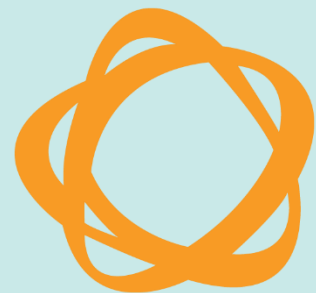




Achiever
medical



7 WAYS ACHIEVER MEDICAL LIMS HELPS BOLSTER LAB DATA SECURITY

About this white paper

This white paper draws on Interactive Software Limited's 20 years' experience of working closely with Biobanks, global pharma, and research, testing, and academic laboratories to identify and provide solutions to sample, data and process management challenges faced by those working in the lab.

Similar challenges are faced by labs of all sizes. From small academic labs manually processing samples through to large research institutes handling thousands of samples per day and working with multiple instruments. Irrespective of the size of your lab, if you are handling and processing sensitive data it is critical that you safeguard it from unauthorised access.

This guide outlines 7 ways in which Achiever Medical laboratory information management system (LIMS) can help manage and bolster lab data security.

Introduction

Data is valuable, playing an essential role in diagnostics, drug discovery, personalised medicine and, ultimately, impacting patient outcomes. When used appropriately data can inform decision-making and is the foundation on which Machine Learning (ML) and Artificial Intelligence (AI) are formed. Both of which have the potential to transform medical research through new innovations and quicker breakthroughs by using unparalleled data processing capabilities. The phrase *'data is the new oil'* has been circulating for over a decade and for those working in life-sciences relying on quality data to make informed decisions its importance cannot be overstated.

Life-science labs are receiving and generating ever-increasing volumes of data. Keeping track of that data and safeguarding it from unauthorised access and use can be time-consuming, expensive, and difficult, especially when multiple systems, teams and collaborators are involved.

However, protecting data is not just a legal obligation but also a moral one. With data often relating to patients, their samples and medical history, it is imperative you ensure you are acting in accordance with a patient's wishes and respecting their right to privacy while using their information in any testing and research activities.

Achiever Medical LIMS is a centralised, secure laboratory information management system that uses modern data encryption methods (AES-256), authentication protocols and technology to protect your valuable data while providing connectivity with your other systems to give scientists what they need to carry out their research and testing activities.

7 ways in which Achiever Medical LIMS helps bolster data security

1. Provides a centralised solution to eliminate data silos

Most people are familiar with using spreadsheets. If you are using spreadsheets to capture and manage your data, then you will know how easy it is for users to add and update data. You will also know how easy it is for one spreadsheet to become two or three. Before you know it, everyone has their own copy – which often results in data duplication.

Furthermore, controlling access to these spreadsheets can be impossible with copies often emailed between individuals in order to share information.

You will also know how easy it is for data errors to occur when copying or sorting data in spreadsheets. In addition, there is no accurate audit trail of which information has been added or updated.

Likewise, legacy or systems built in-house may not be easily, or securely, accessible to multiple users, labs, or external collaborators. Similarly, it can be difficult to connect these systems with other applications and instruments due to limitations in sending and receiving data.

Achiever Medical LIMS offers a centralised system with controlled access to information and workflows. Multiple users can access the system at the same time – something that is difficult to manage with spreadsheets. Plus, all system logins as well as record insertions and last updates are audited with the name of the logged in person and date/time.

In addition, data from external data sources such as instruments, systems and even spreadsheets, can be imported or connected for a 360° view of samples, patients, informed consent, results, and clinical trials.

2. Authenticates users attempting to log into the system

Achiever Medical LIMS offers different authentication methods for preventing unauthorised access to the application. Integrating with modern, industry-standard authentication solutions as well as providing an integrated access and password policy system, Achiever Medical LIMS gives you the tools to easily grant and revoke system access.

Centrally controlled and managed through Active Directory, Azure Active Directory, PingFederate, LDAP, or the system's internal tools that use hashing algorithms to store passwords, you can define account and password policies to control settings such as password length and strength, maximum failed attempts, password update frequency, password expiry dates as well as invoke multi-factor authentication.

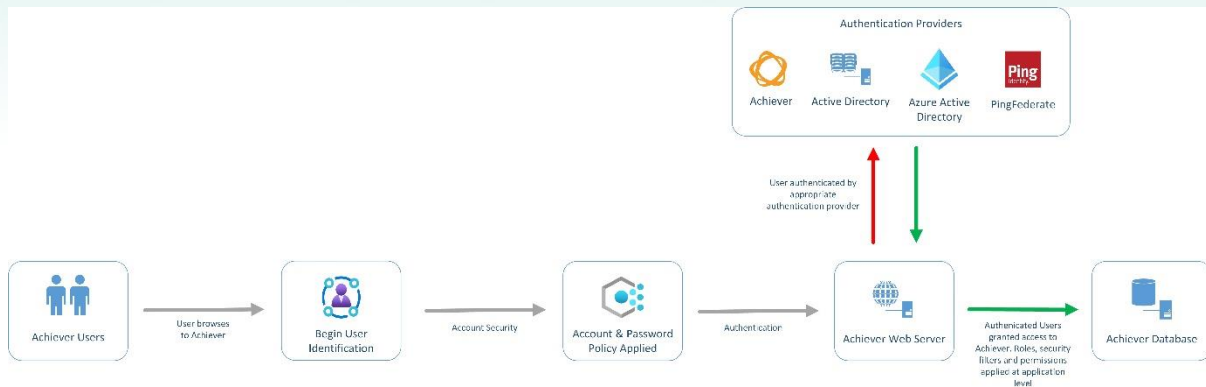


Figure 1: Achiever Medical LIMS Modern Authentication

3. Encrypts sensitive data/personally identifiable information (PII) 'at rest'

Encryption is one of the most common ways to protect data. Encryption gives you an added layer of security and protection by taking plain text and converting it into ciphertext, which is made up of seemingly random characters. The data is decrypted using symmetric keys.

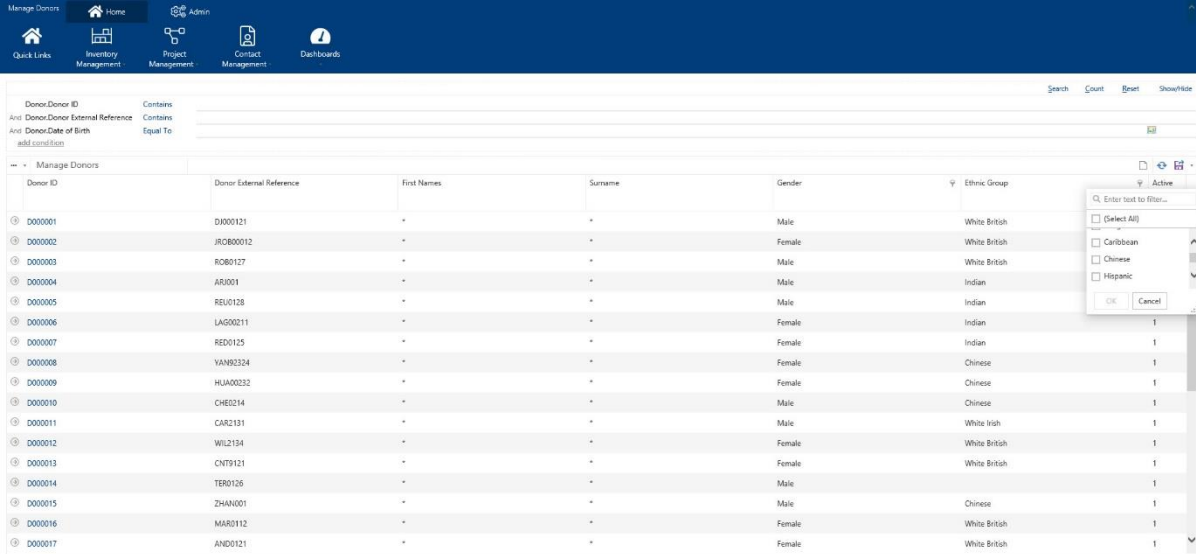
The Advanced Encryption Standard (AES) is widely viewed as the most robust encryption method. With AES-256 viewed as one of the strongest, standards-compliant encryption algorithms available.

The [UK's Information Commissioners Office \(ICO\)](#) recommends that applications or databases holding personal data should do so using an encrypted format.

One option is to provide database-level encryption to protect data. Achiever Medical LIMS achieves this through SQL Server Transparent Data Encryption (TDE). In addition, the LIMS offers field-level encryption 'at rest' for data columns storing personally identifiable information (PII) such as Name and Hospital Number. The data is only accessible through the front-end application for authorised users with the appropriate permissions, which are determined at a project¹ level by appointed security officers.

This level of flexibility enables you to assign two users to the same project and grant just one of them permission to see personally identifiable information (PII) for any patients included in the project. The user without permission to access PII still has access to the information needed to do their job, such as sample details, consent restrictions, treatment history and demographic data, while you continue to safeguard your sensitive information. The encrypted data is obfuscated and read-only. Making it easier for secure collaboration between labs and organisations.

¹ Projects are used in Achiever Medical LIMS to denote a collection or subset of samples which may belong to individual labs or biobanks, are ring-fenced for particular research studies and trials, or contain certain sample formats or types



Donor ID	Donor External Reference	First Names	Surname	Gender	Ethnic Group	Active
DD000001	DJ000121	*	*	Male	White British	1
DD000002	JROB0012	*	*	Female	White British	1
DD000003	ROB0127	*	*	Male	White British	1
DD000004	ARJ001	*	*	Male	Indian	1
DD000005	REU0128	*	*	Male	Indian	1
DD000006	LAG00211	*	*	Female	Indian	1
DD000007	RED0115	*	*	Female	Indian	1
DD000008	YAN92324	*	*	Female	Chinese	1
DD000009	HJAA0232	*	*	Female	Chinese	1
DD000010	CHE0214	*	*	Male	Chinese	1
DD000011	CAR2131	*	*	Male	White Irish	1
DD000012	WIL2134	*	*	Female	White British	1
DD000013	CNT9121	*	*	Female	White British	1
DD000014	TER0126	*	*	Male	White British	1
DD000015	ZHAN001	*	*	Male	Chinese	1
DD000016	MAR0112	*	*	Female	White British	1
DD000017	AND0121	*	*	Female	White British	1

Figure 2: Patient Search in Achiever Medical LIMS with encrypted PII shown as asterisks

4. Offers system, project, and study role-based permissions

Unlike many LIMS, Achiever Medical LIMS includes multi-layered permissions at system, project role, and study role level. This unique approach gives you greater control as well as delivering increased flexibility.

Using system roles, super users and IT users can grant users access to the menus, system areas, screens, workflows, and data sets needed to fulfil their role. Project and study-level permissions enable security officers and principal investigators to grant individual users access to specific projects and their associated data including authorising access to personally identifiable data. This is achieved by assigning users a specific role on a project and/or study which also determines the workflows that the user can carry out on the project/study data sets. As a result, the same user may be able to register new patients and samples on one study while having a read-only view on another.

5. Provides data searching and visualisation tools

Many LIMS offer reports and dashboards using external 3rd party applications and this is also available with Achiever Medical LIMS. However, Achiever Medical LIMS also offers integrated data visualisation and reporting tools that, importantly, honour all data security filters and permissions you have already set up within the LIMS. As a result, by default everyone sees only the information and reports for their permission level without you having to code the permissions into external reports and views.

Achiever Medical LIMS eliminates the need to export data to spreadsheets for analysis and reporting by providing dashboards, and comprehensive searching and data visualisation tools within a centralised system.

In addition, the LIMS dashboards enable analysis to be performed across multiple data sources (including spreadsheets) in one view. As a result, you do not need to transfer data between applications to get a complete view of your lab operations.

Filters are applied to data visualisations and searches so you can slice-and-dice the data and uncover patterns and trends.

Drilldowns are also available so you can access the raw data set and individual data records for greater in-depth analysis.

Dashboard visualisations and report summaries can be exported to PDF to create report packs for board meetings or, alternatively, authorised users can access the dashboards and reports directly within the LIMS themselves.

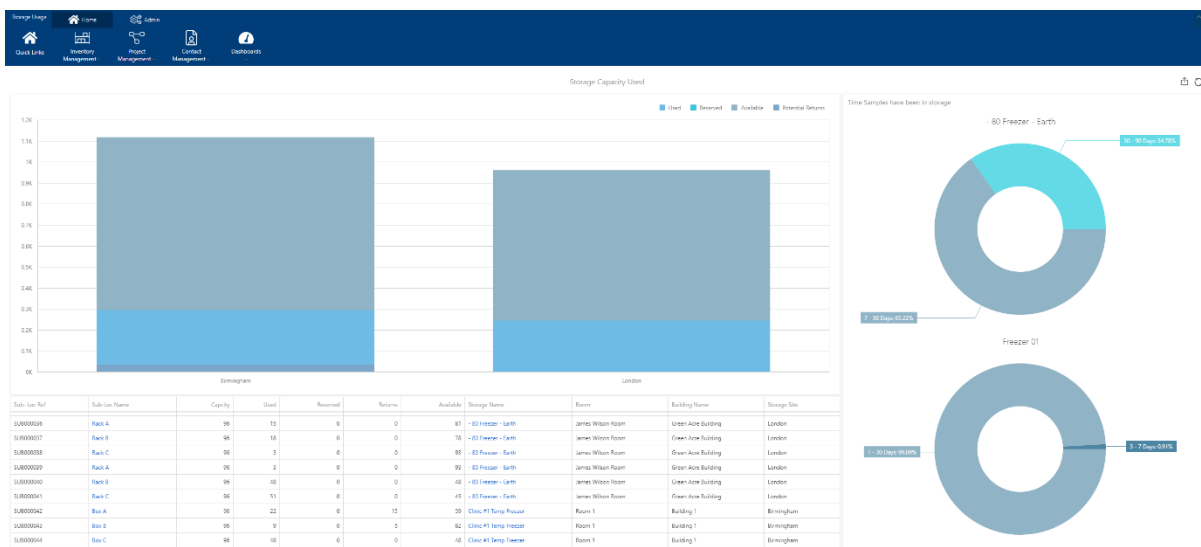


Figure 3: Storage Used Dashboard in Achiever Medical LIMS

6. Transfers data using SFTP, HTTPS and token-based integration methods

Achiever Medical LIMS consolidates information from disparate systems into one centralised solution including output files generated by instruments and equipment. Connectivity with other applications and instruments is supported by the LIMS through its API as well as its batch file import and manual bulk data import tools. This helps to reduce data duplication and errors caused by manual data manipulation and rekeying that in turn, results in increased lab productivity and efficiency.



Achiever Medical LIMS' API provides a secure, token-based access method. All requests to and responses from the API are encrypted with communication between the client and web server transmitted over a secure HTTPS connection which is encrypted using SSL/TLS.

In addition, the LIMS' batch file import supports Secure File Transfer Protocol (SFTP) which adds a further layer of security when transferring files between remote locations.

7. Web-based system deployed on-premise, private or public cloud and SaaS

Achiever Medical LIMS is a 100% HTML5 compliant, web-based application offering authorised users secure access to the system from anywhere through modern browsers such as Chrome and Edge.

Firstly, an accessible, web-based application negates the requirement to hold data locally on laptops and in spreadsheets. Secondly, leveraging modern web technologies that use up-to-date software frameworks and platforms enables the latest security patches to be deployed to the application's infrastructure to protect you from any newly identified risks and vulnerabilities.

When implementing a non-SaaS deployed Achiever Medical LIMS, it is recommended that an HTTPS-only policy is used to secure communication between the web server and clients with SSL certificates obtained from a trusted Certificate Authority (CA) installed on web servers for additional security.

Also, Achiever LIMS SaaS platform provider Microsoft Azure is constantly reviewing and updating its security services and systems to identify and warn of any potential threats to enable early intervention in the prevention of cyber-attacks.

Improving lab data security

Cybercrime is on the increase with hackers using increasingly sophisticated methods to exploit any vulnerabilities in your systems' security. Therefore, your first step in protecting your systems is to make sure you regularly apply the latest security patches for your systems and environment.

In addition, new software systems, and methods for safeguarding applications from falling victim to cybercrime are constantly being developed. In order to take advantage of these you need to be using compatible systems – which often means ensuring that you are using the latest technologies.

Achiever Medical LIMS is a modern, accessible, web-based solution that leverages security features provided through its supporting infrastructure.



Further, it connects with modern authentication solutions such as Azure Active Directory, PingFederate and multi-factor authentication to enable you to define login and password protocols as well as grant and revoke access.

Additional security features and tools within the application including project and study-role permissions and encryption of PII further augment the safeguarding of sensitive data from unauthorised access – including users and the IT team. Similarly, connectivity, data visualisation and reporting tools within the LIMS eliminate the need for users to create output files containing sensitive data which can become unsecure and uncontrolled.

Finally, Achiever Medical LIMS provides a consolidated, centralised solution which reduces the number of applications and systems you need to monitor and update. Helping you save time, resources and effort while improving security and enabling access to be controlled and managed centrally.

About Interactive Software Limited

For over 20 years Interactive Software Limited has been helping life science organisations implement successful software solutions that transform the way they work and deliver greater insight into their data. Achiever Medical Laboratory Information Management System (LIMS) is a modern, configurable web-based solution that centralises lab data and supports pre-clinical, clinical research, academic research and biorepository processes and compliance needs. Managing all sample life-cycle events, the LIMS gives complete traceability of all sample activities providing evidence for compliance and quality assurance.

Looking to protect your lab and sample data while still getting the most from it?

Get in touch to learn more about how Achiever Medical LIMS can help:

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Or visit www.interactivesoftware.co.uk to learn more.