

Open-Source Software for Sample Inventory



CANADIAN BIOSAMPLE REPOSITORY

Control



ALBERTA INGENUITY CENTRE FOR
MACHINE LEARNING

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INTRODUCTION

BioBank allows multiple users, operating at different computers and different locations, to simultaneously process and log thousands of samples daily. In normal circumstances it can be difficult to manage and exchange data when a researcher might be in one location, a collection clinic might be in another, and the storage might be somewhere else. BioBank connects people in various areas to access the information they need. The ability to transfer data between collaborating centers can cover gaps in capabilities. For example, if storage space is limited at one center, another may have the extra space that they need. BioBank is part of a larger effort by the Canadian Biosample Repository to create a network of research collaboration, and is available to help with lab setup, configuration and training. The system is flexible so it can be adapted for almost any storage application; it allows the set up an inventory system, whether it uses handwritten labels, barcodes, test tubes, cryovials or glass slides to label and store samples.

FEATURES

Barcodes are an important feature of BioBank, as they uniquely link the physical tube to the data in the network. They are not human readable, and contain only an identifier, keeping the important information private. The only way to retrieve this data is for a user with a valid user name and password to scan it into the application. Scanning a barcode takes less time than copying an id by hand and there is little chance for error as the user has limited opportunity to modify the identifier. Users may enter up to 96 tubes at once by simply placing the tubes in a SBS footprint on a flatbed scanner.

While the use of barcodes is the first line of defense against errors in the system there are many other features that prevent or catch the inevitable mistakes. Each study is set up with its own acceptable tube types, both for receiving and for storage, which are available in a dropdown menu. Uniqueness constraints prevent duplicate identifiers, waybills, clinics, and study names. Appropriately, no patient information is stored in the database, accommodating privacy requirements. BioBank also allows the tracking of aliquots from their source tubes; if there is a lot recall on the source tube that may affect the aliquots it can be noted per sample in the system.

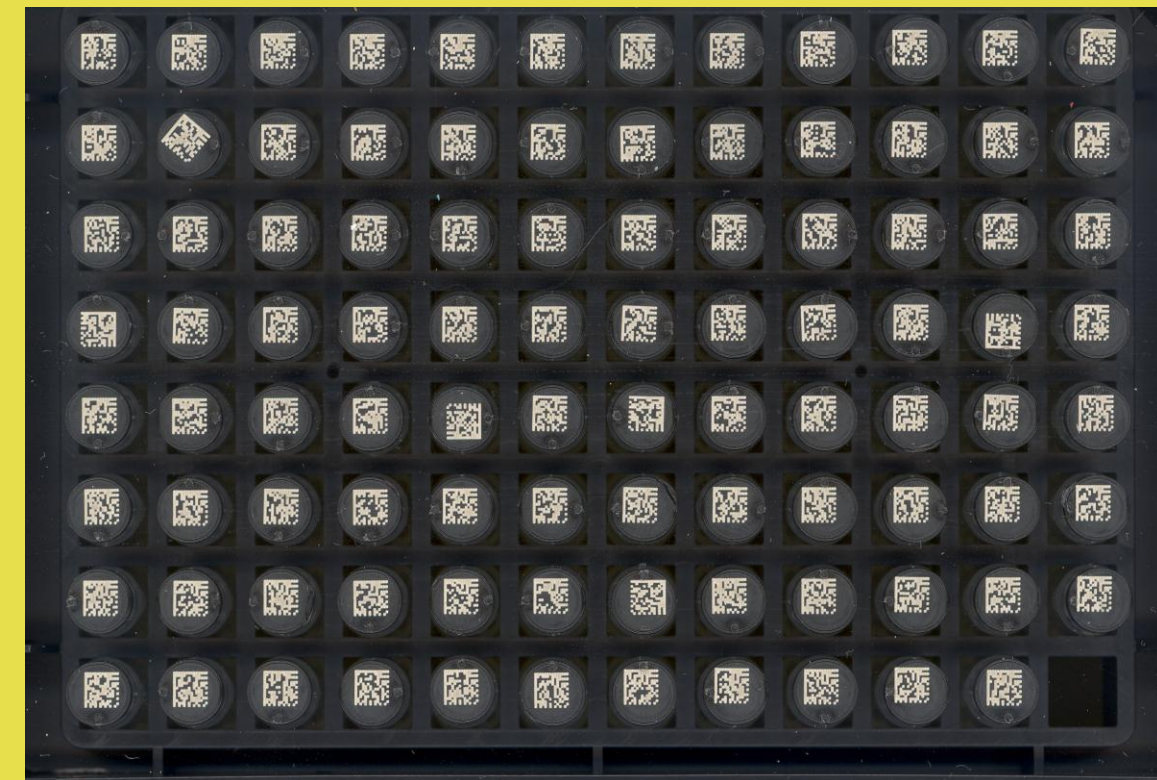


Figure 1 A pallet of 2D bar-coded cryovials in a SBS array



Figure 2 Nunc style freezer hotel

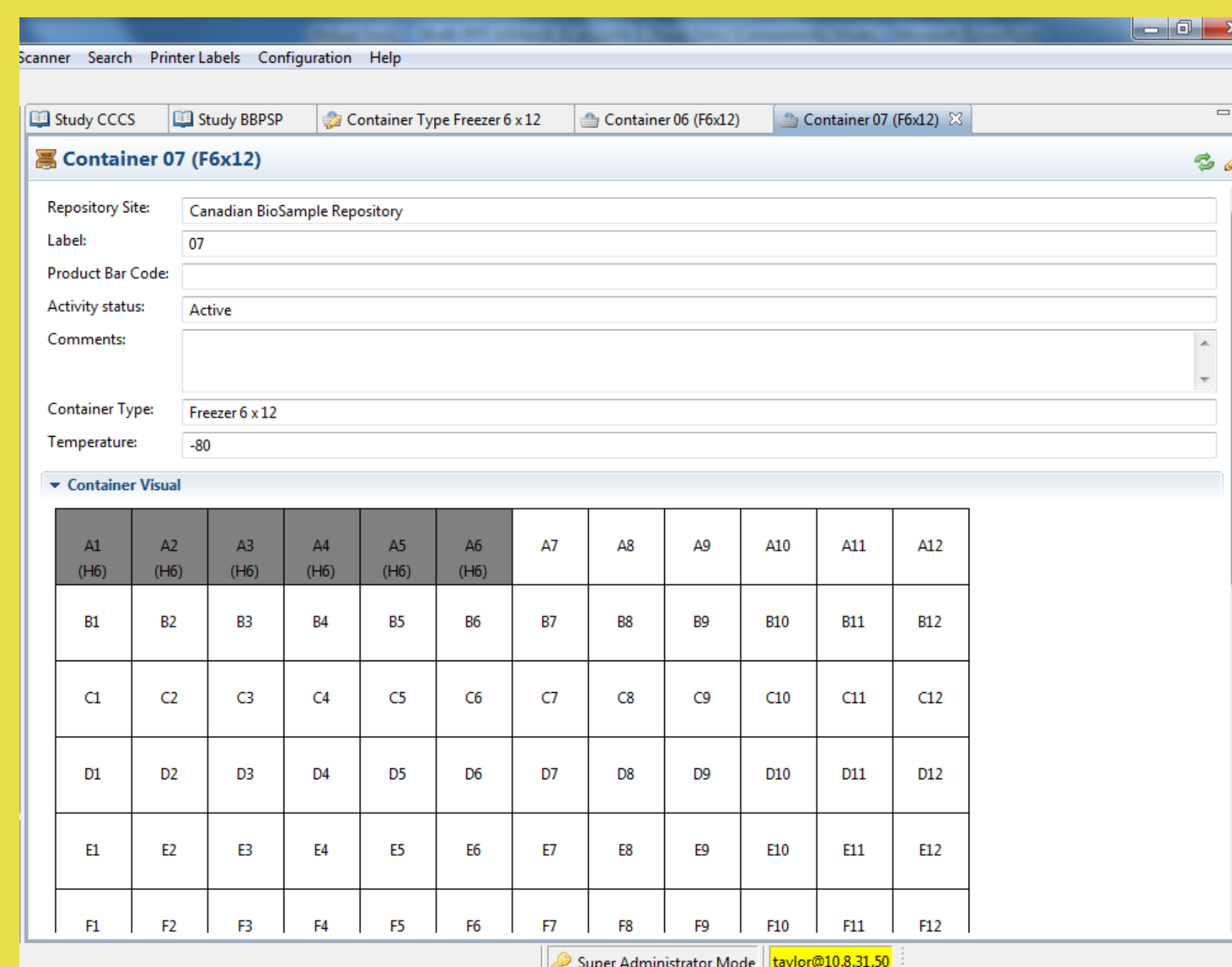


Figure 3 A -80°C freezer organized with hotels (6 x 12 array)

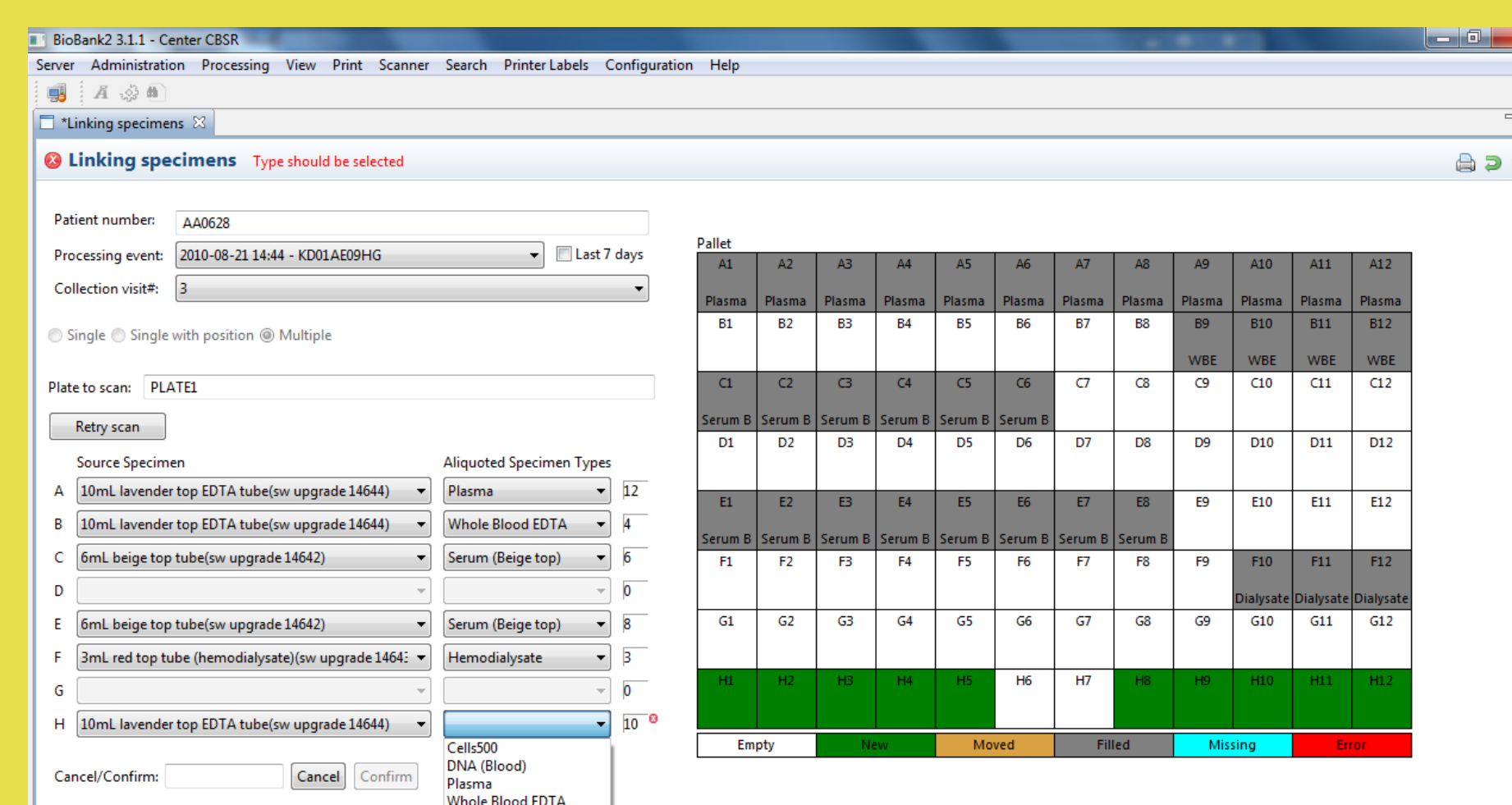


Figure 4 Entering 2D barcoded cryovials into BioBank using a flatbed scanner

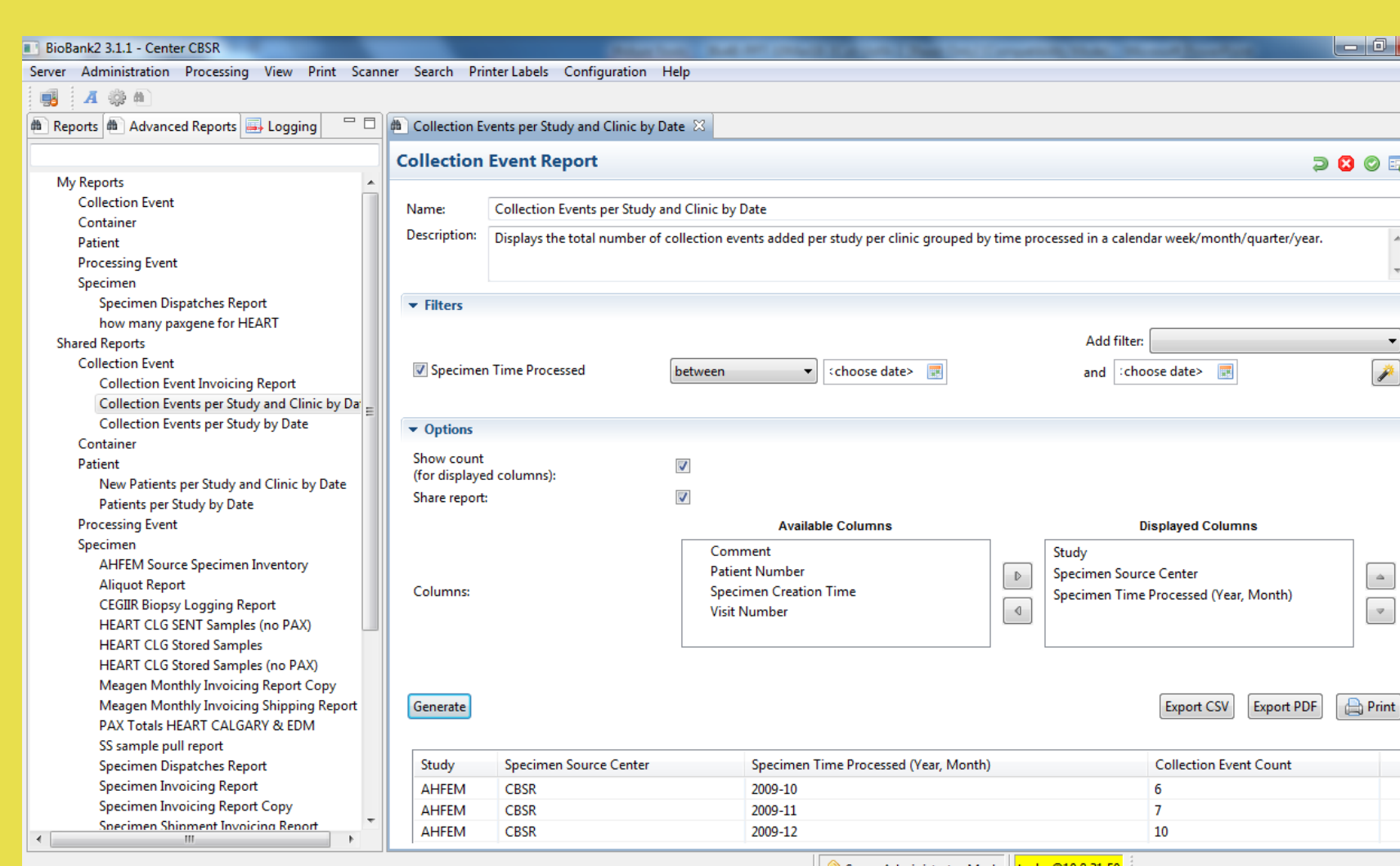


Figure 5 A typical Advanced Report that may be used to determine study activity

CONCLUSION

BioBank is a free, open-source software system designed to offer an affordable solution to research inventory management. Its goal is to advance and support translational research, providing users who have much in common an integrated way to share their resources. Because open-source software is also extensible, it provides a good launching point for anyone who needs something special without requiring them to build from the ground up. Anyone can take BioBank and extend its capabilities, and have the opportunity to improve the software for everyone who uses it. BioBank aims to be standards-compliant, and encourages its users to adopt practices that ultimately result in increased compatibility, efficiency, and reliability.

FEATURES

Container Types are established by defining the number of rows and columns and how the desired descendant locations should be labelled. Once this is complete the container types can be used to create representations of the physical **containers**, such as freezers or dewars, and their contents (Eg. sub-containers like racks and boxes).

Sections of a container, or whole containers themselves, can be locked to hold only specific types of samples. For example, if a tissue is to be stored at a particular temperature this sample type can be locked out of all other containers to prevent it from being added by mistake.

Many labs have records that are kept on paper, or systems that are difficult to search or browse. As a result, they are unable to find their samples quickly, and statistics are often difficult to generate. BioBank's powerful **Advanced Reporting** feature makes it easy to not only find whatever is needed, but share those reports with collaborating groups.

User Management allows administrators to set access rights for staff and configure their level of security and the features they can use. This allows users to send, track, and store samples without exposing sensitive information to unwanted parties. Passwords can be changed at will, but must always meet strong-password requirements.