

## **Goal: Create healthcare informatics environment to support a range of healthcare services through the region**

### **Overview**

Fraser Health Authority (FHA) is one of Canada's largest and fastest growing regional health systems, serving 1.5 million people. A core organizational goal is to provide equitable access to a full range of health care services throughout the region. Some services are available in most communities, whereas others are available in select locations. FHA aims to ensure timely and equitable access to care as a function of need, and not the person's location.

FHA delivers acute care services through 12 hospitals distributed across a wide geography. Four centralized pathology service centers process specimens sent by providers at the other eight acute care hospitals, as well as physician offices.

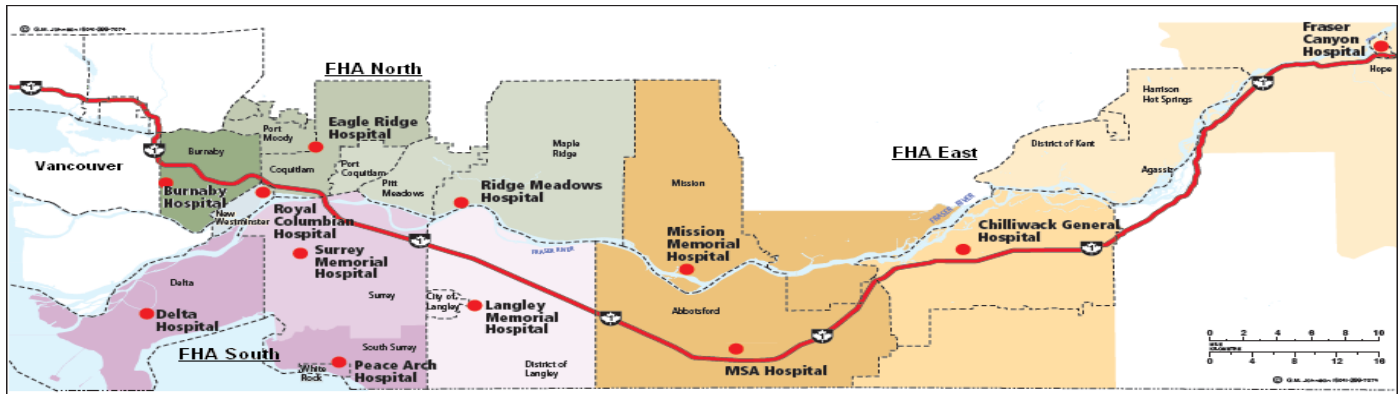
In the Fall of 2006, FHA issued a Request for Proposal for its telepathology project. The scope of the project at that time was focused on the testing of digital imaging to provide a solution for the remote diagnosis of intraoperative consultations, decreasing the amount of inter-hospital travel. The current business objective is to prove the viability of telepathology in process integration into Anatomic Pathology, Hematology and Microbiology as part of FHA's strategic eHealth initiative.

### **Vision**

A sprawling coverage area and finite numbers of pathologists creates challenges in providing timely access to care. A desire to reduce location dependence prompted Fraser Health to think creatively in considering its pathology services, resulting in a proof of concept project being developed and implemented at Royal Columbian Hospital (RCH).

In order to provide frozen section tissue interpretation for intraoperative consultations, pathologists based at RCH would have to drive to one of four possible surgery locations, which could take as long as one hour. Whereas this transportation lag time is acceptable for routine specimen analysis, faster diagnosis must be accomplished during surgery. "When the patient is on the operating table, the surgeon needs a preliminary diagnosis from the specimen as rapidly as possible," explains Janet Tunnicliffe, Anatomic Pathology Regional Laboratory Scientist for Fraser Health Authority. The information provided by the intraoperative consultation will assist the surgeon in deciding how to proceed with the surgery.

An initial step towards digital pathology was to generate digitized images using whole slide scanners and other imaging devices. As the number of digitized images proliferates, FHA envisioned an information system to provide a rational approach for managing image files, enabling efficient retrieval of the files, and managing access to the files in a secure manner. Most importantly, this system would need to verify that the right images are matched with the right patient data.



## Solution

Fraser Health Authority selected a comprehensive system from Apollo PACS, Inc. in order to enable location-independent digital pathology.

Apollo's PathPACS® enables a pathologist at a FHA network computer to view live video of gross tissue specimens and scanned whole slide microscopic images to make a preliminary diagnosis from a remote location. For remote gross specimen analysis and dissection, a centralized pathologist interacts with an onsite Histotechnologist verbally via the telephone and visually via live video imaging. A digital presenter which is equipped with an overhead camera capable of capturing high-resolution video images is connected via the FHA intranet to the server-based Apollo software. The Histotechnologist sequentially places the requisition that documents patient identification and any relevant clinical notes under the digital presenter camera, followed by the tissue to be examined. The pathologist remotely directs the technologist in orientation and dissection of the tissue specimen.

A sample of the tissue is then frozen, sectioned, and stained following frozen section methodologies. The stained and coverslipped slide is then scanned to capture a digitized image that is then associated with the patient meta data and stored by the Apollo PathPACS® software. The whole slide image is generated from a series of digital images stitched together to emulate the standard glass slide image seen via a microscope, with the advantage of the resulting digital images being accessible to multiple viewers across a network.

Apollo PathPACS® manages images acquired from a variety of still and video-based devices within a rational information systems framework. Storage of images on individual personal computer hard drives creates numerous security, privacy, and patient safety issues. Use of a PACS management system allows for centralized storage of images and meta data on a network server with full security and failsafe backup protection. In addition, standardized procedures can be developed for file and image naming conventions allowing easier and more accurate searches for patient or image files.

Without a PACS management system, the manual association of file names to images produced on ancillary equipment introduces opportunity for error in patient match. Images captured and stored on the whole slide scanner or a camera SD card are unsecured, and unauthenticated individuals can access, view, and delete the image. The use of Apollo PathPACS® creates a much more fail-safe process, in which the PathPACS® software automatically searches for images stored in the scanner or camera software files and uploads the image to the secure Apollo PathPACS® system. The automatic uploading into Apollo enables the identification and placement of the image into the correct patient record to minimize opportunity for mismatch. Also, the system deletes the image from the scanner or camera image file to prevent future unauthorized usage. The automatic acquisition of the image improves patient safety as well as privacy and security.

## Solution continued...

The initial scope of FHA's telepathology project has expanded. Digital images are used for Anatomic Pathology case reviews and medical rounds, in which pathologists gather in a conference room equipped with a computer and LCD projector. Sharing slides that have been pre-scanned enables the pathologist conducting rounds presentation and pathologists and clinicians in attendance to look at the exact same image at the same time with the same focus and field of view as the operator of the microscope.

With the successful use of Apollo PathPACS® to view whole slide scanned images and live microscopic images during Anatomic Pathology rounds the project has expanded to use for Hematology and Microbiology rounds and technical in-service education.

The vision of supporting distributed pathology consultation requires attention to pragmatic technology concerns. Fraser Health has conducted extensive proof of concept studies to validate that the network and system handle very large file sizes. Based on lessons learned from using diagnostic imaging PACS, testing has focused on ensuring that no bandwidth limitations exist that could cause lag time.



## Evaluation Considerations

As Fraser Health surveyed the universe of available commercial telepathology options, flexibility was a critical evaluation criterion, as the needs of digital pathology are expected to evolve. The system would need to assimilate live video, scanned images, and still camera images. In order to accomplish remote gross specimen analysis, the project team ruled out proprietary systems as an expensive alternative, as this would have required investment in two separate software applications for gross analysis and the whole slide scanners.

In order to preserve maximum adaptability, the system needed to be compatible with multiple types of whole slide scanners. New scanner vendors are introducing models that could provide increased functionality. Although vendors of scanners offered image management systems, they began with proprietary approaches, and their software would work only with devices made by the same vendor.

Without a system that works with multiple scanner vendors and devices, Fraser Health would have had to purchase the scanner plus its associated software application, and to convert legacy data. Other vendors offered systems that "were overkill" as they included networking components that Fraser didn't necessarily require.

"Fraser Health selected Apollo's PathPACS because we wanted a system that could adapt with our needs. Apollo PACS is more of a software vendor than a hardware vendor, and we expected that this open orientation would allow the company to be more responsive and willing to work with us," explains Janet Tunnicliffe. Apollo preserves this adaptability as FHA evolves its eHealth initiative, recognizing that the evolution of devices in the future is not easy to predict.

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## **Future**

The new world of pathology PACS demands information systems expertise, as the needs of digital pathology will evolve rapidly. “Digital pathology is better accepted now, and so we want to move on and do more, and we have found that Apollo PACS will work with us to meet our evolving needs,” according to Janet Tunnicliffe.

FHA plans to implement web access that will enable pathologists and healthcare providers to consult, view and manage the Apollo system from anywhere via the Internet. One professional will be able to drive the image so that every other viewer on the web views the same image in motion. In the total vision, FHA will be using Apollo’s PathPACS® for:

- Dynamic or virtual telepathology for frozen section tissue
- Static and streaming telepathology for Microbiology and Hematology technical in-service education
- Remote viewing capability
- Image management software with annotation ability
- Region-wide access to shared patient information to enable consultation and collaboration
- Secure access to patient images and related meta data

Telepathology will also be utilized for consultative purposes in Hematology for peripheral blood smear interpretation and in Microbiology to assist in the interpretation of Gram stains from patient specimens.

## **Conclusions**

Apollo PathPACS® provides a foundation for a coordinated digital pathology strategy that enables access to shared resources across a wide coverage area. PathPACS® supplements current service levels. At the end of the proof of concept project, a review will evaluate if PathPACS® can provide a greater level of efficiency for frozen section procedures in distant regional locations.

Consolidating pathology image information in one source improves pathologist productivity in diagnosis and reporting. Apollo PACS has developed patented telepathology and imaging solutions that deliver advanced visualization capabilities to the desktop. Healthcare professionals can provide diagnostic services and consultation when and where these services are optimally needed.