Software Version 16

CentraLink
Data Management System

Standardize testing protocols and result management across your entire organization

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Healthineers

CentraLink® Data Management System provides powerful, easy-to-use rules writing; a comprehensive QC package; and the flexible connectivity needed to drive better operational and clinical outcomes.

- Increase your control with customized and standardized testing protocols, consistent result reviews and reporting, and proactive QC management.

- Simplify your workflow by automating processes, auto-verifying results to better utilize staff, and centralizing management across instruments, automation, sites, and networks.

- Reduce errors while sharpening your clinical focus with the details needed for the informed, accurate decisions that lead to better outcomes.

- Reduce costs and increase productivity, efficiency, and predictability by improving connectivity, visibility, and operational process management.

Proven Results

University of Michigan Hospital achieved:*

- 97% increase in volume to 8 million tests per year
- 73% reduction in errors—just seven errors, or <0.001% per month
- 43% improvement in TAT
- 92% autoverification of results

"The true benefit is in the back-end where results review takes place. That's where [the CentraLink system] has the most impact, by making more efficient use of our technologist staff."

Susan Dawson
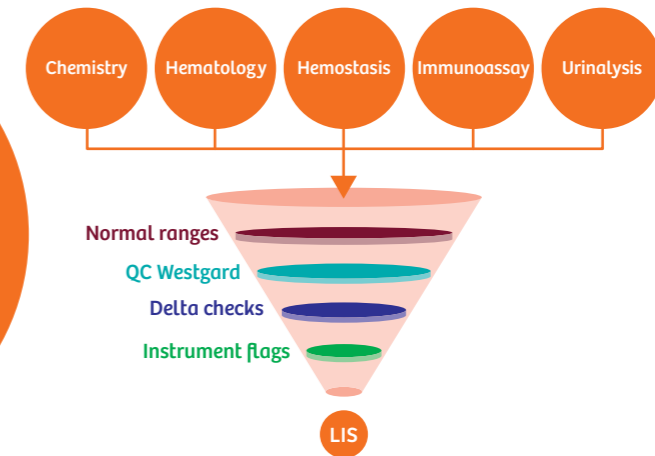*Clinical Lab Manager*
Swedish Covenant Hospital

*Over 8 years without adding staff or instrumentation. The outcomes achieved by the Siemens Healthineers customers described here were achieved in each customer's unique setting. Since there is no typical hospital, and many variables exist (e.g., hospital size, case mix, level of IT adoption), there can be no guarantee that others will achieve the same results.

Autoverification

Customized review processes automate manual tasks to reduce human error.

- Start quickly with rules wizard
- Apply review criteria consistently
- Flag clinically significant changes
- Use patient demographics in advanced diagnostic algorithms
- Hold results linked to a QC failure for manual review

Chemistry · Hematology · Hemostasis · Immunoassay · Urinalysis

Normal ranges
QC Westgard
Delta checks
Instrument flags

LIS

"It's a combination of these four features—customizable review ranges, delta checking, QC, and instrument flagging—that makes autoverification all the more powerful, and the way to make sure results pass all of the criteria you've established."

Susan Dawson

### In what ways can I tailor my review process?

It is easy to write rules to hold, flag, or release results in special or complex circumstances. For example, you may choose to perform delta checks (to spot clinically significant changes in measured values) for both absolute and percentage values.

Integrated Quality Control

Monitor QC continuously and proactively.

- View QC and patient results simultaneously
- Find test results between two failed QC points in two clicks and easily locate samples
- Monitor patient moving averages to identify and troubleshoot system errors
- Upload real-time QC results to Bio-Rad UNITY program
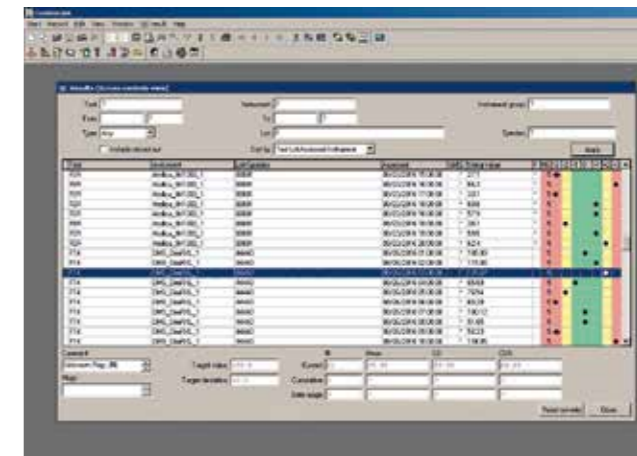
"There are lots of auto-verification systems out there, but QC is not always part of middleware and therefore is done manually. At our lab, QC is an integral part of middleware. If the last QC result is out of range, the autoverification of that test stops—right there. It provides QC compliance to the fullest."

Susan Dawson

In stand-alone environments, the system alerts the operator that a result needs review and prevents it from being uploaded to the LIS. When used with Aptio® Automation or the VersaCell® X3 Solution, the system can deactivate the questionable assay on the instrument to prevent further testing and automatically reroute samples to another instrument for the required test. If no other instrument is available to perform that test, the sample will be held until the QC issues are resolved.

Workflow Management

Obtain centralized access to clinical chemistry, immunoassay, hematology, hemostasis, and urinalysis testing.

- Automate results
- Apply autodilution cascades to save time and reagents
- Define rules according to patient demographics
- Implement advanced diagnostic algorithms to drive reflex testing, reruns, delta checks, instrument flags, and QC

HBsAgII Assay Algorithm

Initial Singleton Test Result

<1.0 Index Value → Report Nonreactive

Above Threshold >50 Index Value → Report Reactive — **Hot Zone**

SMART Algorithm

≥1.0 to ≤50.0 Index Value

<1.0 Index Value → Report Nonreactive

Repeat in Duplicate

1 or 2 ≥1.0 Index Value → Automated Confirmatory
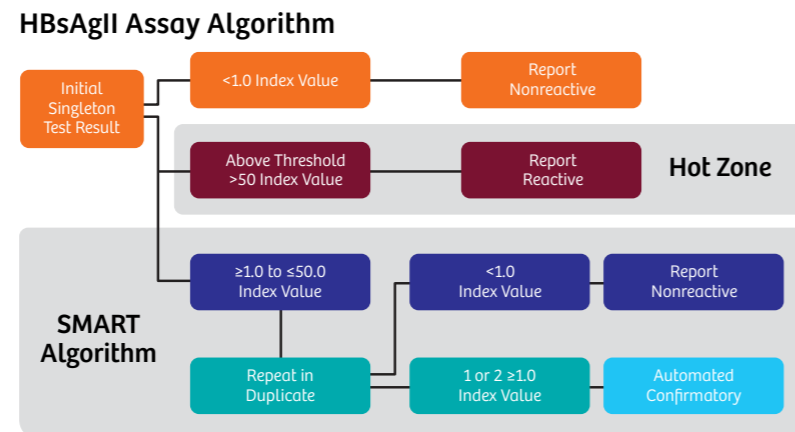
Flexible rules can help manage complex ID algorithms to intelligently guide workflow.

How can I save time and money by using rules to process test orders with no technologist intervention?

Automate your lab's standard operating procedures using our library of more than 900 customizable rules to leverage best practices derived from more than 1500 installations. In the example, the CentraLink system follows a complex algorithm to generate any necessary repeat-test orders and selects the appropriate interpretation for reporting. Siemens Healthineers can also help you craft rules for processes not yet included in our continuously expanding library.

iExpert Support

Standardize handling of flagged results by guiding your staff to lab-defined next steps for advanced decision support.

- Access iExpert with one click
- Customize rules and instructions for next steps
- Help ensure adherence to lab processes
- Bring consistency to result interpretation

Example of Contamination with IV Fluid				
Test	Results		Reference Interval	Units
	Yesterday	Today		
Sodium	131	108	135–145	mmol/M
Potassium	4.0	3.0	3.5–5.0	mmol/M
Chloride	87	73	98–110	mmol/M
Bicarbonate	26	23	22–32	mmol/M
Urea	44.8	38.4	10–20	mg/dL
Creatinine	1.5	1.3	0.7–1.3	mg/dL
Glucose	108	149	65–110	mg/dL
Protein	7.9	6.1	6.0–8.0	g/dL
Albumin	3.6	2.8	3.5–5.0	g/dL

The results being reviewed reveal high calcium together with increased values for chloride and sodium. Because this suggests the possibility that the sample may have been contaminated by IV fluid, an iExpert prompt appears to remind reviewers to add an appropriate comment to the record when the results are released.

How can data-management software help me address challenges related to staffing?

By digitizing lab process instructions that are result context-sensitive, the iExpert feature enables you to confidently assign personnel, even new hires, to unfamiliar work areas. It delivers one-click access to next steps or suggestions to guide employees through your lab's preferred process. For example, when results are returned with impossible inter-assay relationships (e.g., the measured value of albumin exceeds the measured value of total protein), an iExpert script could prompt the reviewer to note the inconsistency and rerun the test.

Real-time Dashboard

Monitor overall sample status and up to 16 customized KPIs.

- Highlight items in need of attention
- Add visual cues to indicate severity
- Prompt for immediate action
- Customize to specific roles
- Provide reassurance when operations are running smoothly

"The software is robust and user-friendly. The operator can evaluate and validate results, review data about the test, test reruns, patient information, quality controls, instrument alarms, and more—with most of the information consolidated onto a single page."

Dr. Davide Giavarina, Vicenza Laboratory, Director

Is the dashboard specific to my laboratory?

Customize the dashboard to display metrics for laboratory-defined critical tests. In the example, a troponin test pending for more than 20 minutes is flagged along with a pending STAT request for an HIV test.

Education and Customer Care

Multidimensional training and technical services support you well beyond the initial installation.

- On-site technical support and training is provided during implementation
- Consulting services are available for customized solutions
- Online education courses simplify ongoing staff training
- One point of contact simplifies communication

Siemens Remote Service technical support engineers configure the system, respond to questions, and show laboratory personnel how to achieve desired outcomes without the delays of travel for on-site service. Many services, updates, and even immediate repairs can now be performed remotely.

Will support be available after the initial implementation of my CentraLink Data Management System?

Change is constant—you merge locations, acquire new analyzers, expand your menu, and hire new employees—and your operations hinge on the performance of your middleware. You count on us for on-site and remote technical support to keep you up and running, innovative approaches to staff training, and professional consulting to guide you toward best practices that continually improve your productivity and quality.

Automation

Enhance the performance of Aptio Automation and VersaCell X3 Solution to further reduce the number of steps from accession to test results.

Add-on Test Procedure Comparison

Manual Add-on	CentraLink Automated Add-on
Phone – Worksheet Alert	Work Order
Review Sample Information Viable? (Yes/No)	Sample Viable? (Yes/No)
Request New Sample Find Sample	Retrieve Sample or Request New Sample
Deliver Sample to Instrument	Sufficient Sample
Result	Result

22 Minutes

● User Input

- Can be used with Aptio Automation or VersaCell X3 Solution
- Algorithm-driven testing
- Result- and QC-based workflows
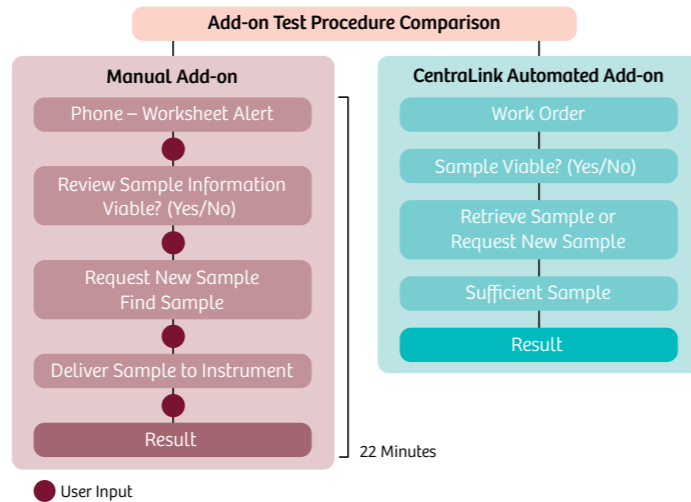
How can I manage add-on orders to improve patient safety and reduce waste?

When CentraLink software is part of an Aptio Automation or VersaCell X3 Solution, manual steps can be performed automatically for greater efficiency. A good example is an add-on test for glucose. The system can be configured to prevent the test from being run if the time between sample collection and centrifugation exceeds a preset limit. This avoids generation of results that may not be valid.

Hematology

Advanced hematology module supports paperless workflow and reduces manual steps.

- Access hematology functions with one click
- Attach images to samples with CellaVision® system
- View patient and sample run history on same screen
- Access user-configurable instructions with one click
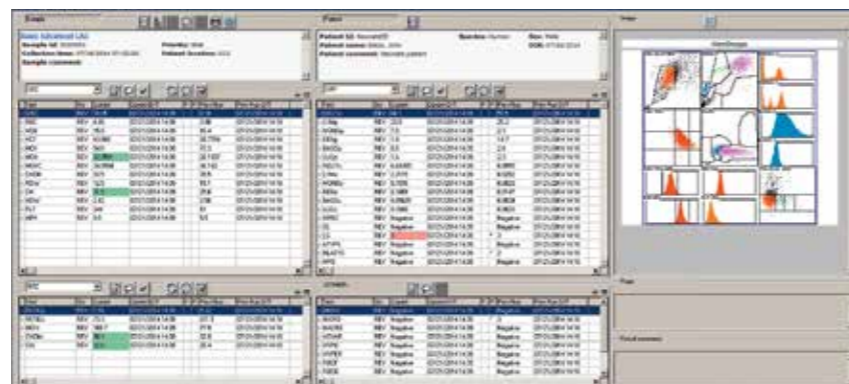
Based on initial results and your laboratory criteria, the CentraLink system will determine if a peripheral blood smear is required, allowing you to prepare a slide while the sample is still on the hematology analyzer or Aptio Automation track.

What can we expect for improved efficiency?

The advanced hematology module consolidates results and images. It provides a holistic view of patients from a single screen, improving efficiency by reducing manual tasks and associated errors.

CentraLink Data Management System, Version 16 Technical Specifications

Configuration	
Users	Unlimited users†
Instruments	Up to 75 devices or up to 150,000 tests per hour

Communication	
Connections	• Multiple LIS connections • Multiple Aptio Automation connections‡
Protocols	ASTM, Spec 79, HL7, LMX

Supported Instrument Interfaces	

In addition to supporting data management for the following instruments (available from Siemens Healthineers), the CentraLink system supports connectivity to analyzers manufactured by Abbott, bioMérieux, Diagnostica Stago Inc., DiaSorin, Dynex Technologies, Inova Diagnostics, Instrument Laboratories, Sebia, Sysmex, Thermo Fisher Scientific, Tosoh Bioscience, and Trinity Biotech. New instrument interfaces are being added frequently.

Please visit **siemens.com/centralink-connectivity** for a current list. Availability of all products varies by country. Ask your local Siemens Healthineers representative for a list of instruments available in your local market.

Automation	Aptio Automation,§ ADVIA® Automation,§ VersaCell System, VersaCell X3 Solution
Immunoassay	ADVIA Centaur® XPT Immunoassay System ADVIA Centaur XP Immunoassay System ADVIA Centaur CP Immunoassay System Atellica® IM 1300 Anayzer Atellica IM 1600 Analyzer IMMULITE® 1000 Immunoassay System IMMULITE 2000 Immunoassay System IMMULITE 2000 XPi Immunoassay System
Chemistry	ADVIA® Chemistry XPT System ADVIA 1800 Chemistry System ADVIA 2400 Chemistry System Atellica® CH 930 Analyzer
Urinalysis	CLINITEK Atlas® Urine Chemistry Analyzer CLINITEK Novus® Automated Urine Chemistry Analyzer
Integrated Systems	Atellica® Solution Dimension Vista® 500 System Dimension Vista 1500 System Dimension® RxL Max® Integrated Chemistry System Dimension Xpand® Plus Integrated Chemistry System Dimension EXL™ 200 Integrated Chemistry System Dimension EXL with LM system
Hematology	ADVIA® 120 Hematology System ADVIA 560 System ADVIA 560 AL System ADVIA 2120 Hematology System** ADVIA 2120i Hematology System ADVIA 2120i Hematology System with Autoslide CellaVision® DM96 Digital Cell Morphology System CellaVision DM1200 Digital Cell Morphology System CellaVision DM9600 Digital Cell Morphology System
Molecular	VERSANT® 440 Molecular System**
Hemostasis	Atellica® COAG 360 System†† BCS® XP System Sysmex® CS-2000i System†† Sysmex CS-2100i System†† Sysmex CS-2500 System Sysmex CS-5100 System
Plasma Proteins	BN™ II System BN ProSpec® System

Review/Edit	Review by Exception
Customizable Review	• Range (definable by age, sex, species, location, etc.) • Delta checking (percentage and absolute basis) • QC violations • Instrument flags
Dispositioning Options	• Results entry and validation • Rerunning, omitting, or editing results • Manually entering differential results • Adding comments to results
Display Options	• Order of results • Viewing hematology graphics • Color designations for exception management and sample prioritization

Quality Control	
Capabilities	• By method, instrument, species, lot, or moving average • Data display as results or Levey-Jennings plots • Westgard rules (1-2s, 1-3s, 10-x, 2-2s, 4-1s, R-4s) • Add comments during review • Support for using comparators (<,>) • Support for qualitative results • Omit data from statistical calculations • Configurable interval for automatic QC exports • Real-time upload to Bio-Rad UNITY solutions • QC lot auto-creation • Ability to find all patient results between QC runs • Customizable QC report

Search/Query	
Search by	• Sample ID • Physician name or ID • Patient name or ID • Instrument or instrument group, test, or sample status • Location • Date and time • Lab-specific commonly used queries via user-defined buttons • User-definable queries

Security	
Capabilities and Features	• Set multiple standard and user-defined access levels • Define menu options for each access level • MCAFEE Antivirus Enterprise Version 8.5i and higher • CentraLink system standard IT security configurations • MICROSOFT security updates • Support for strong passwords

Other Features	
Operating System	MICROSOFT WINDOWS 2008 Server
User Interface	Standard WINDOWS navigation via drop-down menus and icons
Order Entry	Simplified order entry for LIS backup
Multilanguage Support	Configurable language preferences for each connected workstation (English, French, Italian, German, Spanish)
Reporting	Custom report formats for headers, footers, column headings, and test display order
Data Storage	Up to 2,250,000 patient samples and 2,250,000 QC records

†15 concurrent user sessions.
‡May vary depending on configuration.
§Connectivity to third-party analyzers may not be available in all countries.
**No longer available for sale.
††Not available for sale in the U.S.