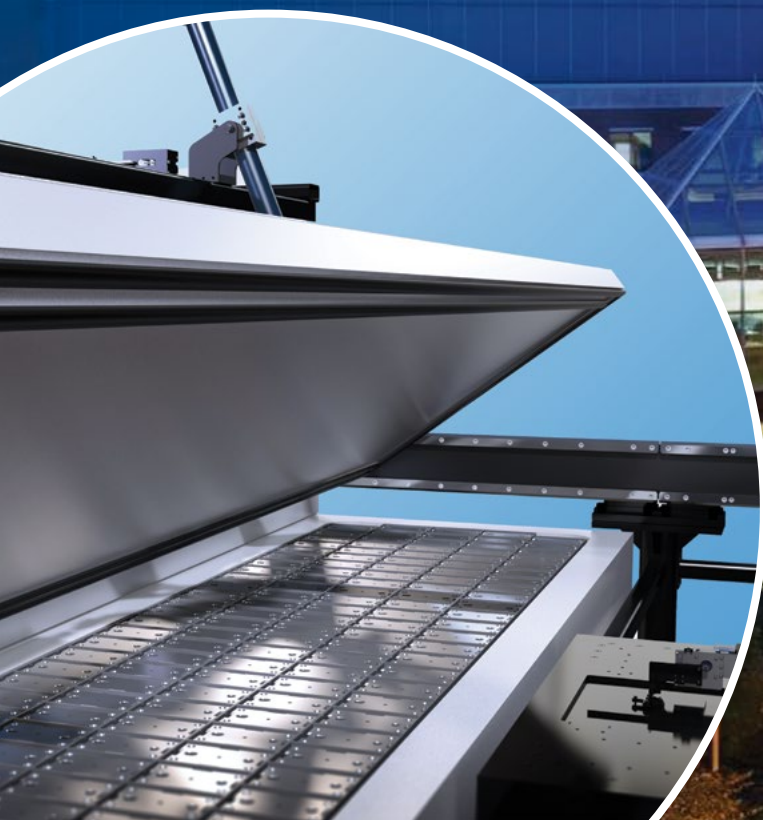


Aiding Responsiveness When Supplying Samples for Alzheimer's Disease and Related Dementias Research

A Case Study with



INDIANA UNIVERSITY
SCHOOL OF MEDICINE



Overview

Indiana University School of Medicine is a standout leader in the fight against Alzheimer's disease, a type of dementia, and home to the National Centralized Repository for Alzheimer's Disease and Related Dementias (NCRAD). As NCRAD expanded, management identified sample storage as an area that would benefit from the use of an automated sample storage system. The BiOS® M10, along with outstanding service and support from Hamilton Storage, will help the NCRAD improve efficiency and consistency in their sample storage and retrieval processes.



Introduction

Approximately 50 million people around the world are estimated to be afflicted with dementia. Alzheimer's disease is the most common form of disease. Alzheimer's disease is the sixth leading cause of death in the United States; among those 65 and older it is the fifth-leading cause of death^{1,2} This progressive type of dementia significantly disrupts normal memory, thinking, and behavioral functions and, unfortunately, has no known cure.

Indiana University School of Medicine, located in Indianapolis, Indiana, aims to change the trajectory of Alzheimer's disease by developing novel ways to identify, treat, and even cure this

disease that devastates patients as well as their loved ones. Among IU School of Medicine's multi-faceted approach to Alzheimer's research is NCRAD.

For over twenty years, NCRAD has collected, maintained and distributed biological samples that are used to advance Alzheimer's and other dementia-related research. "With more than one million samples, including DNA, cerebrospinal fluid, brain tissue, and more, we operate one of the nation's largest biorepositories focused on Alzheimer's disease," notes Colleen Mitchell, Biorepository Operations Manager for IU School of Medicine.



Challenges

High Electrical Consumption

Freezer Variability

Logistics

As NCRAD grew over the years, manual freezers across multiple facilities were used to store samples. This complicated sample retrieval and slowed the distribution of samples to researchers.

In 2018, IU School of Medicine received additional grant funding from the National Institute of Health's National Institute on Aging to increase the size and scope of NCRAD. As planning commenced to expand the NCRAD laboratories into larger and newly renovated facilities, an opportunity arose to transition from manual freezers to an automated system.

Manual freezer farms are not typically amenable to scaling requirements. Banks of freezers take up significant space and consume a great deal of electrical power. As each freezer operates independently, variability is introduced in terms of freezer performance as well as when and how samples are accessed from each unit. Managing each freezer is labor-intensive and logistically challenging.

Solution

As NCRAD began to consider transitioning to an automated sample storage solution they had specific requirements including responsiveness of the provider, throughput, capacity, cost, service, and time frame. NCRAD also required side barcode reading to accommodate older sample containers that were imprinted with barcodes on their sides. In contrast, barcodes are now located on the bottom of most sample containers to comply with current automation-friendly American National Standards Institute/Society for Laboratory Automation and Screening (ANSI/SLAS) recommendations.

With the right blend of capabilities, along with a strong commitment to responsiveness, service, and ongoing support, Hamilton Storage was unanimously selected by the NCRAD review committee to automate sample storage at NCRAD through the BiOS M10 automated storage system.

The BiOS M10 was personalized for NCRAD, including the capacity to store up to 3.5 million samples in 2.0 mL or smaller cryovials at -80°C. This ultra-low temperature protects the integrity of precious samples so that sample recipients may be assured of high quality and reproducible data as part of their Alzheimer's research. A full downloadable audit trail is provided for each sample, along with a temperature log, while permission-based controls prevent accidental or unauthorized sample access.

Many sample vessel sizes and types may be stored in the BiOS M10. The NCRAD collection includes two different 2.0 mL tube types as well as 0.75 mL and 0.5 mL tubes. These tubes will be mixed among 48-position and 96-position ANSI/SLAS compliant racks.



Of note, NCRAD became the first facility to implement the BiOS M10 side 1D and 2D barcode reading module, already in development at Hamilton Storage, and were instrumental in helping to refine its utility prior to widespread market launch. Reading the barcoded sides of legacy sample tubes as well as the 2D barcoded bottoms of newer sample tubes allows all samples to be seamlessly and efficiently managed as a single collection.

The BiOS M10 will integrate to NCRAD's IT infrastructure and Laboratory Information Management System (LIMS) for sample requests, status checks, and other sample management tasks.



Summary

"Our primary goal in purchasing the BiOS M10 was to expedite research," says Ms. Mitchell. "Once the system is fully functional, we estimate that our sample turnaround time will be halved so that our research customers can focus, uninterrupted, on their experiments." The new automated system will also remove sources of variability in sample storage, such as the amount of time that a sample sits before it is stored. The BiOS M10 supports the biorepository operations team in maintaining its mission of ensuring that all research supported by the facility is robust and reproducible.

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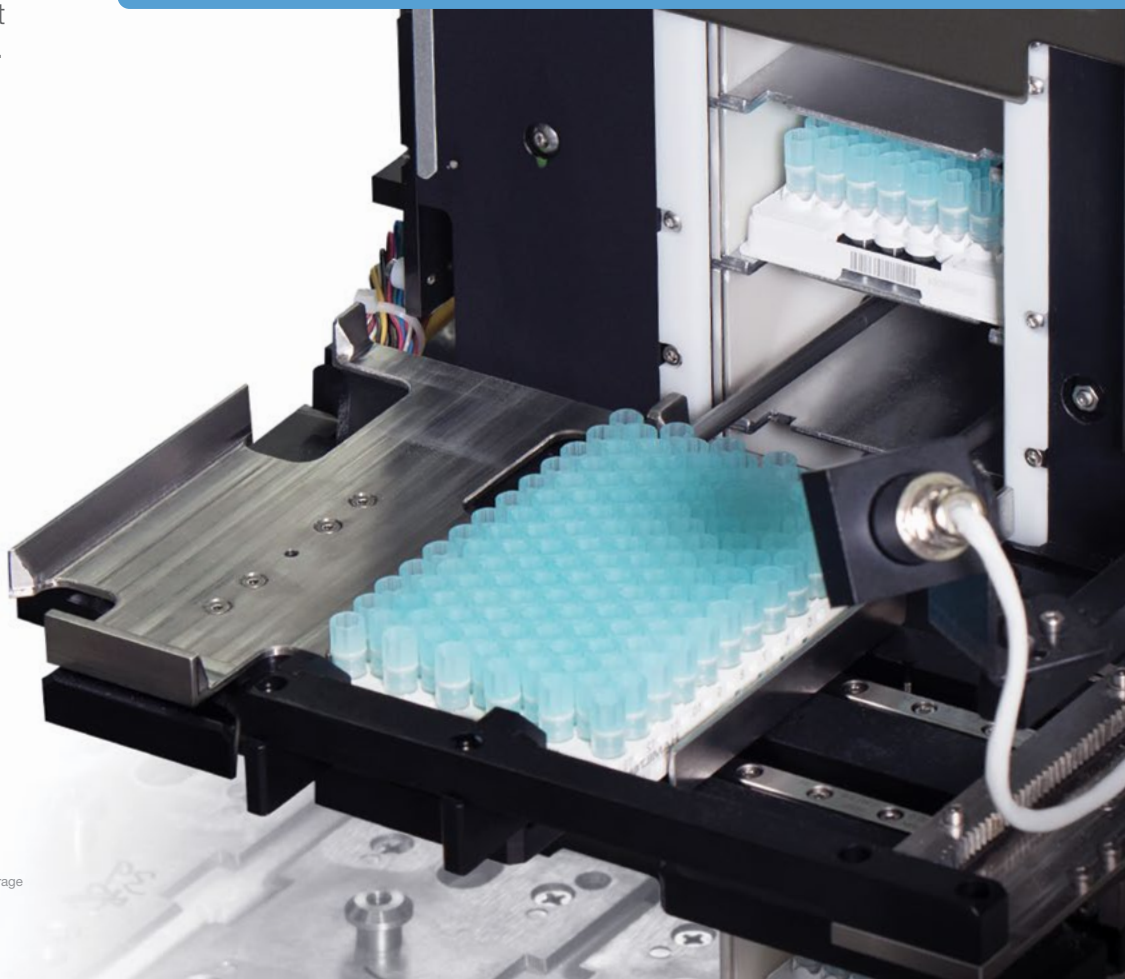
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1. Dementia. World Health Organization. Geneva, Switzerland. September 2020. <https://www.who.int/news-room/fact-sheets/detail/dementia> (Accessed January 12, 2021).
2. 2020 Alzheimer's Disease Facts and Figures. Alzheimer's Association. Chicago, IL., March 2020. <https://www.alz.org/media/Documents/alzheimers-facts-and-figures.pdf> (Accessed January 12, 2021).

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