Information concerning the analysis written for the benefit of the client.

In responding to client requests for a more timely provision of information, the approach in large case submissions was changed. In place of a single large report provided on completion of the examination of all items submitted during the course of an investigation, multiple reports detailing results priority batches are now issued.

A number of initiatives have been implemented in order to be able to define services to clients and to be able to respond proactively to demands. As part of a province-wide major case management program, police follow a set procedure. In order to take advantage of this, a process has been implemented whereby the investigating team meets with a consultant forensic biologist prior to the submission of a case. The consulting scientist directs the items to be submitted and the examinations to be conducted. This avoids the inefficiency of items being submitted but not examined and improves the flow of information between scientists and investigators. This process also facilitates a service contract that includes the number of items to be examined, the specific tests to be performed, and a timeline for the provision of results.

The advent of the DNA databank facilitates the use of DNA analysis as an investigative tool to allow the identification of suspects. In order to maximize this service, a number of programs in partnership with police services have been developed. These include the development of a formal process for the rapid dissemination of information to investigators when a "hit" to the databank is registered, a co-coordinated approach to the examination of DNA evidence in "cold cases," and the development of a service for the examination of evidence from break and enter cases. These services have been designed to facilitate the processing of cases in a timely fashion and have resulted in 147 investigations aided for a total of 1800 profiles entered onto the Crime Scene Index.

The number of samples being processed by technologists in the DNA unit varies between 600-800 per month. Through process review and change, the time required for analysis of a sample from 16 to 8 calendar days has been produced. The current process employs a production line approach that will in future be amenable to the incorporation of further automation.

Ongoing initiatives include process review to maximize the efficiency of item examination, and a Research & Development program that is process driven.

Summary: By employing a variety of different strategies, an increasing range of services to clients has been delivered while continuing to improve turnaround times and quality of the science. This has resulted in increased satisfaction levels on the part of the stakeholders and an improvement in the contribution that the laboratory makes to public safety in the province of Ontario.

Laboratory Management, Service, Resource