Get your bearings before buying a blood bank system

Why is the ability to interface laboratory instruments and blood bank systems still an issue, and what features should blood bank systems offer? CAP TODAY *asked experts in the field for their opinions. Here's what they had to say.*

CAP TODAY: Why is it so difficult to interface laboratory instruments and blood bank information systems?

● *Lynne Briggs, director of applications, Blood Centers of Southeastern Wisconsin, Milwaukee, and chair, information systems committee, American Association of Blood Banks:* The difficulty comes in bringing together and managing multiple layers of technology, including physical connectivity and data transport protocols, the data themselves and their format, and how the laboratory information system receives and interprets the data.

There is no immediate silver bullet for solving interface issues, but efforts to standardize messaging and data transport protocols will help reduce variability in physical connectivity and data transport, as well as in data formatting. LIS vendors can help themselves by developing black box interface engines, eliminating the need to create custom point-to-point interface logic every time a new piece of equipment and technology emerges. However, the cost and return on investment associated with these endeavors can restrain vendors, who are already required to perform rigorous testing as medical device manufacturers.

● *Mario Sanchez, vice president, software engineering, Information Data Management, Rosemont, Ill.:* The simple answer is that interface protocols are not standardized. However, the standards exist—some of the newer instruments support such protocols as HL7, ASTM, and XML. It is unfortunate that these changes are slow in coming and that the standard interfaces often vary slightly between instruments.

Sanchez

Part of the problem is that instruments communicate in a variety of ways. Some send out information indiscriminately. Others send a line of data and wait for an acknowledgement before sending another line. Still others send a line of data and a checksum and expect the receiving laboratory system to recalculate the checksum (using an algorithm specific to that instrument) and send back a positive response if the checksum matched.

Instruments can also format data in numerous ways. Furthermore, instruments often send out error codes that indicate that the test results may be in question. It is up to the laboratory system vendor to develop software to interpret the output and identify valid results.

● *Suzanne H. Butch, MA, CLDir (NCA), administrative manager, blood bank and transfusion service, University of Michigan Hospitals, Ann Arbor:* I may have a jaded viewpoint, but I believe software vendors have little incentive to make interfacing easier since selling interfaces is a good revenue source.

Butch

On the equipment side, it appears that the designers are not using HL7 to communicate and are using older versions of the ASTM standards. To make matters worse, some information that should be table-driven is hard-coded. One example of this problem is the symbol for a negative result, which can be represented as a dash, a zero, the abbreviation "neg," or the word "negative." Let the buyer decide.

● *John Damgaard, vice president and general manager, blood management division, Mediware, Oak Brook, Ill.:* Until recently, blood bank information systems were not designed to interface to laboratory instruments because blood banking was largely a manual process. With expanding blood bank automation options and improved HL7 capabilities, robust blood bank information systems should include the necessary tools to interface with instruments and share data with ancillary systems.

CAP TODAY: What new error-prevention features should transfusion service software vendors incorporate into their systems?

● *John Damgaard (Mediware):* Transfusion software should encourage bar-code scanning throughout the system to help reduce the risk of clerical entry errors. If manual entry of blood products is allowed, the most robust systems will require double-blind entry to ensure that data are input accurately.

Blood bank software vendors should also continue to expand their efforts in advanced tracking

Damgaard

technologies, including two-dimensional bar codes, bedside positive patient identification, and radio-frequency identification.

● *Suzanne H. Butch (University of Michigan Hospitals):* Vendors should include features to verify blood labels for all products. The blood bank should be able to use a bar code to read the unit number and then the ABO/Rh, product code, and outdate. Software should use the concatenation features built into the blood label to read the unit number and ABO/Rh in the same bar-code read. Using concatenation could also detect errors in product codes and outdates.

The blood bank software should also offer a unit number duplicator to label syringes and small units with the original unit number. Some blood bank software products do not use the flag characters available in ISBT 128 to enhance process control.

● *Ranie Koshy, MD, medical director, blood bank/transfusion medicine services, University Hospital/New Jersey Medical School, Newark:* Biometric identification, such as fingerprint, face, or iris recognition, should interface with electronic medical records, allowing the critical information that is captured to be incorporated into a smart card or smart wristband with an embedded radio-frequency identifier at admission. The smart card or smart wristband, operated through handheld electronic devices, will decrease errors and near misses by allowing users to access information from such systems as blood bank, laboratory, pharmacy, decision support, and physician order entry in real time.

Dr. Koshy

A smart card should include such critical information as clinically significant antibodies, allergies, drug reactions known, medications being used, and medical history, including transfusion history. Blood sample collection to blood administration should be integrated through bar-code printing and labeling of samples at the bedside with a patient-specific identifier and radio-frequency identification.

CAP TODAY: What record-keeping features should be included in blood bank software?

● *Mario Sanchez (Information Data Management):* Most of the following record-keeping features are required by FDA regulation 21 CFR part 11:
● traceability and audit trail,

which is the ability to identify who performed a step, who performed a change, when the action was taken, and what data were changed.
● identification of the status and history of a record.
● retrieval, reports, and queries of records. This is usually accomplished by incorporating a relational data base into the system.
● record security by requiring that records be created, modified, or deleted only by designated users and supporting separate designations for each type of action. This may also include data encryption.
● record retention rules that allow users to remove or make inactive outdated records.
● the logging of how records were created. For example, the software should indicate if records were input manually, through scanned entry, or through an electronic data interface with another computer.

● *Suzanne H. Butch (University of Michigan Hospitals):* Vendors should offer lot numbers for supplies used to prepare blood components, as well as their expiration dates, inclusive dates of use, and quality control data on reagents and instruments. They should also provide interfaces with instruments such as irradiators and component centrifuges to capture product component production at the hospital level.

Another worthwhile feature would be the ability to create a supply inventory by bar-coding products. Temperature monitoring would also be useful if the blood bank had a handheld data-entry device.

● *Ranie Koshy, MD (University Hospital/New Jersey Medical School):* Blood bank software should be able to record pertinent medical history that may be considered significant to manage the patient, including information about medications, adverse reactions, history of allergies, current and past history of blood transfusions, and special transfusion needs.

● *John Damgaard (Mediware):* Beyond the typical Health Insurance Portability and Accountability Act record-keeping requirements, blood bank software vendors should continue to expand their data-collection and storage features. These features should include indicators and supporting values to establish and document clinical outcomes in transfusion medicine for patient safety and process improvement. □

Blood bank information systems

Part 1 of 9 *See accompanying article on page 24*	Blood Bank Computer Systems Arlene Magdamit amagdamit@bbcsinc.com 1002 15th St. SW, Ste. 120 Auburn, WA 98001 253-333-0046 www.bbcsinc.com	Cerner Corp. Jeff Sluder jeff.sluder@cerner.com 2800 Rockcreek Parkway Kansas City, MO 64117 816-201-7072 www.cerner.com
Name of blood bank system	Blood Bank Control System	Millennium PathNet Blood Bank Transfusion and PathNet Blood Bank Donor†
First ever blood bank system installation	1987	1985
First/most recent installation of *current* blood bank system	2005/2006	1999 (transfusion), 2003 (donor)/2006
No. of contracts signed since July 1, 2005	3	23
Total number of contracts for operational sites	26	99
•U.S. hospitals—donor and transfusion service	0	0
•U.S. hospitals—transfusion service only	0	90
•U.S. regional blood centers—donor service only	22	0
•U.S. regional blood centers—donor and transfusion service	3	0
•Centralized transfusion services in the U.S.	1	0
•Foreign hospitals/foreign regional blood centers	0	9
Total number of sites operational	112	196
Installs not yet live (hospitals/regional blood centers/others)	3 (1/2/0)	157 (121/0/36)
Percentage of installations that are stand-alone systems	100%	0.5%
Staff to develop/install and support/other* •In entire company/in blood bank systems	12-4-5 (total)	1,381-1,910-3,749/15-34-15
No. of different versions of software installed	7	11
•Versions of product in field covered by FDA 510(k) clearance	BBCS release 4.4, 5.0	versions 2001.01, 2002.01, 2003.01, 2004.01, 2004.M04.01.0, 2004.M04.02.01, 2004.M04.03.01, 2005.01, 2005.02
•Versions of product that did not require FDA 510(k) clearance	Mobile 5.1, 5.2, 5.2.1, 5.2.2	none
Range in No. of terminals/workstations in live sites (average)	10–150 (average, 40)	—
Central hardware or computer platform or services	IBM iSeries	HP (Compaq), IBM RS/6000
Terminals or workstations	IBM 5250-compatible workstations and PCs	Intel Pentium PCs
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	RPG/400, Java	Visual C, C++, Visual Basic
Operating system(s)	OS/400	AIX, Open VMS, Windows NT
Database platform	IBM DB2	Oracle (Millennium)
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	100%	100% (transfusion & donor)
•Autologous and directed unit tracking	100%	100% (transfusion & donor)
•Crossmatch results	15%	100% (transfusion)
•Print donor unit labels—bar coded	4%	available in December 2006 (transfusion & donor)
•Full support of ISBT 128 unit labeling	available	available in December 2006 (transfusion & donor)
•Donor recruitment/donor questionnaire	100%/4%	available in December 2006 (transfusion & donor)/not available
•Mobile scheduling	96%	not available
•Interface with automated type and screen instruments	100%	available (transfusion & donor)
•Source or recovered plasma management	100%	available in December 2006 (donor)
•Bar-code reading of donor and unit information	100%	100% (transfusion & donor)
•Ad hoc report writer	100%	100% (transfusion & donor)
•Accounts receivable	100%	installed (transfusion)
•Management reports	100%	100% (transfusion & donor)
•Direct entry of test results	100%	100% (transfusion & donor)
•Electronic crossmatch decisionmaking	4%	100% (transfusion & donor)
•Laptop-based mobile donor registration module	88%	not available
•Track all steps in production of product	100%	100% (donor)
•Antigen typing	100%	100% (transfusion & donor)
•Interface with blood irradiator or centrifuges	available in 2007	—
•Centralized transfusion services	8%	100% (transfusion)
•Integrated bedside check for transfusion	—	not available
•Handheld devices for positive patient ID	—	not available
System provides standard ASTM/HL7 interface?	yes	yes
Interfaces to automated donor infectious disease testing instruments	uni-directional to Ortho, Immucor, Abbott, Olympus; bi-directional to Ortho, Immucor	—
Interfaces to automated ABO/Rh/antibody screening instruments	uni-directional to Ortho ProVue, Immucor Galileo, Olympus Tango; bi-directional to Ortho ProVue, Olympus Tango	uni-directional to Ortho ProVue, IBG Rosys, Immucor ABS2000, Immucor Rosys Invern, Mircro Typing Systems Reader M/SA
FDA 510(k)-approved interface to bedside patient ID system?	no	no
Connectivity	Telnet, local client, remote client	local client, remote client
Tools to help clients validate their systems	department dedicated to developing validation protocols, flow charts, management guides, validation guide documents, 24/7 client support	documents that provide guidance for validating the systems
Complete blood bank ASP solution?	yes	yes
Method of charging for ASP service	transaction based	fixed fee
Client software required	browser based, uses dumb terminals, software must be installed on client PC	requires software be installed on a client PC
ASP information conduit	operates over the Internet or requires use of private, dedicated circuit	requires use of private, dedicated circuit
Client contracts supported from data center not operated by client	3	—
How data center is operated	by a third party (blood bank or IBM Business Partner, Manage Inc.)	—
System provides indexed field in each test definition for LOINC code?	no	yes
Provide LOINC dictionary for each new installation?	no	yes
HIS and LIS interfaces	Cerner, Mediware, IDM, Meditech	n/a
User group?	yes (meets online as well)	no
Source code?	yes	escrow
Can user modify screens?	no	yes
User-defined report writer?/custom programming?	yes/yes	yes/yes
Cost for hardware/software/monthly maintenance (smallest to largest)	—	—
Distinguishing features (supplied by vendor) *other=sales, marketing, administration, other company functions	• leading the way in risk management • system is highly configurable • user group interaction and direction in product development	• clinical validation • reagent quality control • customized historical and current patient demographic displays †answers reflect both products combined, unless otherwise noted

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Blood bank information systems

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Part 2 of 9 *See accompanying article on page 24*		
Name of blood bank system	Centricity Ultra Laboratory	IDM Select Series
First ever blood bank system installation	1996	1991
First/most recent installation of *current* blood bank system	2005/2006	1996/2006
No. of contracts signed since July 1, 2005	1	2
Total number of contracts for operational sites	7	8
•U.S. hospitals—donor and transfusion service	0	0
•U.S. hospitals—transfusion service only	1	0
•U.S. regional blood centers—donor service only	0	7
•U.S. regional blood centers—donor and transfusion service	0	0
•Centralized transfusion services in the U.S.	0	0
•Foreign hospitals/foreign regional blood centers	6	1
Total number of sites operational	6	8
Installs not yet live (hospitals/regional blood centers/others)	1 (1/0/0)	1 (0/0/1)
Percentage of installations that are stand-alone systems	0	100%
Staff to develop/install and support/other* •In entire company/in blood bank systems	42,500 total/43-49-9	28-14-20 (total)
No. of different versions of software installed	4	8
•Versions of product in field covered by FDA 510(k) clearance	3.3, 4.0	—
•Versions of product that did not require FDA 510(k) clearance	2.4, 3.2	DMIS 1.2.2, 2.0, 2.1; CDIS 1.1.2, 2.0; InTouch 1.5, 2.0, 2.1
Range in No. of terminals/workstations in live sites (average)	2–10 (average, 6)	4–80 (average, 30)
Central hardware or computer platform or services	Unix-based platforms	HP 9000 business servers
Terminals or workstations	PCs with Windows 2000, XP	Unix terminals/X-terminals, PCs, workstations
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	C, C++, 4GL	C++, C
Operating system(s)	Unix	Unix
Database platform	Unify DataServer	Oracle
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	100%	100%
•Autologous and directed unit tracking	installed	100%
•Crossmatch results	100%	0
•Print donor unit labels—bar coded	not available	100%
•Full support of ISBT 128 unit labeling	installed	50%
•Donor recruitment/donor questionnaire	not available/not available	100%/0
•Mobile scheduling	not available	100%
•Interface with automated type and screen instruments	installed	0
•Source or recovered plasma management	not available	100%
•Bar-code reading of donor and unit information	100%	100%
•Ad hoc report writer	100%	100%
•Accounts receivable	not available	not available
•Management reports	100%	100%
•Direct entry of test results	100%	100%
•Electronic crossmatch decisionmaking	installed	not available
•Laptop-based mobile donor registration module	not available	not available
•Track all steps in production of product	not available	100%
•Antigen typing	installed	100%
•Interface with blood irradiator or centrifuges	not available	not available
•Centralized transfusion services	installed	not available
•Integrated bedside check for transfusion	provided by third-party vendor	not available
•Handheld devices for positive patient ID	provided by third-party vendor	not available
System provides standard ASTM/HL7 interface?	yes	no
Interfaces to automated donor infectious disease testing instruments	—	—
Interfaces to automated ABO/Rh/antibody screening instruments	uni-directional to AutoVue, Wadiana, DiaMed; bi-directional to Ortho ProVue, Immucor Galileo, Olympus Tango, AutoVue, Wadiana, DiaMed	—
FDA 510(k)-approved interface to bedside patient ID system?	no	no
Connectivity	Telnet, local client, remote client	Telnet, local client
Tools to help clients validate their systems	internal test case manual used for FDA validation available on request	product users manuals, product validation guide, configuration worksheets, automated testing tools, others
Complete blood bank ASP solution?	no	yes
Method of charging for ASP service	—	fixed fee
Client software required	—	uses dumb terminals
ASP information conduit	—	requires use of private, dedicated circuit
Client contracts supported from data center not operated by client	—	0
How data center is operated	—	—
System provides indexed field in each test definition for LOINC code?	yes	no
Provide LOINC dictionary for each new installation?	no	no
HIS and LIS interfaces	Siemens, others	—
User group?	yes (meets online as well)	yes (online user forum also available)
Source code?	escrow	escrow
Can user modify screens?	no	no
User-defined report writer?/custom programming?	yes/no	yes/yes
Cost for hardware/software/monthly maintenance (smallest to largest)	$40k–$60k/$150k/$2.5k to $125k/$400k/$6k	—
Distinguishing features (supplied by vendor) *other=sales, marketing, administration, other company functions	• fully integrated with other laboratory disciplines • designed for multi-site facilities with full security control over data-access capabilities • interface to third-party product that allows unattended sign-out by clinical/nursing staff	• longevity; large customer base; financial stability; continual R&D • proactive stance on regulatory affairs • 24/7 customer support services

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Blood bank information systems

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Part 3 of 9 *See accompanying article on page 24*		
Name of blood bank system	**IDM Surround**	**IDM Symphony Suite–Prelude†**
First ever blood bank system installation	1991	1991
First/most recent installation of *current* **blood bank system**	2000/2006	2005/2006
No. of contracts signed since July 1, 2005	2	6
Total number of contracts for operational sites	24	1
•U.S. hospitals—donor and transfusion service	0	0
•U.S. hospitals—transfusion service only	0	0
•U.S. regional blood centers—donor service only	20	1
•U.S. regional blood centers—donor and transfusion service	3	0
•Centralized transfusion services in the U.S.	0	0
•Foreign hospitals/foreign regional blood centers	1	0
Total number of sites operational	26	1
Installs not yet live (hospitals/regional blood centers/others)	4 (0/2/2)	5 (0/4/1)
Percentage of installations that are stand-alone systems	72%	0
Staff to develop/install and support/other*		
•In entire company/in blood bank systems	28-14-20 (total)	28-14-20 (total)
No. of different versions of software installed	5	2
•Versions of product in field covered by FDA 510(k) clearance	—	Prelude 1.1
•Versions of product that did not require FDA 510(k) clearance	revisions 4.0, 4.1, 4.2, 4.3, 4.4	Prelude 1.2
Range in No. of terminals/workstations in live sites (average)	3–40 (average, 5)	25
Central hardware or computer platform or services	Intel Pentium server	any compatible with HP-Unix or Windows operating systems
Terminals or workstations	PC workstation	any compatible with Windows
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	Java	Java J2EE
Operating system(s)	Windows NT, 2000, 2003	Unix, Windows 2000/2003 server, 2000/XP
Database platform	Oracle	Oracle 10g
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	not available	100%
•Autologous and directed unit tracking	not available	100%
•Crossmatch results	not available	available
•Print donor unit labels—bar coded	not available	available in May 2007
•Full support of ISBT 128 unit labeling	100%	50%
•Donor recruitment/donor questionnaire	not available/—	available in December 2006/100%
•Mobile scheduling	not available	available in December 2006
•Interface with automated type and screen instruments	100%	not available
•Source or recovered plasma management	not available	available in May 2007
•Bar-code reading of donor and unit information	100%	100%
•Ad hoc report writer	100%	not available
•Accounts receivable	not available	not available
•Management reports	100%	available in May 2007
•Direct entry of test results	100%	not available
•Electronic crossmatch decisionmaking	not available	not available
•Laptop-based mobile donor registration module	not available	available
•Track all steps in production of product	not available	100%
•Antigen typing	not available	not available
•Interface with blood irradiator or centrifuges	not available	available in December 2007
•Centralized transfusion services	not available	not available
•Integrated bedside check for transfusion	not available	not available
•Handheld devices for positive patient ID	not available	available in December 2006
System provides standard ASTM/HL7 interface?	yes (ASTM interface)	no
Interfaces to automated donor infectious disease testing instruments	uni-directional to Ortho, Immucor, Abbott, Olympus, Biotech, DOMS	—
Interfaces to automated ABO/Rh/antibody screening instruments	uni-directional to Ortho ProVue, Immucor Galileo, Olympus Tango	—
FDA 510(k)-approved interface to bedside patient ID system?	no	no
Connectivity	Telnet, remote client	local client, remote client
Tools to help clients validate their systems	product users manuals, product validation guide, configuration worksheets, automated testing tools, others	product users manuals, product validation guide, configuration worksheets, automated testing tools, others
Complete blood bank ASP solution?	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	n/a	0
How data center is operated	—	—
System provides indexed field in each test definition for LOINC code?	no	no
Provide LOINC dictionary for each new installation?	no	no
HIS and LIS interfaces	Cerner, Mak System, others	n/a
User group?	yes (online user forum also available)	yes (online user forum also available)
Source code?	escrow	escrow
Can user modify screens?	no	no
User-defined report writer?/custom programming?	yes/yes	no/yes
Cost for hardware/software/monthly maintenance (smallest to largest)	—	—
Distinguishing features (supplied by vendor)	• longevity; large customer base; financial stability; continual R&D • proactive stance on regulatory affairs • 24/7 customer support services	• longevity; large customer base; financial stability; continual R&D • proactive stance on regulatory affairs • 24/7 customer support services
*other=sales, marketing, administration, other company functions		*†patent pending*

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Blood bank information systems

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	Mak-System Corp. Stephane Sajot sales.us@mak-system.net 2720 River Rd., Ste. 225 Des Plaines, IL 60018 847-803-4863 www.mak-system.net	Medical Information Technology (Meditech) Paul Berthiaume pberthiaume@meditech.com 1 Meditech Circle Westwood, MA 02090 781-821-3000 www.meditech.com
Name of blood bank system	Progesa	Laboratory Information System–Client/Server
First ever blood bank system installation	1985	1981
First/most recent installation of *current* blood bank system	1985/2006	1997/2006
No. of contracts signed since July 1, 2005	35	23
Total number of contracts for operational sites	—	191
•U.S. hospitals—donor and transfusion service	1	—
•U.S. hospitals—transfusion service only	0	—
•U.S. regional blood centers—donor service only	5	—
•U.S. regional blood centers—donor and transfusion service	—	—
•Centralized transfusion services in the U.S.	—	—
•Foreign hospitals/foreign regional blood centers	582	—
•Total number of sites operational	—	—
Installs not yet live (hospitals/regional blood centers/others)	14 (6/8/0)	54
Percentage of installations that are stand-alone systems	100%	2%
Staff to develop/install and support/other* •In entire company/in blood bank systems	128-115-69 (total)	532-966-957 (total)
No. of different versions of software installed	—	2
•Versions of product in field covered by FDA 510(k) clearance	4.4	Magic, client/server
•Versions of product that did not require FDA 510(k) clearance	—	—
Range in No. of terminals/workstations in live sites (average)	10–1,400 (average, 100)	—
Central hardware or computer platform or services	no restrictions	Hewlett-Packard, Dell, EMC, IBM
Terminals or workstations	Sun, IBM, Wyse, HP, DEC, PC	Hewlett-Packard, Dell, EMC, IBM
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	C, C++, Pro/5, Java	Magic
Operating system(s)	Unix, Web technology, client servers, Solarius	Windows 2000, 2003 server
Database platform	Oracle, Caché, C-ISAM	SQL server
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	100%	100%
•Autologous and directed unit tracking	100%	installed
•Crossmatch results	100%	100%
•Print donor unit labels—bar coded	100%	installed
•Full support of ISBT 128 unit labeling	installed	installed
•Donor recruitment/donor questionnaire	100%/100%	installed/installed
•Mobile scheduling	100%	installed
•Interface with automated type and screen instruments	100%	installed
•Source or recovered plasma management	100%	installed
•Bar-code reading of donor and unit information	100%	installed
•Ad hoc report writer	100%	installed
•Accounts receivable	100%	installed
•Management reports	100%	100%
•Direct entry of test results	100%	100%
•Electronic crossmatch decisionmaking	100%	not available
•Laptop-based mobile donor registration module	100%	installed
•Track all steps in production of product	100%	100%
•Antigen typing	100%	installed
•Interface with blood irradiator or centrifuges	100%	not available
•Centralized transfusion services	100%	installed
•Integrated bedside check for transfusion	40%	available
•Handheld devices for positive patient ID	100%	installed
System provides standard ASTM/HL7 interface?	yes	yes
Interfaces to automated donor infectious disease testing instruments	uni- and bi-directional to Ortho, Immucor, Abbott, Olympus	—
Interfaces to automated ABO/Rh/antibody screening instruments	uni- and bi-directional to Ortho ProVue, Immucor Galileo, Olympus Tango	uni- and bi-directional to Ortho ProVue, Immucor Galileo
FDA 510(k)-approved interface to bedside patient ID system?	—	no
Connectivity	Telnet, remote client, Web client	local client, remote client, Web client
Tools to help clients validate their systems	user guides, hazard analysis, training manuals, data conversion, validation scenario samples	comprehensive manual to address validation issues; consultants take customer through the guide step by step
Complete blood bank ASP solution?	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	—	—
System provides indexed field in each test definition for LOINC code?	no	yes
Provide LOINC dictionary for each new installation?	—	no
HIS and LIS interfaces	no restrictions	Cerner, Siemens, McKesson, Misys, others
User group?	yes (meets online as well)	yes (meets online as well)
Source code?	escrow	yes
Can user modify screens?	no	yes
User-defined report writer?/custom programming?	—	yes/no
Cost for hardware/software/monthly maintenance (smallest to largest)	—	—
Distinguishing features (supplied by vendor)	• fully integrated application with abundant functionality • highly customizable through parameters	• fully integrated applications • developed in-house by Meditech • 36 years of LIS experience

*other=sales, marketing, administration, other company functions

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Blood bank information systems

Part 5 of 9

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	Medical Information Technology (Meditech)	Mediware Information Systems
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	Westwood, MA 02090	Oak Brook, IL 60523
	781-821-3000 www.meditech.com	630-218-2700 www.mediware.com
Name of blood bank system	Laboratory Information System–Magic	HCLL Transfusion and HCLL Donor†
First ever blood bank system installation	1981	1980
First/most recent installation of *current* blood bank system	1981/2006	2003/2006
No. of contracts signed since July 1, 2005	23	41
Total number of contracts for operational sites	562	104
•U.S. hospitals—donor and transfusion service	—	21
•U.S. hospitals—transfusion service only	—	77
•U.S. regional blood centers—donor service only	—	0
•U.S. regional blood centers—donor and transfusion service	—	1
•Centralized transfusion services in the U.S.	—	1
•Foreign hospitals/foreign regional blood centers	—	4
Total number of sites operational	—	20
Installs not yet live (hospitals/regional blood centers/others)	68	84 (84/0/0)
Percentage of installations that are stand-alone systems	2%	100%
Staff to develop/install and support/other*		
•In entire company/in blood bank systems	532-966-957 (total)	219 (total)/15-40-15
No. of different versions of software installed	2	4
•Versions of product in field covered by FDA 510(k) clearance	Magic, client server	HCLL Donor 1.0
•Versions of product that did not require FDA 510(k) clearance	—	HCLL Transfusion 2.7, HCLL Transfusion 2.8, HCLL Donor 1.1
Range in No. of terminals/workstations in live sites (average)	—	2–30 (average, 7)
Central hardware or computer platform or services	Hewlett-Packard, Dell, EMC, IBM	Microsoft compatible
Terminals or workstations	Hewlett-Packard, Dell, EMC, IBM	Microsoft compatible
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	Magic	Visual Basic, C++ Com
Operating system(s)	Magic	Windows
Database platform	Magic	Microsoft SQL
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	100%	installed
•Autologous and directed unit tracking	installed	installed
•Crossmatch results	100%	installed
•Print donor unit labels—bar coded	installed	installed
•Full support of ISBT 128 unit labeling	100%	installed
•Donor recruitment/donor questionnaire	installed/installed	not available/not available
•Mobile scheduling	installed	not available
•Interface with automated type and screen instruments	installed	installed
•Source or recovered plasma management	installed	installed
•Bar-code reading of donor and unit information	installed	installed
•Ad hoc report writer	installed	installed
•Accounts receivable	installed	not available
•Management reports	100%	installed
•Direct entry of test results	100%	installed
•Electronic crossmatch decisionmaking	not available	installed
•Laptop-based mobile donor registration module	installed	not available
•Track all steps in production of product	100%	installed
•Antigen typing	installed	installed
•Interface with blood irradiator or centrifuges	not available	not available
•Centralized transfusion services	installed	installed
•Integrated bedside check for transfusion	available	not available
•Handheld devices for positive patient ID	installed	not available
System provides standard ASTM/HL7 interface?	yes	yes
Interfaces to automated donor infectious disease testing instruments	—	—
Interfaces to automated ABO/Rh/antibody screening instruments	uni- and bi-directional to Ortho ProVue, Immucor Galileo	uni-directional to Ortho ProVue, Immucor Galileo, Immucor ABS2000
FDA 510(k)-approved interface to bedside patient ID system?	no	no
Connectivity	Telnet, local client, Web client, remote client, others	local client
Tools to help clients validate their systems	comprehensive manual to address validation issues; consultants take customer through the guide step by step	validation scripts
Complete blood bank ASP solution?	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	—	—
System provides indexed field in each test definition for LOINC code?	yes	—
Provide LOINC dictionary for each new installation?	no	—
HIS and LIS interfaces	Cerner, Siemens, McKesson, Misys, others	to HL7-compliant HIS and LIS vendors
User group?	yes (meets online as well)	yes
Source code?	yes	escrow
Can user modify screens?	yes	yes
User-defined report writer?/custom programming?	yes/no	yes/no
Cost for hardware/software/monthly maintenance (smallest to largest)	—	$12k/$30k/$6.6k to $175k/$600k/$132k
Distinguishing features (supplied by vendor)	• fully integrated applications • developed in-house by Meditech • 36 years of LIS experience	• over 25 years of experience in the blood bank software industry • over 12 percent of staff in blood bank division are SBB certified • HCLL requires bar-code scanning or double-blind entry of blood products to eliminate clerical error
*other=sales, marketing, administration, other company functions		†company did not indicate whether answers apply to both products combined or just one of the products

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Blood bank information systems

	Mediware Information Systems Joe Tehan joe.tehan@mediware.com 1900 Spring Rd., Ste. 450 Oak Brook, IL 60523 630-218-2700 www.mediware.com	Misys Healthcare Systems Rick Foster rick.foster@misyshealthcare.com 8529 Six Forks Rd. Raleigh, NC 27615 866-647-9787 www.misyshealthcare.com
Part 6 of 9		
See accompanying article on page 24		
Name of blood bank system	LifeTrak	Misys Blood Bank†
First ever blood bank system installation	1980	1985
First/most recent installation of *current* blood bank system	1994/2006	2005/2006
No. of contracts signed since July 1, 2005	1	55
Total number of contracts for operational sites	10	~490
•U.S. hospitals—donor and transfusion service	4	38
•U.S. hospitals—transfusion service only	0	421
•U.S. regional blood centers—donor service only	4	0
•U.S. regional blood centers—donor and transfusion service	1	0
•Centralized transfusion services in the U.S.	1	0
•Foreign hospitals/foreign regional blood centers	0	28
Total number of sites operational	7	473
Installs not yet live (hospitals/regional blood centers/others)	3 (3/0/0)	17 (17/0/0)
Percentage of installations that are stand-alone systems	100%	0
Staff to develop/install and support/other*		
•In entire company/in blood bank systems	219 total/15-40-15	814-1,040-800/not available
No. of different versions of software installed	2	2
•Versions of product in field covered by FDA 510(k) clearance	LifeTrak 2.03, Life Trak 3.02	all
•Versions of product that did not require FDA 510(k) clearance	—	—
Range in No. of terminals/workstations in live sites (average)	10–300 (average, 100)	4–500 (average, 15–20)
Central hardware or computer platform or services	Intel-based server (Linux), HP 9000 (HP-UX 11)	HP Alpha servers, IBM pSeries servers and e-servers (RS/6000)
Terminals or workstations	Microsoft compatible	PCs, terminals
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	Oracle forms and reports, Pro*C	ANSI Standard M, Caché Script, standard C/C++, Visual Basic, Visual C++, Active X
Operating system(s)	HP-UX, Linux AS	HP-UX, OpenVMS, AIX
Database platform	Oracle	Intersystems Caché
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	installed	100%
•Autologous and directed unit tracking	installed	100%
•Crossmatch results	not available	100%
•Print donor unit labels—bar coded	installed	not available
•Full support of ISBT 128 unit labeling	not available	100%
•Donor recruitment/donor questionnaire	installed/installed	15%/not available
•Mobile scheduling	installed	not available
•Interface with automated type and screen instruments	installed	5%
•Source or recovered plasma management	installed	100%
•Bar-code reading of donor and unit information	installed	100%
•Ad hoc report writer	installed	100%
•Accounts receivable	not available	100% (charge capture)
•Management reports	installed	100%
•Direct entry of test results	installed	100%
•Electronic crossmatch decisionmaking	not available	5%
•Laptop-based mobile donor registration module	installed	not available
•Track all steps in production of product	installed	100%
•Antigen typing	installed	100%
•Interface with blood irradiator or centrifuges	not available	not available
•Centralized transfusion services	not available	installed
•Integrated bedside check for transfusion	not available	not available
•Handheld devices for positive patient ID	not available	2%
System provides standard ASTM/HL7 interface?	yes	yes
Interfaces to automated donor infectious disease testing instruments	uni-directional to Ortho, Immucor, Abbott, Olympus, NAT Tracker	uni-directional to Ortho, Immucor, Abbott, Olympus, DiaMed
Interfaces to automated ABO/Rh/antibody screening instruments	uni-directional to Ortho ProVue, Immucor Galileo, Immucor ABS2000	uni-directional to Ortho ProVue, Immucor Galileo, Olympus Tango, DiaMed
FDA 510(k)-approved interface to bedside patient ID system?	no	no
Connectivity	Telnet, local client, remote client, Web client	Telnet, local client, remote client
Tools to help clients validate their systems	validation scripts	Misys Healthcare Consulting, documentation and training
Complete blood bank ASP solution?	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	—	—
System provides indexed field in each test definition for LOINC code?	—	no
Provide LOINC dictionary for each new installation?	—	no
HIS and LIS interfaces	n/a	McKesson, Meditech, Siemens, Epic, Eclipsys, Cerner, Phamis, others
User group?	yes	yes (meets online as well)
Source code?	escrow	escrow
Can user modify screens?	no	no
User-defined report writer?/custom programming?	no/no	yes/yes
Cost for hardware/software/monthly maintenance (smallest to largest)	$15k/$75k/$2.6k to $250k/$400k/$23k	$60k/$100k/$1.5k to $200k/$250k/$4k
Distinguishing features (supplied by vendor)	• used by one of the largest national testing labs in the United States • Mediware's LifeWeBB secure Web-based solution seamlessly integrates the donor self-scheduling process with LifeTrak	• integrated with Misys Laboratory—includes integrated display of results and integrated reports • tracking inventories by facility and blood bank within facility •proactive utilization reports
*other=sales, marketing, administration, other company functions		†Misys Blood Donor is available with Misys Blood Bank

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Blood bank information systems

Part 7 of 9	Netlims LLC Avi Allerhand avi@netlims.com 96 Engle St. Englewood, NJ 07631 201-894-5300 www.netlims.com	Psyche Systems Corp. Rachel Stratman info@psychesystems.com 321 Fortune Blvd. Milford, MA 01757 800-345-1514 www.psychesystems.com
See accompanying article on page 24		
Name of blood bank system	AutoFusion	Systematic Blood Bank–Hosted Transfusion System
First ever blood bank system installation	2001	1987
First/most recent installation of *current* blood bank system	2002/2006	2001/2006
No. of contracts signed since July 1, 2005	3	4
Total number of contracts for operational sites	2	14
•U.S. hospitals—donor and transfusion service	0	0
•U.S. hospitals—transfusion service only	0	14
•U.S. regional blood centers—donor service only	0	0
•U.S. regional blood centers—donor and transfusion service	0	0
•Centralized transfusion services in the U.S.	0	0
•Foreign hospitals/foreign regional blood centers	2	0
Total number of sites operational	14	6
Installs not yet live (hospitals/regional blood centers/others)	2 (2/0/0)	5 (5/0/0)
Percentage of installations that are stand-alone systems	0	36%
Staff to develop/install and support/other*	53-33-18/6-5-3	10-16-9/3-5-2
•In entire company/in blood bank systems	2	1
No. of different versions of software installed		
•Versions of product in field covered by FDA 510(k) clearance	none†	Systematic Blood Bank (SBB) 3.0
•Versions of product that did not require FDA 510(k) clearance	AutoFusion 2.42, AutoFusion 3.0	none
Range in No. of terminals/workstations in live sites (average)	3–20 (average, 10)	1–6 (average, 3)
Central hardware or computer platform or services	Wintel (HP, IBM, Dell)	hosted/Web deployed
Terminals or workstations	Wintel (HP, IBM, Dell)	PCs
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	C++	Visual Basic, Fortran
Operating system(s)	Windows	any
Database platform	SQL, Oracle	proprietary
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	installed	100%
•Autologous and directed unit tracking	installed	100%
•Crossmatch results	installed	100%
•Print donor unit labels—bar coded	installed	not available
•Full support of ISBT 128 unit labeling	installed	100%
•Donor recruitment/donor questionnaire	installed/installed	not available/not available
•Mobile scheduling	not available	not available
•Interface with automated type and screen instruments	installed	10%
•Source or recovered plasma management	not available	not available
•Bar-code reading of donor and unit information	installed	100%
•Ad hoc report writer	installed	100%
•Accounts receivable	not available	not available
•Management reports	installed	100%
•Direct entry of test results	installed	100%
•Electronic crossmatch decisionmaking	installed	100%
•Laptop-based mobile donor registration module	installed	not available
•Track all steps in production of product	installed	100%
•Antigen typing	installed	100%
•Interface with blood irradiator or centrifuges	available in 2006	—
•Centralized transfusion services	installed	100%
•Integrated bedside check for transfusion	available in 2006	available
•Handheld devices for positive patient ID	installed	available
System provides standard ASTM/HL7 interface?	yes	yes
Interfaces to automated donor infectious disease testing instruments	bi-directional to Abbott, Olympus	—
Interfaces to automated ABO/Rh/antibody screening instruments	uni-directional to Wadiana; bi-directional to Olympus Tango	uni-directional to Immucor Galileo
FDA 510(k)-approved interface to bedside patient ID system?	no	no
Connectivity	local client, remote client	Telnet, local client, remote client, Web client
Tools to help clients validate their systems	—	software validation guidelines
Complete blood bank ASP solution?	no	yes
Method of charging for ASP service	—	fixed fee
Client software required	—	browser based, requires software be installed on a client PC
ASP information conduit	—	operates over the Internet
Client contracts supported from data center not operated by client	—	8
How data center is operated	—	by vendor
System provides indexed field in each test definition for LOINC code?	yes	no
Provide LOINC dictionary for each new installation?	no	no
HIS and LIS interfaces	any HL7 compliant	CPSI, Psyche Systems, Meditech, Siemens, McKesson, Cerner, Misys, others
User group?	yes (meets online as well)	yes (meets online as well)
Source code?	escrow	escrow
Can user modify screens?	yes	yes
User-defined report writer?/custom programming?	yes/yes	yes/no
Cost for hardware/software/monthly maintenance (smallest to largest)	$40k/$75k/$2k to $140k/$300k/$4.5k	$0/$10k/$0.5k to $3k/$50k/$1k
Distinguishing features (supplied by vendor)	• full integration with all other lab modules and free choice of database on same database • highly customizable and open system • unique user interface	• complete, affordable blood bank system for the small to mid-size blood bank • flexible and easy to use • securely hosted, Web-deployed system requires no additional hardware investment
*other=sales, marketing, administration, other company functions	†*awaiting FDA 510(k) clearance*	

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SYSTEM REVIEW SERIES

Blood bank information systems

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See accompanying article on page 24

	SCC Soft Computer Ellie Vahman ellie@softcomputer.com 5400 Tech Data Drive Clearwater, FL 33760 727-789-0100 www.softcomputer.com	SCC Soft Computer Ellie Vahman ellie@softcomputer.com 5400 Tech Data Drive Clearwater, FL 33760 727-789-0100 www.softcomputer.com
Name of blood bank system	SoftBank	SoftDonor
First ever blood bank system installation	1992	1992
First/most recent installation of *current* blood bank system	2005/2006	2005/2006
No. of contracts signed since July 1, 2005	33	7
Total number of contracts for operational sites	125	4
•U.S. hospitals—donor and transfusion service	4	4
•U.S. hospitals—transfusion service only	117	0
•U.S. regional blood centers—donor service only	0	0
•U.S. regional blood centers—donor and transfusion service	0	0
•Centralized transfusion services in the U.S.	0	0
•Foreign hospitals/foreign regional blood centers	4	0
Total number of sites operational	203	4
Installs not yet live (hospitals/regional blood centers/others)	25 (25/0/0)	6 (6/0/0)
Percentage of installations that are stand-alone systems	3%	10%
Staff to develop/install and support/other*		
•In entire company/in blood bank systems	603-257-170/34-23-15	603-257-170/21-23-15
No. of different versions of software installed	6	3
•Versions of product in field covered by FDA 510(k) clearance	19.1, 21, 22, 23, 23 with Softscape, 23 with DMSI	4.1, 4.2, 4.3
•Versions of product that did not require FDA 510(k) clearance	none	none
Range in No. of terminals/workstations in live sites (average)	1–90+ (average, 8)	3–8 (average, 8)
Central hardware or computer platform or services	IBM pSeries	IBM pSeries
Terminals or workstations	PCs	PCs
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	C, C++, .Net	C, C++, .Net
Operating system(s)	IBM AIX (Unix)	IBM AIX (Unix)
Database platform	RDM, Oracle	RDM, Oracle
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	100%	100%
•Autologous and directed unit tracking	100%	100%
•Crossmatch results	100%	not available
•Print donor unit labels—bar coded	30% (component labels only)	available in 2006
•Full support of ISBT 128 unit labeling	70%	installed
•Donor recruitment/donor questionnaire	not available/not available	100%/100%
•Mobile scheduling	not available	50%
•Interface with automated type and screen instruments	2%	100%
•Source or recovered plasma management	50%	100%
•Bar-code reading of donor and unit information	100%	100%
•Ad hoc report writer	100%	100%
•Accounts receivable	95%	100%
•Management reports	100%	100%
•Direct entry of test results	100%	100%
•Electronic crossmatch decisionmaking	70%	not available
•Laptop-based mobile donor registration module	not available	100%
•Track all steps in production of product	100%	100%
•Antigen typing	100%	100%
•Interface with blood irradiator or centrifuges	available in June 2007	available in 2007
•Centralized transfusion services	0	not available
•Integrated bedside check for transfusion	available in June 2007	not available
•Handheld devices for positive patient ID	available in June 2007	not available
System provides standard ASTM/HL7 interface?	yes	yes
Interfaces to automated donor infectious disease testing instruments	—	bi-directional to Abbott
Interfaces to automated ABO/Rh/antibody screening instruments	uni-directional to Immucor ABS2000, Ortho MTS; bi-directional to Orth ProVue, Immucor Galileo	bi-directional to Ortho ProVue, Immucor Galileo
FDA 510(k)-approved interface to bedside patient ID system?	—	no
Connectivity	Telnet, local client, remote client, Web client, thin client	Telnet, local client, remote client, thin client
Tools to help clients validate their systems	critical control points and instructions on how to write test cases with electronic screen capture	critical points and instructions on how to write test cases with electronic screen capture
Complete blood bank ASP solution?	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	1	0
How data center is operated	by vendor	by vendor
System provides indexed field in each test definition for LOINC code?	no	no
Provide LOINC dictionary for each new installation?	no	no
HIS and LIS interfaces	Meditech, McKesson, Siemens, IDX, Cerner, CPSI, QuadraMed, any vendor that supports HL7 protocol	Meditech, McKesson, Siemens, IDX, Cerner, CPSI, QuadraMed, any vendor that supports HL7 protocol
User group?	yes (meets online as well)	yes (meets online as well)
Source code?	escrow	escrow
Can user modify screens?	yes	no
User-defined report writer?/custom programming?	yes/yes	yes/yes
Cost for hardware/software/monthly maintenance (smallest to largest)	$30k/$30k/$0.6k to $75k/$150k/$3k	$30k/$50k/$1k to $75k/$300k/$6k
Distinguishing features (supplied by vendor)	• interfacing to all major vendors • management tools, including audits and reporting • development, support, and implementation through blood bankers	• interface with all major vendors • over 25 years of leading clinical software solutions • development, support, and implementation by donor specialists

*other=sales, marketing, administration, other company functions

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SYSTEM REVIEW SERIES

Blood bank information systems

Part 9 of 9

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	Wyndgate Technologies Scott Dustin dustins@wyndgate.com 4925 Robert J. Mathews Parkway, Ste. 100 El Dorado Hills, CA 95762 916-404-8400 www.wyndgate.com	Wyndgate Technologies Scott Dustin dustins@wyndgate.com 4925 Robert J. Mathews Parkway, Ste. 100 El Dorado Hills, CA 95762 916-404-8400 www.wyndgate.com
Name of blood bank system	SafeTrace	SafeTrace Tx
First ever blood bank system installation	1996	1996
First/most recent installation of *current* blood bank system	1996/2006	1999/2006
No. of contracts signed since July 1, 2005	5	34
Total number of contracts for operational sites	46	154
•U.S. hospitals—donor and transfusion service	11	13
•U.S. hospitals—transfusion service only	0	116
•U.S. regional blood centers—donor service only	23	0
•U.S. regional blood centers—donor and transfusion service	9	7
•Centralized transfusion services in the U.S.	0	15
•Foreign hospitals/foreign regional blood centers	3	3
Total number of sites operational	232	148
Installs not yet live (hospitals/regional blood centers/others)	10 (5/5/0)	72 (70/2/0)
Percentage of installations that are stand-alone systems	100%	100%
Staff to develop/install and support/other*		
•In entire company/in blood bank systems	24-25-20 (total)†	24-25-20 (total)†
No. of different versions of software installed	2+	2+
•Versions of product in field covered by FDA 510(k) clearance	all	all
•Versions of product that did not require FDA 510(k) clearance	n/a	n/a
Range in No. of terminals/workstations in live sites (average)	3–200+ (average, ~40)	1–75+ (average, ~8)
Central hardware or computer platform or services	Sun, HP, IBM	Intel-based and Unix-based servers
Terminals or workstations	PCs	PCs
Central hardware redundant or fault-tolerant?	yes	yes
Software programming language(s)	Delphi, PL/SQL, .Net, C, 4GL	Delphi, SQL
Operating system(s)	Unix	Windows XP Professional, 2003, 2000 (Unix optional)
Database platform	Oracle	Oracle
Standard system includes full transaction logging?	yes	yes
Features (listed as percentage of live installs or based on availability)		
•Unit inventory	100%	100%
•Autologous and directed unit tracking	100%	100%
•Crossmatch results	not available	100%
•Print donor unit labels—bar coded	100%	installed
•Full support of ISBT 128 unit labeling	100%	100%
•Donor recruitment/donor questionnaire	100%/not available	not available/not available
•Mobile scheduling	100%	not available
•Interface with automated type and screen instruments	100%	installed
•Source or recovered plasma management	100%	not available
•Bar-code reading of donor and unit information	100%	100%
•Ad hoc report writer	100%	installed
•Accounts receivable	not available	not available
•Management reports	100%	100%
•Direct entry of test results	100%	100%
•Electronic crossmatch decisionmaking	not available	45%
•Laptop-based mobile donor registration module	installed	not available
•Track all steps in production of product	100%	100%
•Antigen typing	100%	100%
•Interface with blood irradiator or centrifuges	not available	installed
•Centralized transfusion services	n/a	10%
•Integrated bedside check for transfusion	n/a	available through business partners††
•Handheld devices for positive patient ID	n/a	available through business partners††
System provides standard ASTM/HL7 interface?	yes	yes
Interfaces to automated donor infectious disease testing instruments	uni-directional to Ortho, Immucor, Abbott, Olympus, Hitachi, Gambro; bi-directional to Gambro	uni- and bi-directional to Ortho, Immucor
Interfaces to automated ABO/Rh/antibody screening instruments	uni-directional to Ortho ProVue, Immucor Galileo	uni- and bi-directional to Ortho ProVue, Immucor Galileo
FDA 510(k)-approved interface to bedside patient ID system?	no	no
Connectivity	Telnet, remote client	local client, remote client, Web client
Tools to help clients validate their systems	validation and sample test cases	validation guidelines, templates, and validation test plan for safety critical control checks
Complete blood bank ASP solution?	yes	yes
Method of charging for ASP service	fixed fee, transaction based	fixed fee, transaction based
Client software required	browser based, uses dumb terminals	browser based
ASP information conduit	operates over the Internet, requires use of a private, dedicated circuit	operates over the Internet, requires use of a private, dedicated circuit
Client contracts supported from data center not operated by client	7	2
How data center is operated	by a third party (Hemo-Net)	by a third party (Hemo-Net)
System provides indexed field in each test definition for LOINC code?	no	no
Provide LOINC dictionary for each new installation?	no	no
HIS and LIS interfaces	—	McKesson, Siemens, Aspyra, GE, CPSI, Meditech, Keane, IDX, SCC, Sysmex, others
User group?	yes (meets online as well)	yes (meets online as well)
Source code?	yes††	escrow
Can user modify screens?	no	no
User-defined report writer?/custom programming?	yes/yes	yes (through third-party software)/yes
Cost for hardware/software/monthly maintenance (smallest to largest)	—	—
Distinguishing features (supplied by vendor)	• extensive safety checks throughout the system • open workflow and extensive user-defined table-based rules • complete Vein-to-Vein tracking	• numerous safety features, including Patient-At-A-Glance Bar • patent-pending CTS and other transfusion service functionality • comprehensive Vein-to-Vein tracking
*other=sales, marketing, administration, other company functions	†*excludes consultant employees* ††*for most modules; otherwise escrow*	†*excludes consultant employees* ††*McKesson, Lattice, Care Fusion, HealthCare ID*

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