

On a quest for a new LIS? Research, research, research

Raymond Aller, MD

Don't be foolhardy and fall for flashy features and functions when shopping for a laboratory information system. Focus instead on satisfaction: Will I be satisfied with the support I receive from the LIS vendor? Can I be fairly certain that the LIS will fit with my business plan?

You can add functions and features later or adapt capabilities that are already in your LIS. Database platform and operating environment as well should not be selection criteria.

Likewise, avoid vendors offering splashy demonstrations and grand promises. A few years ago, a medical group on the West Coast selected a system based on an impressive demonstration, a persuasive sales force, promises of modern software and database architecture, and claims that the system was operating smoothly in several organizations. Unfortunately, no one in the medical group called system users to ask probing questions. The group subsequently signed a contract for the system and then, over the next two years, came to the conclusion that

the software was vaporware. The group ended up pouring several million dollars down the drain and, in the process, severely disillusioned or alienated its partner organizations and clients.

This example illustrates the need to ask a prospective vendor for a *complete* list of clients and their telephone numbers. If the vendor won't comply because of confidentiality issues or for other reasons, then don't use that company. Once a vendor provides you with a client list, call several of those organizations, where feasible focusing on those clients that most closely match the size and complexity of your lab. Ask the vendor's clients if the company responds to phone calls promptly and addresses problems in a reasonable time frame. Recognize, however, that every vendor probably has a few dissatisfied clients, so don't dismiss a vendor based solely on a few negative comments. Weigh those comments against positive feedback about the vendor.

To address the recurrent question, How do I know if a vendor gears most of its business to large or small laboratories? CAP TODAY added new questions to its 2006 LIS lineup on pages 26

to 62. One such question asks vendors if they market primarily to high- or low-volume labs. (The definitions of high- and low-volume are provided at the bottom of each survey page.) Similarly, the survey asks how many billed tests the vendor's installations generate annually. Combined, these questions can help a laboratory quickly hone in on those vendors most likely to meet its needs.

CAP TODAY also asked vendors how many contracts were signed and went live during a recent 12-month period. Responses to this question can indicate whether a vendor is actively marketing its LIS or primarily focusing on its existing customer base.

The data presented on the following pages are based entirely on vendors' responses to a written questionnaire. We urge readers to verify the information provided before purchasing a system.

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Assessing an LIS

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attached instruments. Data retention on data managers and legacy systems is much shorter than on a modern LIS, which may preserve clinical lab results for several years.

Before deciding whether to purchase an LIS with a rules engine versus middleware with rules, consider the following:

- ◆ Does the middleware application require additional hardware and interfaces to function with the existing LIS?
- ◆ Can the rules engine middleware application access the history of the patient or the master patient index?

- ◆ Can auto-verification access all instrument results and patient diagnoses?

◆ **Brian Keefe, MT(ASCP)** (*Psyche Systems Corp.*): Rules and algorithms should be standard functionality in any LIS. However, if a laboratory must use a system that lacks this functionality, third-party software can fill the gaps.



Keefe

It's important to consider the third-party vendor's experience working with many different types of LISs to ensure that data can be transferred properly between the

systems. When using third-party software, data must reside in two places to apply rules to various parameters recorded in the LIS. For this reason, data integrity could become an issue if the systems aren't working together properly.

Additionally, many rules engines cannot access data once they've released it, which can also make it difficult to run algorithms on such information as historical patient data. When selecting a rules engine, the laboratory must note how much data redundancy is needed between the third-party software and the LIS to run various rules and algorithms. Also important is whether the software is user friendly or if it requires some technical proficiency to create a new algorithm.

◆ **J.P. Fingado** (*Cerner Corp.*): The seamless integration of a rules engine with the LIS provides greater flexibility and promotes increased quality of care and patient safety. Attempting to use middleware from a third-party supplier rather than the LIS vendor will result in the need for complex interfaces, which will increase support costs and limit capabilities as compared with an integrated solution.

An integrated rules engine achieves greater benefits because it offers a more complete laboratory record for automated assessment, whereas middleware has a narrower view. Where the LIS and rules engine share a unified platform with the patient electronic medical record, the scope of clinical data available to the rules engine far exceeds that available to middleware solutions. The middleware can contribute highly sophisticated analytical data but often cannot "see" the patient's full status, thereby limiting the effectiveness of the rules.

- ◆ **Jay Abrajano, CLS, MT(ASCP)**

(*Aspyra*): Increased use of auto-verification and goals to improve efficiency and reduce errors have made rules a necessity. Laboratories should ascertain if the rules engine handles the rules that are needed and whether they are flexible, scalable, and easy to modify and activate. Advantages of using rules within the LIS are that



Abrajano

they are already in the system and linked to additional result review/release functionality. Some of these features include critical/abnormal call reporting alerts, tracking/monitoring reports, date/time/technologist stamps for all actions available for historical inquiries within one system, and result comments usually entered in the LIS.

Middleware vendors designed rules and reports for review/release of instrument results. However, LIS vendors have increased their focus in this area and incorporated much of this functionality and flexibility into their applications.

Regardless of whether you are leaning toward an LIS or middleware vendor, you should research interface, implementation, and maintenance processes and costs for each. Note that with the development of rules in LISs, vendors have adjusted interface pricing to be more attractive.

In evaluating middleware, laboratories should research their true rules requirements and those already available in their LIS. Furthermore, they should consider any functional losses within the LIS in terms of their current result review standard operating procedures. □

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Laboratory information systems

Part 1 of 18 See accompanying articles on pages 18 and 24	Antek HealthWare Paul Taylor ptaylor@antekhealthware.com 228 Business Center Drive, Reisterstown, MD 21136 410-517-0330/800-359-0911 www.antekhealthware.com; www.labdaq.com	Aspyra (formerly CCA) Bill Blair sales@aspyra.com 26115-A Mureau Rd. Calabasas, CA 91302-3128 800-437-9000 www.aspyra.com
Name of system	LabDaq	CyberLab
First ever LIS installation/most recent installation	1991/2006	1982/2006
No. of contracts for sites operating LIS	1,901	178
• Hospital/independent lab contracts in U.S.	214/259	85/34
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	1,412/6	43/1
• Other contracted U.S. sites/contracts for foreign sites	0/10	10/5
• Contracts that went live between Sept. 2005–Aug. 2006	171	1
Contracts signed but LIS not operational (hospitals/independent labs/others)	11(2/0/9)	2(1/0/1)
• Contracts signed between Sept. 2005–Aug. 2006	11	2
No. of sites operating LIS	2,129	425+
• Percentage of high-volume* sites installed	15%	30%
• Percentage of low-volume** sites installed	85%	70%
Staff to develop/install and support/other*** in entire firm	12/36/25	30/50/45
Staff to develop/install and support/other*** in LIS division	10/30/23	15/30/20
No. of terminals/workstations in sites operating LIS	1–80+ (average, 6–7)	3–250 (average, 50)
No. of billed tests generated annually by LIS	n/a	15,000–4,000,000 (mean, 650,000; median, 550,000)
• Central hardware or service type	Intel	HP, IBM
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	Antek	PC workstations, thin client
Software		
• Programming language(s)	Delphi, C++, ASP.Net	C, C++, Cobol, Java, HTML
• Operating system(s)	Windows 2000, XP Pro, 2003, Vista	Unix/AIX, Windows
• Databases and tools used	Oracle, Advantage	Oracle, MS SQL
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	48%	80%
• Handheld devices for bedside-positive patient ID	available but not installed	5%
• NCCLS POCT-1A standard interface for POCT devices	available but not installed	15%
• Microbiology	12%	100%
• Blood bank donor and transfusion	not available	15%
• Surgical pathology/cytology	not available	10%/90%
• HIS or EMR interface: A/D/T	30%	75%
• HIS or EMR interface: order entry	15%	60%
• HIS or EMR interface: results reporting	30%	70%
• HIS or EMR interface: package results into PDF format	40%	5%
• Ad hoc reporting	100%	100%
• Rules-based system	100%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	15%	100%
• Compliance checking	19%	100%
• Billing and accounts receivable	10%	0
• Materials management and inventory	not available	not available
• Test partition/remote faxing and printing	20%/36%	100%/100%
• Physician office outreach	15%	45%
• HIPAA-standard transaction formats	100%	not available
• Web-based remote inquiry of reports/Web access for order entry	15%/7%	50%/40%
• Specimen management and tracking	100%	available in 2007
Complete LIS application service provider solution?	no	no
ASP for physician order entry and results reporting?	yes	no
Method of charging for ASP service	fixed fee	n/a
Client software required	browser based	n/a
ASP information conduit	operates over the Internet	n/a
Client contracts supported from data center not operated by client	123	n/a
How data center is operated	by vendor	n/a
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	available but not installed	available but not installed
• Other reportable diseases	available but not installed	3 sites
• Tumor diagnosis or registry data	available but not installed	1 site
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	no/no	no/no
Hospital/integrated health care systems interfaced	Misys, Cerner, McKesson, CPSI, Dairyland, APS, Siemens	McKesson, IDX, Siemens, QuadraMed, CPSI, Meditech, Keane, Misys, others
Physician office management systems interfaced	Medical Manager, Allscripts, NextGen, A4, VitalWorks, Versys, Pulse, PMSI, MegaWest, others	Allscripts, Telcor, NextGen, VitalWorks, Medical Manager, Medic, Practice Partners, others
Automated lab transportation systems interfaced	planned	available but not yet operational to Beckman Coulter, Tecan, Roche/BMC/Hitachi, Oasis
Validation/testing tools provided?	yes (proprietary)	yes (release notes with test protocols specific to each update)
LIS allows for third-party updates of tables and rules?	yes (Quest, LabCorp, CodeMap)	yes (via HL7 interface)
LIS permits use of voice input technology?	yes	yes (for CyberPath module)
LIS allows for image capture and display?	yes	yes (for CyberPath module)
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	yes	yes (for CyberPath module)
Market modules for other hospital departments?	no	yes
• Percentage of LIS installations stand-alone	—	70%
No. of different lab instruments interfaced with LIS	425	400+
Source code?/User group that meets regularly?	escrow/yes	escrow/yes
User can modify screens?	no (offer custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL	SQL
Smallest cost for hardware/software/monthly maintenance	\$1.7k/\$5.3k/\$0.6k	—
Largest cost for hardware/software/monthly maintenance	\$40k/\$108k/\$1.5k	—
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> intuitive software flexible and scalable outstanding customer support 	<ul style="list-style-type: none"> platform and database independence comprehensive rules-based decision tools and alerts native browser-based technology

*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day
 **generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day
 ***other=sales, marketing, administration, and other company functions
 ****via a computer-to-computer interface

Laboratory information systems

Part 2 of 18	Cerner Corp. Jeff Sluder jeff.sluder@cerner.com 2800 Rockcreek Parkway Kansas City, MO 64117 816-201-7072 www.cerner.com	Cerner Corp. Jeff Sluder jeff.sluder@cerner.com 2800 Rockcreek Parkway Kansas City, MO 64117 816-201-7072 www.cerner.com
See accompanying articles on pages 18 and 24		
Name of system	Cerner Millennium PathNet	Cerner PathNet HNA Classic
First ever LIS installation/most recent installation	1982/2006	1982/—
No. of contracts for sites operating LIS	164	261
• Hospital/independent lab contracts in U.S.	135/3	229/6
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	4/3	0
• Other contracted U.S. sites/contracts for foreign sites	3/16	0/26
• Contracts that went live between Sept. 2005–Aug. 2006	29	—
Contracts signed but LIS not operational (hospitals/independent labs/others)	59	—
• Contracts signed between Sept. 2005–Aug. 2006	51	—
No. of sites operating LIS	386	420
• Percentage of high-volume* sites installed	—	—
• Percentage of low-volume** sites installed	—	—
Staff to develop/install and support/other*** in entire firm	1,381/1,910/3,749	1,381/1,910/3,749
Staff to develop/install and support/other*** in LIS division	73/118/39	73/118/39
No. of terminals/workstations in sites operating LIS	7–600	7–500+
No. of billed tests generated annually by LIS	—	—
• Central hardware or service type	HP Compaq, IBM RS/6000	HP Compaq, IBM RS/6000
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	Intel Pentium PCs	Intel Pentium PCs
Software		
• Programming language(s)	Visual C++, Visual Basic, Java	Cobol C++
• Operating system(s)	Open VMS, AIX, Windows, Windows NT	Open VMS
• Databases and tools used	Oracle	proprietary
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	5%	5%
• NCCLS POCT-1A standard interface for POCT devices	available	—
• Microbiology	90%	90%
• Blood bank donor and transfusion	60%	—
• Surgical pathology/cytology	65%/50%	65%/50%
• HIS or EMR interface: A/D/T	80%	98%
• HIS or EMR interface: order entry	60%	90%
• HIS or EMR interface: results reporting	60%	90%
• HIS or EMR interface: package results into PDF format	—	—
• Ad hoc reporting	100%	100%
• Rules-based system	100%	100%
• Management and statistical reporting	10%	10%
• Outreach and commercial laboratory	25%	25%
• Compliance checking	15%	15%
• Billing and accounts receivable	available	available
• Materials management and inventory	available	available
• Test partition/remote faxing and printing	100%/100%	100%/100%
• Physician office outreach	5%	5%
• HIPAA-standard transaction formats	available	via third party
• Web-based remote inquiry of reports/Web access for order entry	5%/5%	5%/5%
• Specimen management and tracking	90%	90%
Complete LIS application service provider solution?	yes	yes
ASP for physician order entry and results reporting?	yes	yes
Method of charging for ASP service	fixed fee	fixed fee
Client software required	requires software be installed on a client PC	requires software be installed on a client PC
ASP information conduit	requires use of private, dedicated circuit	requires use of private, dedicated circuit
Client contracts supported from data center not operated by client	100+	100+
How data center is operated	by vendor	by vendor
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	100% of sites	100% of sites
• Other reportable diseases	>50% of sites	50% of sites
• Tumor diagnosis or registry data	1 site	1 site
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	no/no	no/no
Hospital/integrated health care systems interfaced	—	—
Physician office management systems interfaced	—	—
Automated lab transportation systems interfaced	Beckman Coulter, Sysmex, Tecan, Roche/BMC/Hitachi	Beckman Coulter, Sysmex, Tecan, Roche/BMC/Hitachi
Validation/testing tools provided?	yes	yes
LIS allows for third-party updates of tables and rules?	yes	yes
LIS permits use of voice input technology?	yes	yes
LIS allows for image capture and display?	yes	yes
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	yes	yes
Market modules for other hospital departments?	yes	yes
• Percentage of LIS installations stand-alone	75%	75%
No. of different lab instruments interfaced with LIS	400	400
Source code?/User group that meets regularly?	escrow/yes (meets online as well)	escrow/yes (meets online as well)
User can modify screens?	yes (offer user-defined report writer, custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL, Discern Explorer	Discern Explorer
Smallest cost for hardware/software/monthly maintenance	—	—
Largest cost for hardware/software/monthly maintenance	—	—
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • complete, comprehensive, totally integrated solution • 25 years' experience in the LIS industry • continued innovations in LIS, such as molecular diagnostics and laboratory outreach 	<ul style="list-style-type: none"> • complete, comprehensive, totally integrated solution • 25 years' experience in the LIS industry • continued innovations in LIS, such as molecular diagnostics, synoptic reporting, and laboratory outreach
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

Tabulation does not represent an endorsement by the College of American Pathologists.

Laboratory information systems

Part 3 of 18 See accompanying articles on pages 18 and 24	Clinical Information Systems Angela Woolley cissupport@aol.com 18805 Willamette Drive West Linn, OR 97068 800-869-0680	Clinical Software Solutions Elaine Nordhues enordhues@qwest.net 20940 E. Mewes Rd. Queen Creek, AZ 85242 480-888-9447/800-570-0474
Name of system	CisLab	CSS Win
First ever LIS installation/most recent installation	1981/2006	1987/2006
No. of contracts for sites operating LIS	53	210+
• Hospital/independent lab contracts in U.S.	4/44	50+/150+
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	2/1	10/0
• Other contracted U.S. sites/contracts for foreign sites	1/1	2/0
• Contracts that went live between Sept. 2005–Aug. 2006	2	—
Contracts signed but LIS not operational (hospitals/independent labs/others)	2 (0/2/0)	6 (6/0/0)
• Contracts signed between Sept. 2005–Aug. 2006	2	6
No. of sites operating LIS	53	200+
• Percentage of high-volume* sites installed	98%	—
• Percentage of low-volume** sites installed	2%	—
Staff to develop/install and support/other*** in entire firm	6 total	2/3/2
Staff to develop/install and support/other*** in LIS division	—	—
No. of terminals/workstations in sites operating LIS	1–170 (average, 25)	1–45+ (average, 4)
No. of billed tests generated annually by LIS	182,000–1,000,000+	—
• Central hardware or service type	generic PC, HP, Dell, Compaq	Dell, IBM compatible
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	CTL, Wyse, Link, PCs, Dell, HP	Dell
Software		
• Programming language(s)	Delphi, C++, Visual Basic, Cobol	4GL
• Operating system(s)	Windows, SCO Unix	Windows
• Databases and tools used	MS SQL 7, C-ISAM, RDBMS, Interbase	SQL
• System includes full transaction logging?	no	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	95%	95%
• Bar-coded collection labels	95%	50%
• Handheld devices for bedside-positive patient ID	0	5%
• NCCLS POCT-1A standard interface for POCT devices	0	—
• Microbiology	95%	50%
• Blood bank donor and transfusion	15%	—
• Surgical pathology/cytology	15%/50%	—
• HIS or EMR interface: A/D/T	10%	60%
• HIS or EMR interface: order entry	10%	75%
• HIS or EMR interface: results reporting	20%	75%
• HIS or EMR interface: package results into PDF format	10%	75%
• Ad hoc reporting	0	50%
• Rules-based system	0	95%
• Management and statistical reporting	50%	90%
• Outreach and commercial laboratory	90%	25%
• Compliance checking	95%	95%
• Billing and accounts receivable	95%	50%
• Materials management and inventory	5%	20%
• Test partition/remote faxing and printing	100%/100%	100%/60%
• Physician office outreach	95%	50%
• HIPAA-standard transaction formats	100%	100%
• Web-based remote inquiry of reports/Web access for order entry	95%/80%	25%/25%
• Specimen management and tracking	10%	95%
Complete LIS application service provider solution?	yes	no
ASP for physician order entry and results reporting?	yes	yes
Method of charging for ASP service	fixed fee	fixed fee
Client software required	browser based, requires software be installed on a client PC	browser based, requires software be installed on a client PC
ASP information conduit	operates over the Internet	operates over the Internet, requires use of a private, dedicated circuit
Client contracts supported from data center not operated by client	100%	0
How data center is operated	by vendor	—
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	4 sites	3 sites
• Other reportable diseases	4 sites	available but not installed
• Tumor diagnosis or registry data	4 sites	available but not installed
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	yes/yes	yes/yes
Hospital/integrated health care systems interfaced	McKesson, Dairyland, PCS, ADT, Tower, CPSI, Sun	Siemens, Dairyland, Misys, LabCorp, Pearl, other HL7-compliant systems
Physician office management systems interfaced	Medical Manager, MediSoft/MediNotes, A4, custom, others	Medical Manager, Logician, other HL7/ASTM-compliant systems, ASCII import/export capable
Automated lab transportation systems interfaced	Beckman Coulter, Sysmex, Bayer, Roche/Hitachi	no
Validation/testing tools provided?	yes (customized by lab)	yes (proprietary)
LIS allows for third-party updates of tables and rules?	no	no
LIS permits use of voice input technology?	yes (DragonSpeak)	no
LIS allows for image capture and display?	yes	yes
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	yes	yes
Market modules for other hospital departments?	no	yes
• Percentage of LIS installations stand-alone	—	25%
No. of different lab instruments interfaced with LIS	200+	300+
Source code?/User group that meets regularly?	escrow/no	no/no (meets online)
User can modify screens?	no (offer user-defined report writer, custom programming)	no (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL	SQL, MS Access, Crystal Reports, other ODBC-compliant reporting tools
Smallest cost for hardware/software/monthly maintenance	\$5k/\$7.5k/\$0.4k	—/\$10k+/percent of total
Largest cost for hardware/software/monthly maintenance	\$100k/\$150k/\$0.75k	—/\$100k+/percent of total
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • willingness to customize • economical purchase of high quality • user friendly 	<ul style="list-style-type: none"> • versatile for any size facility, including multi-site facilities • fully integrated with other departments and systems • Web access and customization available

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 **generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day
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 ****via a computer-to-computer interface

Laboratory information systems

Part 4 of 18 See accompanying articles on pages 18 and 24	ClinLab Rick Ballester sales@clinlabinc.com 2411 E. Graves Ave., Ste. 1 Orange City, FL 32763 800-487-5227 www.clinlabinc.com	Comp Pro Med Andy McLean amclean@comppromed.com 3430 Medocino Ave. Santa Rosa, CA 95403 800-276-4522 www.comppromed.com
Name of system	ClinLab LIS	Polytech LIS
First ever LIS installation/most recent installation	1987/2006	1981/2006
No. of contracts for sites operating LIS	48	68
• Hospital/independent lab contracts in U.S.	5/12	10/11
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	20/0	38/0
• Other contracted U.S. sites/contracts for foreign sites	10/1	6/3 [†]
• Contracts that went live between Sept. 2005–Aug. 2006	4	12
Contracts signed but LIS not operational (hospitals/independent labs/others)	1 (0/1/0)	3 (1/0/2 ^{††})
• Contracts signed between Sept. 2005–Aug. 2006	1	11
No. of sites operating LIS	48	88
• Percentage of high-volume* sites installed	12%	—
• Percentage of low-volume** sites installed	88%	—
Staff to develop/install and support/other*** in entire firm	4/6/0	3/3/5
Staff to develop/install and support/other*** in LIS division	—	—
No. of terminals/workstations in sites operating LIS	2–70 (average, 10)	1–38 (average, 8)
No. of billed tests generated annually by LIS	—	30,000–1,100,000 (mean, 275,000; median, 520,000)
• Central hardware or service type	Dell	any—user supplied
• Central hardware redundant/fault-tolerant?	yes	n/a
• Terminals/workstations or PC platform	Dell	n/a
Software		
• Programming language(s)	Delphi, Visual FoxPro, Clipper	C
• Operating system(s)	Windows, Novell	Windows XP, NT, 2000
• Databases and tools used	Advantage DB server, dBase, FoxPro	Pervasive
• System includes full transaction logging?	no	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	available but not installed	available but not installed
• NCCLS POCT-1A standard interface for POCT devices	available but not installed	available but not installed
• Microbiology	100%	13%
• Blood bank donor and transfusion	not available	not available
• Surgical pathology/cytology	available but not installed	not available
• HIS or EMR interface: A/D/T	90%	68%
• HIS or EMR interface: order entry	70%	35%
• HIS or EMR interface: results reporting	70%	45%
• HIS or EMR interface: package results into PDF format	installed	not available
• Ad hoc reporting	100%	100%
• Rules-based system	50%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	40%	18%
• Compliance checking	100%	100%
• Billing and accounts receivable	available but not installed	63%
• Materials management and inventory	not available	not available
• Test partition/remote faxing and printing	100%/100%	100%/95%+
• Physician office outreach	40%	23%
• HIPAA-standard transaction formats	not available	not available
• Web-based remote inquiry of reports/Web access for order entry	40%/40%	28%/25%
• Specimen management and tracking	installed	20%
Complete LIS application service provider solution?	yes	no
ASP for physician order entry and results reporting?	yes	yes
Method of charging for ASP service	fixed fee	fixed fee
Client software required	requires software be installed on a client PC	requires software be installed on a client PC
ASP information conduit	operates over the Internet	operates over the Internet
Client contracts supported from data center not operated by client	0	0
How data center is operated	by vendor	—
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	4 sites	not available
• Other reportable diseases	—	not available
• Tumor diagnosis or registry data	0	not available
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	yes/yes	yes/yes
Hospital/integrated health care systems interfaced	Meditech	IDX, Siemens, Intermed, Dairyland, others
Physician office management systems interfaced	Medical Manager, IDX, Medic Nuesoft, Softaid, Softatic, Medstar, Misys	Misys, Medical Manager, MedLogic, Cerner, VitalWorks, eClinical-Works, others
Automated lab transportation systems interfaced	planned	no
Validation/testing tools provided?	no	no
LIS allows for third-party updates of tables and rules?	no	yes (Quest, LabCorp, OML)
LIS permits use of voice input technology?	no	no
LIS allows for image capture and display?	no	no
Software provides indexed field in each test definition for LOINC code?	no	yes
Provide LOINC dictionary for each new installation?	no	yes
LIS supports use of SNOMED CT?	no	no
Market modules for other hospital departments?	no	no
• Percentage of LIS installations stand-alone	—	—
No. of different lab instruments interfaced with LIS	163	230+
Source code?/User group that meets regularly?	escrow/no	escrow/no
User can modify screens?	no (offer user-defined report writer, custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL	Pervasive, SQL, ODBC and built-in user query language
Smallest cost for hardware/software/monthly maintenance	\$5k/\$15k/\$0.188k	0/\$15k/\$0.15k
Largest cost for hardware/software/monthly maintenance	\$80k/\$380k/\$4.75k	0/\$128k/\$1.28k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • reputation among clients for exceptional service • user friendly, versatile for all laboratories • high quality product at a conservative price; on-site training 	<ul style="list-style-type: none"> • seamless interfaces with EMR, billing, reference labs, practice management, ADT systems • redundant database replication • extensive rules-based functionality
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		
		[†] 21 other labs in Africa administered by CDC
		^{††} GMP and POL labs

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Laboratory information systems

<p>Part 5 of 18</p> <p>See accompanying articles on pages 18 and 24</p>	<p>Computer Service & Support James T. O'Neill jimjr@csslis.com 2106 New Rd., Bldg. E-6 Linwood, NJ 08221 609-653-6444 www.csslis.com</p>	<p>CPSI (Computer Programs & Systems) sales@cpsinet.com 6600 Wall St. Mobile, AL 36695 800-711-2774 www.cpsinet.com</p>
Name of system	CLS-2000	CPSI System
First ever LIS installation/most recent installation	1980/2006	1986/2006
No. of contracts for sites operating LIS	90	344
• Hospital/independent lab contracts in U.S.	0/78	343/1
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	12/0	0
• Other contracted U.S. sites/contracts for foreign sites	0	0
• Contracts that went live between Sept. 2005–Aug. 2006	7	34
Contracts signed but LIS not operational (hospitals/independent labs/others)	4 (0/4/0)	10 (10/0/0)
• Contracts signed between Sept. 2005–Aug. 2006	4	—
No. of sites operating LIS	90	344
• Percentage of high-volume* sites installed	44%	1%
• Percentage of low-volume** sites installed	55%	99%
Staff to develop/install and support/other*** in entire firm	6/8/5	28/511/364
Staff to develop/install and support/other*** in LIS division	—	12/115/0
No. of terminals/workstations in sites operating LIS	4–65 (average, 20)	6–500 (average, 100)
No. of billed tests generated annually by LIS	20,000–3,000,000 (mean, 750,000; median, 900,000)	148,000–665,000 (mean, 372,800; median, 310,000)
• Central hardware or service type	IBM RISC/6000	IBM x366 Series
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	—	Windows 2000 or above
Software		
• Programming language(s)	C++	AcuCobol
• Operating system(s)	AIX 5.3	Unix operating system in a client/server configuration
• Databases and tools used	SQL server, MySQL	CPSI ad hoc reporting with optional ODBC database access
• System includes full transaction logging?	yes	no
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	0	16%
• NCCLS POCT-1A standard interface for POCT devices	0	1%
• Microbiology	85%	100%
• Blood bank donor and transfusion	—	not available
• Surgical pathology/cytology	20%/30%	1%/1%
• HIS or EMR interface: A/D/T	20%	100%
• HIS or EMR interface: order entry	25%	100%
• HIS or EMR interface: results reporting	30%	100%
• HIS or EMR interface: package results into PDF format	30%	100%
• Ad hoc reporting	75%	100%
• Rules-based system	100%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	100%	100%
• Compliance checking	100%	100%
• Billing and accounts receivable	80%	100%
• Materials management and inventory	75%	100%
• Test partition/remote faxing and printing	25%/100%	100%/100%
• Physician office outreach	40%	100%
• HIPAA-standard transaction formats	100%	100%
• Web-based remote inquiry of reports/Web access for order entry	40%/40%	40%/10%
• Specimen management and tracking	100%	not available
Complete LIS application service provider solution?	no	yes
ASP for physician order entry and results reporting?	yes	yes
Method of charging for ASP service	fixed fee	fixed fee
Client software required	browser based	browser based, requires software be installed on a client PC
ASP information conduit	operates over the Internet	requires use of a private, dedicated circuit
Client contracts supported from data center not operated by client	20	21
How data center is operated	by vendor	by vendor
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	0	not available
• Other reportable diseases	0	not available
• Tumor diagnosis or registry data	0	not available
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	yes/yes	yes/yes
Hospital/integrated health care systems interfaced	Advance Data Systems, Aspyra, IDX, McKesson, Misys, PCN, SCC, others	—
Physician office management systems interfaced	Advance Data Systems, Aspyra, IDX, McKesson, Misys, PCN, SCC, others	Medical Manager, MedicaLogic, Logician
Automated lab transportation systems interfaced	Beckman Coulter, Sysmex, Bayer, Roche/BMC/Hitachi	planned to Beckman Coulter, Sysmex, Bayer, Tecan, A&T Corp., Roche/BMC/Hitachi
Validation/testing tools provided?	yes (Ingenix)	no
LIS allows for third-party updates of tables and rules?	yes (Ingenix, CSS)	yes (MicroMedex for clinical monitoring, 3M, NEBO, Care Medics for medical necessity)
LIS permits use of voice input technology?	no	yes
LIS allows for image capture and display?	no	yes
Software provides indexed field in each test definition for LOINC code?	yes	no
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	no	yes
Market modules for other hospital departments?	no	yes
• Percentage of LIS installations stand-alone	—	2%
No. of different lab instruments interfaced with LIS	300	361
Source code?/User group that meets regularly?	yes/no	escrow/yes (meets online as well)
User can modify screens?	no (offer custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	Access, Oracle	CPSI database, optional ODBC database access
Smallest cost for hardware/software/monthly maintenance	\$7.5k/\$15k/\$0.3k	\$3.252k/\$49.5k/\$0.548k
Largest cost for hardware/software/monthly maintenance	\$50k/\$200k/\$5k	\$32.52k/\$83.5k/\$1.044k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • secured paperless reporting and statistical portal • integrated part A and scheduling module for long-term care facilities • 26 years in the LIS industry 	<ul style="list-style-type: none"> • fully integrated HIS/LIS • build libraries and data dictionaries as a standard part of installation and conversion • on-site training and support for all end users (not train the trainer)
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

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Laboratory information systems

Part 6 of 18	Custom Software Systems George Widuch george@css-corporate.com DeWitt Rhaly dewitt@css-corporate.com 7012 Westbelt Drive Nashville, TN 37209 800-344-8053 www.css-corporate.com	eTeleNext Joseph Nollar sales@etelenext.com 28570 Marguerite Parkway, Ste. 222 Mission Viejo, CA 92692 949-365-0952 www.etelenext.com
See accompanying articles on pages 18 and 24		
Name of system	StarLab	eTeleNext LIS
First ever LIS installation/most recent installation	1984/2005	2004/2006
No. of contracts for sites operating LIS	23	9
• Hospital/independent lab contracts in U.S.	19/2	0/9
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	2/0	0
• Other contracted U.S. sites/contracts for foreign sites	0	0
• Contracts that went live between Sept. 2005–Aug. 2006	—	3
Contracts signed but LIS not operational (hospitals/independent labs/others)	1 (1/0/0)	2 (0/1/1)
• Contracts signed between Sept. 2005–Aug. 2006	1	2
No. of sites operating LIS	23	9
• Percentage of high-volume* sites installed	—	20%
• Percentage of low-volume** sites installed	—	80%
Staff to develop/install and support/other*** in entire firm	8/9/23	6/2/2
Staff to develop/install and support/other*** in LIS division	4/6/3	—
No. of terminals/workstations in sites operating LIS	2–80	40–150 (average, 95)
No. of billed tests generated annually by LIS	n/a	12,996–106,800 (mean, 59,898; median, 89,199)
• Central hardware or service type	IBM xSeries	IBM, Dell
• Central hardware redundant/fault-tolerant?	—	yes
• Terminals/workstations or PC platform	CSS network-ready workstation	IBM, Dell
Software		
• Programming language(s)	Cobol	Visual Basic .Net
• Operating system(s)	Linux	Windows server 2003
• Databases and tools used	T-ISAM	SQL
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	80%	100%
• Handheld devices for bedside-positive patient ID	—	not available
• NCCLS POCT-1A standard interface for POCT devices	—	not available
• Microbiology	10%	30%
• Blood bank donor and transfusion	not available	10%
• Surgical pathology/cytology	installed	90%/90%
• HIS or EMR interface: A/D/T	80%	available but not installed
• HIS or EMR interface: order entry	80%	50%
• HIS or EMR interface: results reporting	80%	80%
• HIS or EMR interface: package results into PDF format	installed	80%
• Ad hoc reporting	45%	100%
• Rules-based system	available but not installed	100%
• Management and statistical reporting	10%	100%
• Outreach and commercial laboratory	50%	80%
• Compliance checking	100%	50%
• Billing and accounts receivable	10%	30%
• Materials management and inventory	available but not installed	available in June 2007
• Test partition/remote faxing and printing	available but not installed/75%	100%/100%
• Physician office outreach	20%	80%
• HIPAA-standard transaction formats	10%	100%
• Web-based remote inquiry of reports/Web access for order entry	available but not installed	100%/50%
• Specimen management and tracking	—	100%
Complete LIS application service provider solution?	no	yes
ASP for physician order entry and results reporting?	no	yes
Method of charging for ASP service	—	fixed fee
Client software required	—	—
ASP information conduit	—	—
Client contracts supported from data center not operated by client	—	2
How data center is operated	—	by a third party (SBC)
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	—	available but not installed
• Other reportable diseases	—	available but not installed
• Tumor diagnosis or registry data	—	2 sites
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	—	yes/yes
Hospital/integrated health care systems interfaced	Dairyland, Siemens, Healthcare Management Systems	Cortex, GE, Misys, Meditech, Cerner
Physician office management systems interfaced	—	Medical Manager, Misys, Dr. Chart
Automated lab transportation systems interfaced	planned	available but not yet operational to Beckman Coulter, Sysmex, Bayer, Roche/BMC/Hitachi, ACIS, Ventana, Aperio, Trestle
Validation/testing tools provided?	no	yes (proprietary)
LIS allows for third-party updates of tables and rules?	no	yes (HL7, XML)
LIS permits use of voice input technology?	no	no
LIS allows for image capture and display?	no	yes
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	no	—
Market modules for other hospital departments?	yes	no
• Percentage of LIS installations stand-alone	20%	—
No. of different lab instruments interfaced with LIS	20	100
Source code?/User group that meets regularly?	escrow/yes	escrow/no (meets online)
User can modify screens?	no (offer custom programming)	no (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	MS Access, other PC-based tools	SQL, ODBC, XML, HL7
Smallest cost for hardware/software/monthly maintenance	\$25k/\$35k/\$0.6k	0/\$152k/\$1.5k
Largest cost for hardware/software/monthly maintenance	\$250k/\$350k/\$6k	0/\$152k/\$1k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • standardized screens and functions • total system integration • developed from the clinical perspective with an emphasis on results reporting 	<ul style="list-style-type: none"> • advanced Web-based technology • customized reporting solution • proven outreach solution
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

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Laboratory information systems

Part 7 of 18	Fletcher-Flora Health Care Systems Steve Fogle steve@labpak.com 1580 Orangethorpe Way Anaheim, CA 92801 714-525-0283 www.fletcher-flora.com	Fletcher-Flora Health Care Systems Steve Fogle steve@labpak.com 1580 Orangethorpe Way Anaheim, CA 92801 866-881-4634 www.fletcher-flora.com
See accompanying articles on pages 18 and 24		
Name of system	encaLiber	LabPak
First ever LIS installation/most recent installation	1972/2006	1972/2006
No. of contracts for sites operating LIS	6	1,400
• Hospital/independent lab contracts in U.S.	3/2	270/53
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	1/0	1,059/0
• Other contracted U.S. sites/contracts for foreign sites	0	8/10
• Contracts that went live between Sept. 2005–Aug. 2006	2	88
Contracts signed but LIS not operational (hospitals/independent labs/others)	0	35 (2/7/26)
• Contracts signed between Sept. 2005–Aug. 2006	0	10
No. of sites operating LIS	6	—
• Percentage of high-volume* sites installed	17%	0
• Percentage of low-volume** sites installed	83%	100%
Staff to develop/install and support/other*** in entire firm	12/18/16	12/18/16
Staff to develop/install and support/other*** in LIS division	—	—
No. of terminals/workstations in sites operating LIS	5–100	0–40+
No. of billed tests generated annually by LIS	15,000–300,000	—
• Central hardware or service type	hardware independent	Dell
• Central hardware redundant/fault-tolerant?	not applicable	not applicable
• Terminals/workstations or PC platform	Windows-based PC running XP	Windows PC
Software		
• Programming language(s)	Java	C++, Java
• Operating system(s)	Linux/Unix, Windows	Windows XP
• Databases and tools used	any ODBC-compliant database; optional ODBC-compliant reporting tools	Pervasive
• System includes full transaction logging?	yes	no
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	50%
• Handheld devices for bedside-positive patient ID	available but not installed	not available
• NCCLS POCT-1A standard interface for POCT devices	available but not installed	not available
• Microbiology	80%	30%
• Blood bank donor and transfusion	not available	not available
• Surgical pathology/cytology	not available/100%	not available
• HIS or EMR interface: A/D/T	100%	50%
• HIS or EMR interface: order entry	100%	20%
• HIS or EMR interface: results reporting	100%	75%
• HIS or EMR interface: package results into PDF format	50%	100%
• Ad hoc reporting	100%	100%
• Rules-based system	100%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	50%	10%
• Compliance checking	50%	100%
• Billing and accounts receivable	100%	not available
• Materials management and inventory	20%	10%
• Test partition/remote faxing and printing	40%/100%	70%/100%
• Physician office outreach	40%	40%
• HIPAA-standard transaction formats	100%	—
• Web-based remote inquiry of reports/Web access for order entry	70%/70%	15%/15%
• Specimen management and tracking	100%	not available
Complete LIS application service provider solution?	yes	no
ASP for physician order entry and results reporting?	yes	yes
Method of charging for ASP service	fixed fee	fixed fee
Client software required	browser based	browser based, requires software be installed on a client PC
ASP information conduit	operates over the Internet	operates over the Internet
Client contracts supported from data center not operated by client	0	5
How data center is operated	—	by a third party
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	0	0
• Other reportable diseases	0	0
• Tumor diagnosis or registry data	0	0
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	yes/yes	no/no
Hospital/integrated health care systems interfaced	Misys, Mednet, Cerner, McKesson, Keane, QuadraMed	Tech Time, IDX, CPSI, Dairyland, QSI, Experior, iMedica, others
Physician office management systems interfaced	iMedica, A4, Medical Manager, others	Medical Manager, Millbrook, MegaWest, IDX, Pyramed, IBEX, Emdeon, PowerMed, others
Automated lab transportation systems interfaced	Roche/BMC/Hitachi, Olympus	no
Validation/testing tools provided?	yes (self developed)	no
LIS allows for third-party updates of tables and rules?	yes (3M, ICD-9, SNOMED, LOINC)	no
LIS permits use of voice input technology?	no	no
LIS allows for image capture and display?	yes	no
Software provides indexed field in each test definition for LOINC code?	yes	no
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	yes	no
Market modules for other hospital departments?	no	no
• Percentage of LIS installations stand-alone	—	—
No. of different lab instruments interfaced with LIS	400	400
Source code?/User group that meets regularly?	escrow/yes (meets online as well)	no/no (meets online)
User can modify screens?	yes (offer user-defined report writer, custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL	—
Smallest cost for hardware/software/monthly maintenance	—	—
Largest cost for hardware/software/monthly maintenance	—	—
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • Web-based LIS that can be scaled for small clinics to large reference labs • integrate multiple remote lab locations over a network or the Internet • accurate, secure real-time data 	<ul style="list-style-type: none"> • intuitive, easy-to-use screens • scalable; ideal for multi-site operations • feature-rich system at a reasonable cost
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

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Laboratory information systems

Part 8 of 18 <i>See accompanying articles on pages 18 and 24</i>	GE Healthcare Barbara Mullarky barbara.mullarky@ge.com 3100 Steeles Ave. East, Markham, Ontario, Canada L3R 1A3 520-722-9734 www.gehealthcare.com/usen/cis/index.html	Hex Laboratory Systems Susan Bollinger sbollinger@hexlab.com 1042B El Camino Real, Ste. 308, Encinitas, CA 92024 800-729-2085, ext. 803 www.hexlab.com
Name of system	Centricity Ultra Laboratory	Lab/Hex
First ever LIS installation/most recent installation	1990/2005	1981/2006
No. of contracts for sites operating LIS	45	133
• Hospital/independent lab contracts in U.S.	12/6	9/62
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	0	42/1
• Other contracted U.S. sites/contracts for foreign sites	0/27	9/10
• Contracts that went live between Sept. 2005–Aug. 2006	2	—
Contracts signed but LIS not operational (hospitals/independent labs/others)	2 (2/0/0)	1 (0/1/0)
• Contracts signed between Sept. 2005–Aug. 2006	0	1
No. of sites operating LIS	—	144
• Percentage of high-volume* sites installed	75%	50%
• Percentage of low-volume** sites installed	25%	50%
Staff to develop/install and support/other*** in entire firm	42,500 total	4/7/3
Staff to develop/install and support/other*** in LIS division	44/49/9	—
No. of terminals/workstations in sites operating LIS	20–500+ (average, 200)	3–64 (average, 16)
No. of billed tests generated annually by LIS	—	250,000–18,250,000 (mean, 3,650,000; median, 3,650,000)
• Central hardware or service type	IBM RS/6000	Dell PowerEdge
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	Windows 2000, XP	Windows PC
Software		
• Programming language(s)	C, 4GL	Thoroughbred Basic
• Operating system(s)	Unix	Linux
• Databases and tools used	Unify Dataserver	SQL, 4GL, IDOL 4
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	99%	100%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	installed	2%
• NCCLS POCT-1A standard interface for POCT devices	installed	2%
• Microbiology	80%	100%
• Blood bank donor and transfusion	available in February 2007	not available
• Surgical pathology/cytology	40%/40%	50%/100%
• HIS or EMR interface: A/D/T	installed	75%
• HIS or EMR interface: order entry	installed	75%
• HIS or EMR interface: results reporting	installed	75%
• HIS or EMR interface: package results into PDF format	available but not installed	90%
• Ad hoc reporting	installed	100%
• Rules-based system	installed	100%
• Management and statistical reporting	installed	100%
• Outreach and commercial laboratory	installed	60%
• Compliance checking	installed	100%
• Billing and accounts receivable	installed	75%
• Materials management and inventory	—	1%
• Test partition/remote faxing and printing	100%/installed	100%/100%
• Physician office outreach	available but not installed	75%
• HIPAA-standard transaction formats	100%	100%
• Web-based remote inquiry of reports/Web access for order entry	installed/available but not installed	40%/40%
• Specimen management and tracking	installed	available but not installed
Complete LIS application service provider solution?	no	yes
ASP for physician order entry and results reporting?	no	yes
Method of charging for ASP service	—	fixed fee
Client software required	—	browser based
ASP information conduit	—	operates over the Internet
Client contracts supported from data center not operated by client	—	10
How data center is operated	—	by a third party (Nethosters)
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	installed but do not track No. of sites	available but not installed
• Other reportable diseases	installed but do not track No. of sites	available but not installed
• Tumor diagnosis or registry data	installed but do not track No. of sites	available but not installed
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	no/no	yes/yes
Hospital/integrated health care systems interfaced	Affinity, Epic, McKesson, GE, IDX, MediSolution, Meditech, Siemens	McKesson, Cerner, Misys, PSI, Siemens, Experior, Logician, Quest, LabCorp, others
Physician office management systems interfaced	Allscripts, GE, MedicalLogic, Dr. Chart, Sysmex, LabWorks, Data Passport, eClinics	Medical Manager, MedicalLogic, Practice Partners, LoginClinic, PMS, IDX, Allscripts, Millbrook, others
Automated lab transportation systems interfaced	Beckman Coulter, Sysmex, Bayer, Roche/BMC/Hitachi, Labtronics; planned to Abbott	Beckman Coulter, Roche/BMC/Hitachi
Validation/testing tools provided?	no	yes (Hex)
LIS allows for third-party updates of tables and rules?	yes (any vendor from which clients can provide data extracts in GE-specified format)	yes (any vendor)
LIS permits use of voice input technology?	yes (Philips Speech Magic, Dragon Naturally Speaking)	yes (Dragon or any Windows)
LIS allows for image capture and display?	yes	yes
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	no	yes
Market modules for other hospital departments?	yes	no
• Percentage of LIS installations stand-alone	~75%	—
No. of different lab instruments interfaced with LIS	265	250
Source code?/User group that meets regularly?	escrow/yes (meets online as well)	escrow/no
User can modify screens?	yes (offer user-defined report writer, custom programming)	no (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL, ODBC-compliant tools	SQL
Smallest cost for hardware/software/monthly maintenance	\$100k/\$250k/\$5k	\$5k/\$10k/0
Largest cost for hardware/software/monthly maintenance	\$1m/\$1.5m/\$37k	\$100k/\$180k/\$2k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • proven high-volume processing with rapid data entry • relational database • integration with other enterprise systems 	<ul style="list-style-type: none"> • flexibility; handle unique needs • integrated billing, e-billing, medical necessity • expandable—extensive growth capabilities

*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day
 **generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day
 ***other=sales, marketing, administration, and other company functions
 ****via a computer-to-computer interface

Laboratory information systems

Part 9 of 18	Impac Medical Systems sales@impac.com 6399 San Ignacio Ave., Ste. 200 San Jose, CA 95119 888-464-6722 www.impac.com	LabSoft Steven Hawn steve@labsoftweb.com 8402 Laurel Fair Circle, Ste. 207 Tampa, FL 33610 800-767-3279 www.labsoftweb.com
See accompanying articles on pages 18 and 24		
Name of system	IntelliLab	LabNet
First ever LIS installation/most recent installation	1988/2005	1992/2006
No. of contracts for sites operating LIS	65	>300
• Hospital/independent lab contracts in U.S.	5/2	60/40
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	57/1	127/4
• Other contracted U.S. sites/contracts for foreign sites	0	69+/0
• Contracts that went live between Sept. 2005–Aug. 2006	8	10
Contracts signed but LIS not operational (hospitals/independent labs/others)	2 (0/0/2)	2 (1/1/0)
• Contracts signed between Sept. 2005–Aug. 2006	10	10
No. of sites operating LIS	228	>300
• Percentage of high-volume* sites installed	—	—
• Percentage of low-volume** sites installed	—	—
Staff to develop/install and support/other*** in entire firm	150/150/200	2/4/2
Staff to develop/install and support/other*** in LIS division	5/6/6	—
No. of terminals/workstations in sites operating LIS	3–1,300 (average, 20)	1–75
No. of billed tests generated annually by LIS	—	—
• Central hardware or service type	HP, Compaq	any
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	Dell, HP, Compaq	any
Software		
• Programming language(s)	Visual Basic, C, Basic	Delphi
• Operating system(s)	Windows 2000, 2003, XP	Windows XP
• Databases and tools used	mvBase	MS SQL
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	not available	0
• NCCLS POCT-1A standard interface for POCT devices	not available	30%
• Microbiology	20%	20%
• Blood bank donor and transfusion	not available	0
• Surgical pathology/cytology	5%/not available	0/0
• HIS or EMR interface: A/D/T	40%	50%
• HIS or EMR interface: order entry	40%	50%
• HIS or EMR interface: results reporting	40%	100%
• HIS or EMR interface: package results into PDF format	not available	10%
• Ad hoc reporting	100%	30%
• Rules-based system	100%	50%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	100%	25%
• Compliance checking	100%	70%
• Billing and accounts receivable	10%	100%
• Materials management and inventory	not available	0
• Test partition/remote faxing and printing	100%/100%	100%/50%
• Physician office outreach	100%	—
• HIPAA-standard transaction formats	100%	not available
• Web-based remote inquiry of reports/Web access for order entry	100%/100%	30%/30%
• Specimen management and tracking	not available	60%
Complete LIS application service provider solution?	no	no
ASP for physician order entry and results reporting?	no	no
Method of charging for ASP service	—	—
Client software required	—	—
ASP information conduit	—	—
Client contracts supported from data center not operated by client	—	—
How data center is operated	—	—
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	available but not installed	not available
• Other reportable diseases	available but not installed	not available
• Tumor diagnosis or registry data	4 sites	not available
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	no/no	—
Hospital/integrated health care systems interfaced	Siemens, Dairyland	—
Physician office management systems interfaced	Impac, Misis, Medical Manager, NextGen, Allscripts, QSI, MedicaLogic, HealthWorks	—
Automated lab transportation systems interfaced	planned	planned
Validation/testing tools provided?	no	no
LIS allows for third-party updates of tables and rules?	yes (only tables in correct format)	yes
LIS permits use of voice input technology?	yes (Microsoft compatible, others)	no
LIS allows for image capture and display?	yes	yes
Software provides indexed field in each test definition for LOINC code?	no	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	no	no
Market modules for other hospital departments?	yes	no
• Percentage of LIS installations stand-alone	80%	—
No. of different lab instruments interfaced with LIS	400	205
Source code?/User group that meets regularly?	escrow/yes	escrow/no
User can modify screens?	yes (offer user-defined report writer, custom programming)	no (offer custom programming)
Query language to retrieve information from LIS database	AQL, SQL with ODBC	—
Smallest cost for hardware/software/monthly maintenance	~\$10k/\$25k/0	\$3.5k/\$6k/\$0.1k
Largest cost for hardware/software/monthly maintenance	\$30k/\$200k/0	\$30k/\$150k/\$0.992k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • provides automated e-mail, fax, and printing of reports • completely Internet based • fully integrated with oncology-based information systems 	<ul style="list-style-type: none"> • high value • user friendly • reliable

*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day
 **generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day
 ***other=sales, marketing, administration, and other company functions
 ****via a computer-to-computer interface

Laboratory information systems

Part 10 of 18	McKesson Stacy Block stacy.block@mckesson.com 5995 Windward Parkway Alpharetta, GA 30005 800-981-8601 www.mckesson.com	Medcom Information Systems David Baird dbaird@emirj.com 2117 Stonington Ave. Hoffman Estates, IL 60195 847-885-1553 www.emirj.com
See accompanying articles on pages 18 and 24		
Name of system	Horizon Lab	Medcom Lab Manager
First ever LIS installation/most recent installation	1972/2006	1992/2006
No. of contracts for sites operating LIS	88	460
• Hospital/independent lab contracts in U.S.	—	21/71
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	—	368/0
• Other contracted U.S. sites/contracts for foreign sites	—	0
• Contracts that went live between Sept. 2005–Aug. 2006	—	—
Contracts signed but LIS not operational (hospitals/independent labs/others)	10	4 (0/4/0)
• Contracts signed between Sept. 2005–Aug. 2006	—	8
No. of sites operating LIS	140	460
• Percentage of high-volume* sites installed	—	—
• Percentage of low-volume** sites installed	—	—
Staff to develop/install and support/other*** in entire firm	6,000 total	4/10/7
Staff to develop/install and support/other*** in LIS division	—	3/10/5
No. of terminals/workstations in sites operating LIS	10–300+ (average, 75)	1–11 (average, 2-3)
No. of billed tests generated annually by LIS	1,600,000+ (largest)	—
• Central hardware or service type	HP, IBM	Medcom IBM-compatible PC
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	PC	Medcom IBM-compatible PC
Software		
• Programming language(s)	Delphi, ANSI, Standard C	C++
• Operating system(s)	Linux, Windows 9x, NT, 2000, XP, HP-UX, AIX	DOS, Windows 9x, NT
• Databases and tools used	Oracle	dBase compatible
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	70%
• Handheld devices for bedside-positive patient ID	15%	—
• NCCLS POCT-1A standard interface for POCT devices	50%	—
• Microbiology	100%	5%
• Blood bank donor and transfusion	25%	—
• Surgical pathology/cytology	—/not available	—
• HIS or EMR interface: A/D/T	100%	3%
• HIS or EMR interface: order entry	100%	2%
• HIS or EMR interface: results reporting	100%	4%
• HIS or EMR interface: package results into PDF format	—	—
• Ad hoc reporting	100%	100%
• Rules-based system	100%	—
• Management and statistical reporting	100%	—
• Outreach and commercial laboratory	15%	—
• Compliance checking	100%	5%
• Billing and accounts receivable	available but not installed	—
• Materials management and inventory	—	—
• Test partition/remote faxing and printing	100%/100%	—/5%
• Physician office outreach	15%	—
• HIPAA-standard transaction formats	not available	—
• Web-based remote inquiry of reports/Web access for order entry	25%/15%	1%/1%
• Specimen management and tracking	100%	—
Complete LIS application service provider solution?	yes	yes
ASP for physician order entry and results reporting?	—	yes
Method of charging for ASP service	—	fixed fee
Client software required	—	browser based
ASP information conduit	—	operates over the Internet
Client contracts supported from data center not operated by client	—	0
How data center is operated	—	by a third party (YNC)
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	25 sites	not available
• Other reportable diseases	—	not available
• Tumor diagnosis or registry data	—	—
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	—	yes/yes
Hospital/integrated health care systems interfaced	McKesson, Siemens, IDX, Meditech, homegrown	—
Physician office management systems interfaced	WebMD Clinician, NextGen, Logician, iMedica, others	Medical Manager, MedicaLogic, AMS, Edimis, Wismer Martin, IDX, Versys
Automated lab transportation systems interfaced	Beckman Coulter, Roche/BMC/Hitachi	planned
Validation/testing tools provided?	yes	yes (Alpha II Code Wizard, CodeMap)
LIS allows for third-party updates of tables and rules?	no	yes (Alpha II, CodeMap)
LIS permits use of voice input technology?	yes (any)	yes
LIS allows for image capture and display?	—	no
Software provides indexed field in each test definition for LOINC code?	yes	no
Provide LOINC dictionary for each new installation?	yes	no
LIS supports use of SNOMED CT?	yes	no
Market modules for other hospital departments?	yes	no
• Percentage of LIS installations stand-alone	—	—
No. of different lab instruments interfaced with LIS	200	hundreds
Source code?/User group that meets regularly?	escrow/yes (meets online as well)	no/no
User can modify screens?	yes (offer user-defined report writer, custom programming)	no (offer custom programming)
Query language to retrieve information from LIS database	any ODBC software package, e.g. Crystal Reports	—
Smallest cost for hardware/software/monthly maintenance	—	\$2k/\$7k/\$0.1k per month
Largest cost for hardware/software/monthly maintenance	—	\$35k/\$70k/\$0.75k per month
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • advanced bi-directional communication with McKesson's pharmacy information system • supports all lab business models • part of a comprehensive, integrated laboratory solution suite 	<ul style="list-style-type: none"> • cost-effective interfacing for data exchange with other software • software support includes updates, upgrades, modem support, phone help • interfaces available for reference labs, billing systems, and EMRs
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

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Laboratory information systems

Part 11 of 18	Medical Information Technology (Meditech) Paul Berthiaume pberthiaume@meditech.com Meditech Circle Westwood, MA 02090 781-821-3000 www.meditech.com	Medical Information Technology (Meditech) Paul Berthiaume pberthiaume@meditech.com Meditech Circle Westwood, MA 02090 781-821-3000 www.meditech.com
See accompanying articles on pages 18 and 24		
Name of system	Meditech LIS-client/server	Meditech LIS-Magic
First ever LIS installation/most recent installation	1969/2006	1969/2006
No. of contracts for sites operating LIS	279	972
• Hospital/independent lab contracts in U.S.	—	—
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	—	—
• Other contracted U.S. sites/contracts for foreign sites	—	—
• Contracts that went live between Sept. 2005–Aug. 2006	31	22
Contracts signed but LIS not operational (hospitals/independent labs/others)	40	27
• Contracts signed between Sept. 2005–Aug. 2006	—	—
No. of sites operating LIS	—	—
• Percentage of high-volume* sites installed	—	—
• Percentage of low-volume** sites installed	—	—
Staff to develop/install and support/other*** in entire firm	557/1,506/449	557/1,506/449
Staff to develop/install and support/other*** in LIS division	—	—
No. of terminals/workstations in sites operating LIS	—	—
No. of billed tests generated annually by LIS	—	—
• Central hardware or service type	HP, Dell, EMC, IBM	HP, Dell, EMC, IBM
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	HP, Dell, EMC, IBM	HP, Dell, EMC, IBM
Software		
• Programming language(s)	Magic	Magic
• Operating system(s)	Windows 2000, 2003 servers	Magic (in conjunction with Windows 2000, 2003 servers)
• Databases and tools used	Meditech Hierarchical Database	Meditech Hierarchical Database
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	20%	20%
• NCCLS POCT-1A standard interface for POCT devices	20%	20%
• Microbiology	100%	100%
• Blood bank donor and transfusion	installed	installed
• Surgical pathology/cytology	installed	installed
• HIS or EMR interface: A/D/T	25%	25%
• HIS or EMR interface: order entry	25%	25%
• HIS or EMR interface: results reporting	25%	25%
• HIS or EMR interface: package results into PDF format	installed	installed
• Ad hoc reporting	100%	100%
• Rules-based system	100%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	installed	installed
• Compliance checking	installed	installed
• Billing and accounts receivable	97%	97%
• Materials management and inventory	80%	80%
• Test partition/remote faxing and printing	100%/100%	100%/100%
• Physician office outreach	installed	installed
• HIPAA-standard transaction formats	100%	100%
• Web-based remote inquiry of reports/Web access for order entry	available but not installed	available but not installed
• Specimen management and tracking	100%	100%
Complete LIS application service provider solution?	no	no
ASP for physician order entry and results reporting?	no	no
Method of charging for ASP service	—	—
Client software required	—	—
ASP information conduit	—	—
Client contracts supported from data center not operated by client	—	—
How data center is operated	—	—
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	not available	not available
• Other reportable diseases	not available	not available
• Tumor diagnosis or registry data	not available	not available
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	no/no	no/no
Hospital/integrated health care systems interfaced	Cerner, McKesson, Siemens, others	Cerner, McKesson, Siemens, others
Physician office management systems interfaced	—	—
Automated lab transportation systems interfaced	Beckman Coulter, Sysmex, Bayer, Roche/BMC/Hitachi	Beckman Coulter, Sysmex, Bayer, Roche/BMC/Hitachi
Validation/testing tools provided?	yes (proprietary)	yes (proprietary)
LIS allows for third-party updates of tables and rules?	yes (Info-X, SNOMED)	yes (Info-X, SNOMED)
LIS permits use of voice input technology?	yes (ScanSoft Dragon Naturally Speaking)	yes (ScanSoft Dragon Naturally Speaking)
LIS allows for image capture and display?	yes	yes
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	yes	yes
Market modules for other hospital departments?	yes	yes
• Percentage of LIS installations stand-alone	25%	25%
No. of different lab instruments interfaced with LIS	hundreds	hundreds
Source code?/User group that meets regularly?	yes/yes (meets online as well)	yes/yes (meets online as well)
User can modify screens?	yes (offer user-defined report writer, custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL based, Meditech Report Writer	SQL based, Meditech Report Writer
Smallest cost for hardware/software/monthly maintenance	—	—
Largest cost for hardware/software/monthly maintenance	—	—
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • 37 years' experience developing and implementing lab systems • seamless support for labs in an integrated delivery network • accurate, up-to-the-minute patient data and charge information 	<ul style="list-style-type: none"> • 37 years' experience developing and implementing lab systems • seamless support for labs in an integrated delivery network • accurate, up-to-the-minute patient data and charge information

*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day
 **generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day
 ***other=sales, marketing, administration, and other company functions
 ****via a computer-to-computer interface

Laboratory information systems

Part 12 of 18	MediSolution Soraya Comeau soraya.comeau@medisolution.com 5915 Airport Rd. Mississauga, Ontario, Canada L4V 1T1 866-467-4636 www.medisolution.com	Misys Healthcare Systems Rick Foster rick.foster@misyshealthcare.com 8529 Six Forks Rd. Raleigh, NC 27615 866-647-9787 www.misyshealthcare.com
See accompanying articles on pages 18 and 24		
Name of system	MediLab	Misys Commercial Laboratory
First ever LIS installation/most recent installation	1972/2006	1979/2006
No. of contracts for sites operating LIS	770+	37
• Hospital/independent lab contracts in U.S.	4/2	—
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	0	—
• Other contracted U.S. sites/contracts for foreign sites	0/765	—/0
• Contracts that went live between Sept. 2005–Aug. 2006	—	3
Contracts signed but LIS not operational (hospitals/independent labs/others)	6	5
• Contracts signed between Sept. 2005–Aug. 2006	6	4
No. of sites operating LIS	770+	50
• Percentage of high-volume* sites installed	41%	95%
• Percentage of low-volume** sites installed	59%	5%
Staff to develop/install and support/other*** in entire firm	375 total	700/1,400/600
Staff to develop/install and support/other*** in LIS division	79/25/7	90/40/70
No. of terminals/workstations in sites operating LIS	1–700 (average, 40)	10–1,000 (average, 50)
No. of billed tests generated annually by LIS	140,000–22,400,000 (mean, 1,500,000; median, 1,400,000)	2,000,000–60,000,000
• Central hardware or service type	Sun, Unix, Linux, Windows, IBM, HP	HP AlphaServers, IBM pSeries servers, e-servers (RS/6000)
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	IBM-compatible PC	Dell, HP
Software		
• Programming language(s)	C++, Java	Caché, M
• Operating system(s)	Sun OS, Windows XP, 2000, 2003, Unix, Linux	HP-UX, AIX
• Databases and tools used	SQL server, Oracle	Caché
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	95%	100%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	4%	not available
• NCCLS POCT-1A standard interface for POCT devices	5%	available but not installed
• Microbiology	95%	100%
• Blood bank donor and transfusion	35% (only in Canada)	not available
• Surgical pathology/cytology	40%/35%	30%/30%
• HIS or EMR interface: A/D/T	100%	80%
• HIS or EMR interface: order entry	20%	80%
• HIS or EMR interface: results reporting	45%	80%
• HIS or EMR interface: package results into PDF format	5%	not available
• Ad hoc reporting	100%	100%
• Rules-based system	100%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	60%	100%
• Compliance checking	4%	installed
• Billing and accounts receivable	55%	90%
• Materials management and inventory	3%	installed
• Test partition/remote faxing and printing	100%/100%	100%/100%
• Physician office outreach	55%	installed
• HIPAA-standard transaction formats	100%	100%
• Web-based remote inquiry of reports/Web access for order entry	40%/35%	installed
• Specimen management and tracking	25%	100%
Complete LIS application service provider solution?	yes	no
ASP for physician order entry and results reporting?	no	no
Method of charging for ASP service	fixed fee	—
Client software required	requires software be installed on a client PC	—
ASP information conduit	requires use of private, dedicated circuit	—
Client contracts supported from data center not operated by client	2	—
How data center is operated	by a third party (Superior Consulting Co.)	—
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	available but not installed	available but not installed
• Other reportable diseases	available but not installed	available but not installed
• Tumor diagnosis or registry data	3% of sites	available but not installed
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	yes/yes	no/no
Hospital/integrated health care systems interfaced	Meditech, GE, Misys, MediSolution, SCC, Keane, McKesson, self developed, others	McKesson, Cerner, Siemens, Epic, Meditech, others
Physician office management systems interfaced	MediSolution, Purkinje, others	Allscripts, Logician, WebMD, Atlas, McKesson, A4, NextGen, Care Evolve, Misys, others
Automated lab transportation systems interfaced	Beckman Coulter, Sysmex, Bayer, Tecan, Roche/BMC/Hitachi	Beckman Coulter, Sysmex, Bayer, Tecan, A&T Corp., Roche/BMC/Hitachi
Validation/testing tools provided?	yes (self developed)	yes (Misys specific)
LIS allows for third-party updates of tables and rules?	yes (SNOMED, Info-X, NCCLS)	yes (3M)
LIS permits use of voice input technology?	yes (IBM Voice, Dragon, other IBM compatible)	yes
LIS allows for image capture and display?	yes	no
Software provides indexed field in each test definition for LOINC code?	yes	no
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	yes	yes
Market modules for other hospital departments?	yes	yes
• Percentage of LIS installations stand-alone	80%	99%
No. of different lab instruments interfaced with LIS	475+	200+
Source code?/User group that meets regularly?	escrow/yes	escrow/yes (meets online as well)
User can modify screens?	yes (offer user-defined report writer, custom programming)	no (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL, Access, Excel, Crystal Reports	SQL
Smallest cost for hardware/software/monthly maintenance	\$6k/\$30k/\$6k	\$500k/\$100k/1.5%
Largest cost for hardware/software/monthly maintenance	\$300k/\$2m/\$33k	\$500k/\$3m/1.5%
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • patient safety module; wireless positive patient ID • proactive turnaround time and management tools • multilingual—21 languages 	<ul style="list-style-type: none"> • proven high-volume processing and extensive outreach capability • streamlined workflow • integration with Misys suite of products
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

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Laboratory information systems

Part 13 of 18	Misys Healthcare Systems Rick Foster rick.foster@misyshealthcare.com 8529 Six Forks Rd. Raleigh, NC 27615 866-647-9787 www.misyshealthcare.com	Multidata Computer Systems Michael Slater mrslater@mul.com 55 Broad St., 10th floor New York, NY 10004 212-967-6700 www.mul.com
See accompanying articles on pages 18 and 24		
Name of system	Misys Laboratory	MultiTech
First ever LIS installation/most recent installation	1979/2006	1983/2003
No. of contracts for sites operating LIS	454	41
• Hospital/independent lab contracts in U.S.	—	7/33
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	—	1/0
• Other contracted U.S. sites/contracts for foreign sites	—	0
• Contracts that went live between Sept. 2005–Aug. 2006	12	0
Contracts signed but LIS not operational (hospitals/independent labs/others)	22	0
• Contracts signed between Sept. 2005–Aug. 2006	23	0
No. of sites operating LIS	990	41
• Percentage of high-volume* sites installed	99%	40%
• Percentage of low-volume** sites installed	1%	60%
Staff to develop/install and support/other*** in entire firm	700/1,400/600	4/5/2
Staff to develop/install and support/other*** in LIS division	90/40/70	—
No. of terminals/workstations in sites operating LIS	4–500 (average, 20–100)	4–120+ (average, 30)
No. of billed tests generated annually by LIS	500,000–17,000,000 (median, 2,000,000)	50,000–5,000,000
• Central hardware or service type	HP AlphaServers, IBM pSeries servers, e-servers (RS/6000)	Intel x86 compatible, most Unix RISC, DEC Alpha optional
• Central hardware redundant/fault-tolerant?	yes	optional
• Terminals/workstations or PC platform	Dell, HP	PC with VT emulation, DEC VT or compatible
Software		
• Programming language(s)	ANSI Standard M, Caché Script, Standard C/C++, Visual Basic, Visual C++, Active X	Caché (M), Visual Basic, HTML
• Operating system(s)	AIX, HP-UX	Windows 2003, Unix, Linux, DEC VMS
• Databases and tools used	InterSystems Caché	Caché (M)
• System includes full transaction logging?	yes	optional
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	90%
• Bar-coded collection labels	100%	90%
• Handheld devices for bedside-positive patient ID	10%	—
• NCCLS POCT-1A standard interface for POCT devices	20%	—
• Microbiology	100%	80%
• Blood bank donor and transfusion	50%	—
• Surgical pathology/cytology	70%/70%	15%/40%
• HIS or EMR interface: A/D/T	99%	25%
• HIS or EMR interface: order entry	99%	20%
• HIS or EMR interface: results reporting	99%	25%
• HIS or EMR interface: package results into PDF format	not available	5%
• Ad hoc reporting	90%	40%
• Rules-based system	100%	90%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	75%	90%
• Compliance checking	30%	80%
• Billing and accounts receivable	10%	90%
• Materials management and inventory	10%	20%
• Test partition/remote faxing and printing	100%/90%	100%/80%
• Physician office outreach	20%	80%
• HIPAA-standard transaction formats	100%	90%
• Web-based remote inquiry of reports/Web access for order entry	6%/6%	20%/10%
• Specimen management and tracking	100%	10%
Complete LIS application service provider solution?	no	no
ASP for physician order entry and results reporting?	no	yes
Method of charging for ASP service	—	fixed fee
Client software required	—	browser based
ASP information conduit	—	operates over the Internet
Client contracts supported from data center not operated by client	—	3
How data center is operated	—	by vendor
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	5% of sites	1 site
• Other reportable diseases	5% of sites	20 sites
• Tumor diagnosis or registry data	10% of sites	—
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	no/no	no/no
Hospital/integrated health care systems interfaced	McKesson, Cerner, Siemens, IDX, Epic, Eclypsis, others	Siemens, CSM, Cerner
Physician office management systems interfaced	Allscripts, Logician, WebMD, Atlas, McKesson, A4, NextGen, Care Evolve, Misys, others	Epic, IDX, Medical Manager, VitalWorks
Automated lab transportation systems interfaced	Beckman Coulter, Sysmex, Bayer, Tecan, A&T Corp., Roche/BMC/Hitachi	Bayer, Tecan
Validation/testing tools provided?	yes (Misys specific)	no
LIS allows for third-party updates of tables and rules?	yes (3M, ICD-9)	yes (PMIC, CMS)
LIS permits use of voice input technology?	yes (Dragon-AP only)	no
LIS allows for image capture and display?	no	optional
Software provides indexed field in each test definition for LOINC code?	no	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	yes	no
Market modules for other hospital departments?	yes	no
• Percentage of LIS installations stand-alone	90%	—
No. of different lab instruments interfaced with LIS	300+	125
Source code?/User group that meets regularly?	escrow/yes (meets online as well)	escrow/no
User can modify screens?	yes (offer user-defined report writer, custom programming)	no (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL	any ODBC compliant, e.g. Crystal Reports, SQL, Access
Smallest cost for hardware/software/monthly maintenance	\$100k/\$250k/1.5%	\$20k/\$50k/\$0.75k
Largest cost for hardware/software/monthly maintenance	\$500k/\$1m/1.5%	\$250k/\$400k/\$6k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • company commitment to support and service • connectivity to POC, LAS, instruments, CPR, HIS, financials • multi-facility and outreach support 	<ul style="list-style-type: none"> • complete billing, A/R, management reporting for commercial labs and hospital outreach • integrated document management system for imaging/retrieval of requisitions and related documents • flexible design and customization capabilities for special requirements
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

Tabulation does not represent an endorsement by the College of American Pathologists.

Laboratory information systems

Part 14 of 18	NetLims Avi Allerhand info@netlims.com 96 Engle St. Englewood, NJ 07631 201-894-5300 www.netlims.com	Omnitech John Fitzgibbon jfitz@omnitechlabs.net 9 Lilly Court Manorville, NY 11949 877-336-6664 www.omnitechlabs.net
See accompanying articles on pages 18 and 24		
Name of system	AutoLims	OmniLab
First ever LIS installation/most recent installation	1996/2006	1994/2006
No. of contracts for sites operating LIS	38	79
• Hospital/independent lab contracts in U.S.	3/5	4/0
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	0	0
• Other contracted U.S. sites/contracts for foreign sites	0/30	0/75
• Contracts that went live between Sept. 2005–Aug. 2006	2	4
Contracts signed but LIS not operational (hospitals/independent labs/others)	2 (1/1/0)	4 (3/1/0)
• Contracts signed between Sept. 2005–Aug. 2006	1	5
No. of sites operating LIS	50+	109
• Percentage of high-volume* sites installed	85%	35%
• Percentage of low-volume** sites installed	15%	65%
Staff to develop/install and support/other*** in entire firm	53/33/18	30/16/10
Staff to develop/install and support/other*** in LIS division	—	28/14/10
No. of terminals/workstations in sites operating LIS	15–550 (average, 50)	4–300+ (average, 50)
No. of billed tests generated annually by LIS	400,000–10,000,000 (mean, 1,500,000)	20,000–10,000,000 (mean, 150,000; median, 75,000)
• Central hardware or service type	IBM, Dell, HP	Windows 2003, 2005 OS (Dell, IBM, HP)
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	any Windows PC	Windows PC, thin client, Web browser
Software		
• Programming language(s)	C++, Visual Basic, Java, .Net	Visual Basic 6, Visual Basic .Net
• Operating system(s)	Windows 2000, 2003, XP, Linux, Unix	Windows 2003, 2005
• Databases and tools used	Oracle, MS SQL 2000, 2005, Caché	MS SQL server
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	95%	94%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	installed	available but not installed
• NCCLS POCT-1A standard interface for POCT devices	not available	available but not installed
• Microbiology	85%	58%
• Blood bank donor and transfusion	25%	available but not installed
• Surgical pathology/cytology	30%/55%	20%/14%
• HIS or EMR interface: A/D/T	75%	49%
• HIS or EMR interface: order entry	55%	24%
• HIS or EMR interface: results reporting	40%	62%
• HIS or EMR interface: package results into PDF format	not available	100%
• Ad hoc reporting	100%	100%
• Rules-based system	100%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	100%	13%
• Compliance checking	60%	available but not installed
• Billing and accounts receivable	40%	8%
• Materials management and inventory	available but not installed	not available
• Test partition/remote faxing and printing	100%/100%	100%/100%
• Physician office outreach	65%	14%
• HIPAA-standard transaction formats	100%	6%
• Web-based remote inquiry of reports/Web access for order entry	60%/50%	8%/8%
• Specimen management and tracking	50%	100%
Complete LIS application service provider solution?	no	yes
ASP for physician order entry and results reporting?	—	yes
Method of charging for ASP service	—	transaction based
Client software required	—	browser based
ASP information conduit	—	operates over the Internet
Client contracts supported from data center not operated by client	—	40
How data center is operated	—	by a third party (province of Quebec)
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	available but not installed	available but not installed
• Other reportable diseases	available but not installed	available but not installed
• Tumor diagnosis or registry data	available but not installed	available but not installed
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	yes/yes	yes/yes
Hospital/integrated health care systems interfaced	Eclipsys, IDX, Siemens, Misys, Cerner	McKesson, MediSolution, Momentum, Per Sé, Sphere, Mardon
Physician office management systems interfaced	—	Purkinje, YorkMed, Omni Med
Automated lab transportation systems interfaced	Olympus, Beckman Coulter, Bayer	Beckman Coulter
Validation/testing tools provided?	yes (test environment)	yes (self developed)
LIS allows for third-party updates of tables and rules?	yes (Info-X, AMA, Quest, Specialty, SNOMED)	yes
LIS permits use of voice input technology?	yes (Dragon Naturally Speaking)	yes (any Windows compatible)
LIS allows for image capture and display?	yes	yes
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	yes	yes
Market modules for other hospital departments?	no	yes
• Percentage of LIS installations stand-alone	—	97%
No. of different lab instruments interfaced with LIS	150+	300+
Source code?/User group that meets regularly?	escrow/no	escrow/no
User can modify screens?	yes (offer user-defined report writer, custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL	SQL, ODBC
Smallest cost for hardware/software/monthly maintenance	\$30k/\$80k/\$1k	\$10k/\$75k/\$1.125k
Largest cost for hardware/software/monthly maintenance	\$700k/\$2.8m/\$55k	\$200k/\$1m+/\$15k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • easily tailored for any environment or work procedure • advanced technology—Windows, Web, choice of database, document management • fully integrated billing system with one database 	<ul style="list-style-type: none"> • hybrid design to support hospital, commercial, and esoteric labs • functional leader in the industry • industry standard-setter for implementation and support
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

Laboratory information systems

Part 15 of 18	Opus Healthcare Solutions Caroline Pritchard cpritchard@opushealthcare.com 12301 Research Blvd., Bldg. 111, Ste. 200 Austin, TX 78759 512-336-7200 www.opushealthcare.com	Orchard Software Kerry Foster kfoster@orchardsoft.com 701 Congressional Blvd., Ste. 360 Carmel, IN 46032 800-856-1948 www.orchardsoft.com
See accompanying articles on pages 18 and 24		
Name of system	OpusLab	Orchard Harvest LIS
First ever LIS installation/most recent installation	1985/2006	1993/2006
No. of contracts for sites operating LIS	44	635
• Hospital/independent lab contracts in U.S.	33/4	142/69
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	2/0	374/16
• Other contracted U.S. sites/contracts for foreign sites	4/1	34/0
• Contracts that went live between Sept. 2005–Aug. 2006	1	84
Contracts signed but LIS not operational (hospitals/independent labs/others)	0	31(7/2/22)
• Contracts signed between Sept. 2005–Aug. 2006	0	31
No. of sites operating LIS	43	685
• Percentage of high-volume* sites installed	30%	—
• Percentage of low-volume** sites installed	70%	—
Staff to develop/install and support/other*** in entire firm	69/34/24	24/58/34
Staff to develop/install and support/other*** in LIS division	8/18/2	n/a
No. of terminals/workstations in sites operating LIS	5–40 (average, 15)	1–150+ (average, 20)
No. of billed tests generated annually by LIS	43,000–882,000 (mean, 248,000; median, 301,000)	—
• Central hardware or service type	HP 9000	HP Business Class, Pentium compatible
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	Windows PC supported	HP Business Class, Pentium compatible
Software		
• Programming language(s)	C, Java, Perl, C++	4D, C++, Java, HTML
• Operating system(s)	Unix, Linux	Windows 2000, 2003, XP, Internet Explorer, Netscape
• Databases and tools used	Postgre SQL, Mason, ModPerl, Opus DBMS, Apache	4D client/server, MS SQL
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	100%
• Handheld devices for bedside-positive patient ID	available but not installed	available but not installed
• NCCLS POCT-1A standard interface for POCT devices	available but not installed	available but not installed
• Microbiology	80%	50%
• Blood bank donor and transfusion	not available	—
• Surgical pathology/cytology	20%/15%	10%/20%
• HIS or EMR interface: A/D/T	80%	65%
• HIS or EMR interface: order entry	75%	65%
• HIS or EMR interface: results reporting	75%	65%
• HIS or EMR interface: package results into PDF format	not available	—
• Ad hoc reporting	100%	100%
• Rules-based system	100%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	75%	70%
• Compliance checking	2%	90%
• Billing and accounts receivable	not available	—
• Materials management and inventory	not available	20%
• Test partition/remote faxing and printing	75%/100%	25%/90%
• Physician office outreach	10%	80%
• HIPAA-standard transaction formats	100%	100%
• Web-based remote inquiry of reports/Web access for order entry	10%/10%	60%/60%
• Specimen management and tracking	not available	100%
Complete LIS application service provider solution?	yes	no
ASP for physician order entry and results reporting?	yes	yes
Method of charging for ASP service	fixed fee	fixed fee
Client software required	requires software be installed on a client PC	browser based
ASP information conduit	requires use of a private, dedicated circuit	operates over the Internet
Client contracts supported from data center not operated by client	2	5
How data center is operated	by vendor	by vendor
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	available but not installed	1%
• Other reportable diseases	available but not installed	—
• Tumor diagnosis or registry data	available but not installed	—
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	no/no	yes/yes
Hospital/integrated health care systems interfaced	McKesson, Siemens, Cerner, Epic, Quest, LabCorp, Hemocare	McKesson, Misys, IDX, Experior, Siemens, Cerner, Dairyland, QuadraMed, Meditech, GE, others
Physician office management systems interfaced	n/a	Millbrook, Epic, NextGen, Clinitek, Medical Manager, Medgate, GE, others
Automated lab transportation systems interfaced	Beckman Coulter, Roche/BMC/Hitachi	Beckman Coulter
Validation/testing tools provided?	yes (test environment)	yes (proprietary)
LIS allows for third-party updates of tables and rules?	no	yes (Quest, AMA, LabCorp, Specialty, others)
LIS permits use of voice input technology?	no	yes (for Orchard Harvest anatomic pathology module)
LIS allows for image capture and display?	yes	yes
Software provides indexed field in each test definition for LOINC code?	no	yes
Provide LOINC dictionary for each new installation?	no	no
LIS supports use of SNOMED CT?	no	yes
Market modules for other hospital departments?	yes	no
• Percentage of LIS installations stand-alone	20%	—
No. of different lab instruments interfaced with LIS	200+	350+
Source code?/User group that meets regularly?	escrow/yes (meets online as well)	escrow/yes (meets online as well)
User can modify screens?	yes (offer user-defined report writer, custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	SQL, Crystal Reports Writer	ODBC compliant
Smallest cost for hardware/software/monthly maintenance	\$30k/\$100k/\$1k	\$10k/\$20k/\$0.25k
Largest cost for hardware/software/monthly maintenance	\$250k/\$600k/\$6k	\$100k/\$800k/\$6k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> comprehensive solution with multi-site capabilities stand-alone or integrated with Opus clinical systems available as an ASP and with option of database management 	<ul style="list-style-type: none"> rules-based advanced decision support logic interfacing and integration with other systems, departments, and reference labs an industry leader in service and support

*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day
 **generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day
 ***other=sales, marketing, administration, and other company functions
 ****via a computer-to-computer interface

Laboratory information systems

Part 16 of 18	Psyche Systems Corp. Rachel Stratman info@psychesystems.com 321 Fortune Blvd. Milford, MA 01757 800-345-1514 www.psychesystems.com	QuadraMed Ruth Weed rweed@quadramed.com 12110 Sunset Hills Rd., Ste. 600 Reston, VA 20190 703-904-5611 www.quadramed.com
See accompanying articles on pages 18 and 24		
Name of system	LabWeb	Affinity Laboratory
First ever LIS installation/most recent installation	1976/2006	1984/2006
No. of contracts for sites operating LIS	26	17
• Hospital/independent lab contracts in U.S.	14/4	0
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	2/2	0
• Other contracted U.S. sites/contracts for foreign sites	0/4	0/17
• Contracts that went live between Sept. 2005–Aug. 2006	3	0
Contracts signed but LIS not operational (hospitals/independent labs/others)	6 (6/0/0)	2 (1/0/1)
• Contracts signed between Sept. 2005–Aug. 2006	6	2
No. of sites operating LIS	30	31
• Percentage of high-volume* sites installed	—	60%
• Percentage of low-volume** sites installed	—	40%
Staff to develop/install and support/other*** in entire firm	12/17/7	251/214/327
Staff to develop/install and support/other*** in LIS division	8/9/7	10/14/9
No. of terminals/workstations in sites operating LIS	1–120 (average, 20)	4–3,000 (average, 64)
No. of billed tests generated annually by LIS	—	50,000–2,500,000
• Central hardware or service type	HP, Pentium compatible	open
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	HP, Pentium compatible	any brand of PC
Software		
• Programming language(s)	Visual Basic .Net, Visual Basic, C/Fortran	InterSystems Caché, .Net
• Operating system(s)	Windows XP, NT, 2000, Open VMS	Windows NT, XP, Unix
• Databases and tools used	MS SQL, Oracle, BrioQuery, Crystal Reports	Caché, Visual Basic 6, .Net, XML, Java, J2EE
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	100%	installed
• Handheld devices for bedside-positive patient ID	available but not installed	available but not installed
• NCCLS POCT-1A standard interface for POCT devices	available but not installed	available but not installed
• Microbiology	33%	100%
• Blood bank donor and transfusion	37%	—
• Surgical pathology/cytology	33%/33%	90%/90%
• HIS or EMR interface: A/D/T	90%	80%
• HIS or EMR interface: order entry	50%	10%
• HIS or EMR interface: results reporting	50%	100%
• HIS or EMR interface: package results into PDF format	available but not installed	available but not installed
• Ad hoc reporting	100%	100%
• Rules-based system	25%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	100%	20%
• Compliance checking	15%	10%
• Billing and accounts receivable	not available	50%
• Materials management and inventory	not available	10%
• Test partition/remote faxing and printing	100%/100%	100%/100%
• Physician office outreach	100%	80%
• HIPAA-standard transaction formats	100%	80%
• Web-based remote inquiry of reports/Web access for order entry	10%/10%	50%/—
• Specimen management and tracking	available in 2008	100%
Complete LIS application service provider solution?	yes	no
ASP for physician order entry and results reporting?	yes	no
Method of charging for ASP service	fixed fee	—
Client software required	browser based	—
ASP information conduit	requires software be installed on a client PC, operates over the Internet	—
Client contracts supported from data center not operated by client	9	—
How data center is operated	by vendor	—
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	available but not installed	8 sites
• Other reportable diseases	available but not installed	24 sites
• Tumor diagnosis or registry data	2 sites	—
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	yes/yes	no/no
Hospital/integrated health care systems interfaced	Meditech, McKesson, CPSI, Siemens, QuadraMed, Cerner, Misys, others	iSoft, Cerner, Siemens, IBA, EDS, McKesson, Health Solutions
Physician office management systems interfaced	IDX, AcerMed, any HL7	Medical Director
Automated lab transportation systems interfaced	Sysmex, Roche/BMC/Hitachi	Beckman Coulter, Sysmex, Bayer, Roche/BMC/Hitachi
Validation/testing tools provided?	yes (proprietary and blood bank guidelines)	no
LIS allows for third-party updates of tables and rules?	yes (CodeMap)	no
LIS permits use of voice input technology?	yes (Dragon, proprietary)	yes (Philips SpeechMagic, IBM ViaVoice, Dragon Dictate)
LIS allows for image capture and display?	yes	yes
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	yes	no
LIS supports use of SNOMED CT?	yes	yes
Market modules for other hospital departments?	no	yes
• Percentage of LIS installations stand-alone	—	90%
No. of different lab instruments interfaced with LIS	200	167
Source code?/User group that meets regularly?	escrow/yes (meets online as well)	escrow/yes
User can modify screens?	yes (offer user-defined report writer, custom programming)	yes (offer user-defined report writer)
Query language to retrieve information from LIS database	MS SQL, ODBC compliant	SQL, ODBC compliant
Smallest cost for hardware/software/monthly maintenance	\$4k/\$20k/0	0/\$50k/\$0.5k
Largest cost for hardware/software/monthly maintenance	\$100k/\$400k/\$6k	0/\$1.75m/\$24k
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • a leader in hosted laboratory information systems • delivers a full, integrated laboratory suite for all departments, including blood bank • superior rules-based report formatting and distribution 	<ul style="list-style-type: none"> • single design concept for all disciplines • specialty modules: molecular genetics, neonatal screening, mortuary • multi-site regional model in a single database
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

Tabulation does not represent an endorsement by the College of American Pathologists.

Laboratory information systems

Part 17 of 18	Quality Software Systems Allan McCutchen amccutchen@labhealth.com 252 Old Nyack Turnpike Spring Valley, NY 10977 919-596-4123 www.labhealth.com	SCC Soft Computer Ellie Vahman ellie@softcomputer.com 5400 Tech Data Drive Clearwater, FL 33760 727-789-0100 www.softcomputer.com
See accompanying articles on pages 18 and 24		
Name of system	QSS LabHealth	SoftLab
First ever LIS installation/most recent installation	1984/2006	1985/2006
No. of contracts for sites operating LIS	25	299
• Hospital/independent lab contracts in U.S.	1/24	215/28
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	0	9/0
• Other contracted U.S. sites/contracts for foreign sites	0	0/47
• Contracts that went live between Sept. 2005–Aug. 2006	2	22
Contracts signed but LIS not operational (hospitals/independent labs/others)	2 (0/2/0)	22 (21/1/0)
• Contracts signed between Sept. 2005–Aug. 2006	5	22
No. of sites operating LIS	—	599
• Percentage of high-volume* sites installed	75%	51%
• Percentage of low-volume** sites installed	25%	49%
Staff to develop/install and support/other*** in entire firm	5/7/3	598/272/246
Staff to develop/install and support/other*** in LIS division	—	467/212/192
No. of terminals/workstations in sites operating LIS	5–80 (average, 15)	10–450 (average, 80)
No. of billed tests generated annually by LIS	100,000–1,000,000+ (mean, 650,000; median, 750,000)	150,000–20,000,000+
• Central hardware or service type	Windows server NT, 2003	IBM pSeries (RS/6000)
• Central hardware redundant/fault-tolerant?	yes	yes
• Terminals/workstations or PC platform	PC based, terminals, HTML	PCs (all brands)
Software		
• Programming language(s)	Data Basic	C, C++, Java, .Net
• Operating system(s)	Windows 2003, NT	server: IBM-AIX; client: Windows 2000, XP
• Databases and tools used	post relational, multivariant, SQL	RDM++, Oracle
• System includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
• Chemistry and hematology	100%	100%
• Bar-coded collection labels	90%	100%
• Handheld devices for bedside-positive patient ID	75%	5%–10%
• NCCLS POCT-1A standard interface for POCT devices	70%	6%
• Microbiology	75%	95%
• Blood bank donor and transfusion	0	48% blood bank/3% donor
• Surgical pathology/cytology	available in December 2006	57%/57%
• HIS or EMR interface: A/D/T	100%	89%
• HIS or EMR interface: order entry	100%	82%
• HIS or EMR interface: results reporting	100%	81%
• HIS or EMR interface: package results into PDF format	85%	installed
• Ad hoc reporting	90%	100%
• Rules-based system	75%	100%
• Management and statistical reporting	100%	100%
• Outreach and commercial laboratory	75%	100%
• Compliance checking	75%	20%
• Billing and accounts receivable	80%	16%
• Materials management and inventory	20%	not available
• Test partition/remote faxing and printing	80%/—	100%/100%
• Physician office outreach	80%	10%
• HIPAA-standard transaction formats	100%	available but not installed
• Web-based remote inquiry of reports/Web access for order entry	80%/80%	10%/10%
• Specimen management and tracking	100%	100%
Complete LIS application service provider solution?	yes	yes
ASP for physician order entry and results reporting?	yes	yes
Method of charging for ASP service	free with system sale	fixed fee
Client software required	browser based	requires software be installed on a client PC
ASP information conduit	operates over the Internet	operates over the Internet
Client contracts supported from data center not operated by client	15	2
How data center is operated	by vendor	by vendor
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****		
• Microbiology data	available but not installed	2 sites
• Other reportable diseases	available but not installed	2 sites
• Tumor diagnosis or registry data	not available	7 sites
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	no/no	no (on client request)/no (on client request)
Hospital/integrated health care systems interfaced	LabCorp, Quest, Eclipsys	GE, IDX, QuadraMed, McKesson, Keane, Perot, CPSI, Siemens, Cerner, Eclipsys, Meditech, others
Physician office management systems interfaced	A4, Misys, Medical Manager, Sami Systems	Medical Manager, HealthWorks, Alliance-Plus, MedicaLogic, Trizetto, Epic, Misys, GE, IDX
Automated lab transportation systems interfaced	Roche/BMC/Hitachi	Beckman Coulter, Sysmex, Bayer, Tecan, Roche/BMC/Hitachi, Dade Behring
Validation/testing tools provided?	yes	yes (Model Soft, Camtasia)
LIS allows for third-party updates of tables and rules?	yes (custom)	yes (Quadax, Vitek, Microscan Phoenix)
LIS permits use of voice input technology?	no	yes (Nuance Power Scribe, Nuance Naturally Speaking, Talk Station, others)
LIS allows for image capture and display?	yes	—
Software provides indexed field in each test definition for LOINC code?	yes	yes
Provide LOINC dictionary for each new installation?	yes	no
LIS supports use of SNOMED CT?	yes	yes
Market modules for other hospital departments?	no	yes
• Percentage of LIS installations stand-alone	—	95%
No. of different lab instruments interfaced with LIS	150	500+
Source code?/User group that meets regularly?	yes/no	escrow/yes (meets online as well)
User can modify screens?	no (offer user-defined report writer, custom programming)	yes (offer user-defined report writer, custom programming)
Query language to retrieve information from LIS database	Access, SQL	ODBC, SQL, XML
Smallest cost for hardware/software/monthly maintenance	\$5k/\$35k/\$1.25k	\$30k/\$50k/18% of list price per year
Largest cost for hardware/software/monthly maintenance	\$5k/\$175k/\$3.9k	\$1m/\$3m/18% of list price per year
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> offer a hosted system option that is billed on a monthly fee for small sites provide clinical and billing to support such features as medical necessity physician office terminal interfaces to PCIS and manages ordering and results 	<ul style="list-style-type: none"> complete set of LIS modules for full-production genetics testing integrated outreach package with Web OE/RR, billing A/R, multi-site, courier management parallel processing; artificial intelligence/rules engine; proven in largest, sophisticated lab environments
*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day		
**generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day		
***other=sales, marketing, administration, and other company functions		
****via a computer-to-computer interface		

Tabulation does not represent an endorsement by the College of American Pathologists.

Laboratory information systems

Part 18 of 18	Schuyler House Janet Chennault schuylab@schuylerhouse.com 26027 Huntington Lane, Unit F Valencia, CA 91355 800-706-0266 www.schuylab.com	Seacoast Laboratory Data Systems Jim Whitehurst jim@sldsi.com 195 New Hampshire Ave., Ste. 140 Portsmouth, NH 03801 603-431-4114 www.sldsi.com	Siemens Medical Solution Donna Roth donna.roth@siemens.com 51 Valley Stream Parkway Malvern, PA 19355 610-219-3156 www.usa.siemens.com/medical
<i>See accompanying articles on pages 18 and 24</i>			
Name of system	SchuyLab	SurroundLab Plus	Novius Lab
First ever LIS installation/most recent installation	1994/2006	2002/2006	1983/2006
No. of contracts for sites operating LIS	624	11	65
• Hospital/independent lab contracts in U.S.	12/497	0/11	61/2
• Clinic or group practice contracts in U.S./public health lab contracts in U.S.	109/0	0	0
• Other contracted U.S. sites/contracts for foreign sites	0/6	0	0/2
• Contracts that went live between Sept. 2005–Aug. 2006	27	5	7
Contracts signed but LIS not operational (hospitals/independent labs/others)	0	3 (0/3/0)	9 (9/0/0)
• Contracts signed between Sept. 2005–Aug. 2006	27	3	10
No. of sites operating LIS	624	11	65
• Percentage of high-volume* sites installed	—	90%	70%
• Percentage of low-volume** sites installed	—	10%	30%
Staff to develop/install and support/other*** in entire firm	3/12/8	—	—
Staff to develop/install and support/other*** in LIS division	2/6/2	—	—
No. of terminals/workstations in sites operating LIS	1–28 (average, 3)	3–90 (average, 20)	—
No. of billed tests generated annually by LIS	1–500	300,000–3,000,000 (mean, 1,500,000)	—
• Central hardware or service type	—	Dell, HP Enterprise servers	IBM pSeries
• Central hardware redundant/fault-tolerant?	not applicable	yes	yes
• Terminals/workstations or PC platform	Dell PC	any	—
Software			
• Programming language(s)	Pervasive	Caché	C++
• Operating system(s)	Windows	Windows server 2003, Linux	Unix, Windows NT, 2000, XP
• Databases and tools used	Pervasive	Caché, SST	Sybase
• System includes full transaction logging?	yes	yes	yes
Features (listed as percentage of live installs or based on availability)			
• Chemistry and hematology	installed	100%	100%
• Bar-coded collection labels	installed	100%	100%
• Handheld devices for bedside-positive patient ID	not available	—	2%
• NCCLS POCT-1A standard interface for POCT devices	installed	—	10%
• Microbiology	not available	80%	98%
• Blood bank donor and transfusion	not available	—	installed
• Surgical pathology/cytology	installed	—	50%/50%
• HIS or EMR interface: A/D/T	not available	20%	90%
• HIS or EMR interface: order entry	not available	40%	98%
• HIS or EMR interface: results reporting	not available	100%	95%
• HIS or EMR interface: package results into PDF format	not available	25%	installed
• Ad hoc reporting	not available	100%	100%
• Rules-based system	not available	100%	100%
• Management and statistical reporting	not available	100%	100%
• Outreach and commercial laboratory	not available	100%	installed
• Compliance checking	installed	100%	installed
• Billing and accounts receivable	installed	100%	installed
• Materials management and inventory	not available	—	not available
• Test partition/remote faxing and printing	installed	—/100%	100%/100%
• Physician office outreach	not available	—	installed
• HIPAA-standard transaction formats	installed	100%	90%
• Web-based remote inquiry of reports/Web access for order entry	installed	40%/40%	20%/—
• Specimen management and tracking	installed	80%	20%
Complete LIS application service provider solution?	yes	—	no
ASP for physician order entry and results reporting?	no	—	yes
Method of charging for ASP service	—	—	transaction based
Client software required	—	—	browser based
ASP information conduit	—	—	operates over the Internet
Client contracts supported from data center not operated by client	—	—	—
How data center is operated	—	—	—
LIS provides surveillance data to public health agencies using CDC/HL7/LOINC/SNOMED standard****			
• Microbiology data	200	2 sites	not available
• Other reportable diseases	not available	—	not available
• Tumor diagnosis or registry data	not available	—	—
Offer HL7 Clinical Document Architecture format for CDA 1/CDA 2?	yes/yes	—	no/no
Hospital/integrated health care systems interfaced	—	Misys, Meditech, Soft, LabCorp, Quest, ARUP	McKesson
Physician office management systems interfaced	—	Medical Manager, Greenway, A4	through partnership with Telcor
Automated lab transportation systems interfaced	Beckman Coulter, Bayer	Beckman Coulter, Bayer	Beckman Coulter, Bayer, Tecan
Validation/testing tools provided?	no	no	yes
LIS allows for third-party updates of tables and rules?	no	no	no
LIS permits use of voice input technology?	no	no	yes (Impac PowerPath)
LIS allows for image capture and display?	yes	yes	no
Software provides indexed field in each test definition for LOINC code?	no	yes	no
Provide LOINC dictionary for each new installation?	no	no	no
LIS supports use of SNOMED CT?	no	yes	no
Market modules for other hospital departments?	yes	no	yes
• Percentage of LIS installations stand-alone	100%	—	—
No. of different lab instruments interfaced with LIS	25	60	300
Source code?/User group that meets regularly?	yes/no	escrow/no	escrow/yes (meets online as well)
User can modify screens?	yes (offer custom programming)	no (offer custom programming)	yes (offer user-defined report writer)
Query language to retrieve information from LIS database	—	SQL	ODBC
Smallest cost for hardware/software/monthly maintenance	\$1k/\$1.5k/\$0.08k	\$10k/\$50k/\$1.1k	—
Largest cost for hardware/software/monthly maintenance	\$40k/\$30k/\$3.5k	\$50k/\$250k/\$5.5k	—
Distinguishing features (supplied by vendor)	<ul style="list-style-type: none"> • easy to use • able to interface • able to accommodate veterinary labs 	<ul style="list-style-type: none"> • commercial lab specific • highly flexible system design • client-specific reporting options 	<ul style="list-style-type: none"> • flexibility and reliability • excellent services • workflow efficiency features: search sets, document links, and turnaround time monitor

*generate >500,000 billed tests annually, or >200 bed hospitals, or >500 requisitions per day
 **generate <500,000 billed tests annually, or <200 bed hospitals, or <500 requisitions per day
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 ****via a computer-to-computer interface