

# Lab Data Collection System

## Purpose:

To save time, reduce paperwork, and improve accuracy when requesting and delivering lab results within a small medical practice.

## Existing Process:

The existing procedure in the office was as follows:

1. Provider requests tests on a patient.
2. Request entered in the office EMR system and recorded on a lab request form.
3. Form delivered to the lab (patient goes to lab or technician goes to room)
4. Technician takes samples and delivers to analysis machine.
5. Machines only allow numeric IDs, so the patient birthday is used as an ID.
6. Machines produce results, technician records results in chart or attaches printout to chart.
7. Provider retrieves chart and results and proceeds with patient care.
8. Results manually entered in EMR.

## Proposed Process:

1. Provider requests tests on a patient.
2. Request entered in the office EMR system.
3. Request electronically delivered to the lab and placed on a status board.
4. Technician takes samples from patient in lab or patient room and enters in analysis machine.
5. Machines only allow numeric IDs, can use birthdate or numeric code generated by system.
6. Machines produce results, results transferred to database. Technician verifies results on screen.
7. Results transferred back to patient room and recorded in EMR.

## Technical Overview:

The Data Collection System was designed to automatically collect data from the lab instrumentation and report it to the patient electronic record. The system consists of several components:

1. Lab equipment interface hardware
2. Lab communication monitoring service
3. Lab data file parsing Service
4. SQL Database
5. Lab Request Software
6. Lab Management Software

### 1- Lab Equipment Interface:

Each piece of Lab equipment is connected to the Lab computer by either a 3-wire serial cable or a USB cable. The USB cables plug directly into the lab computer, the serial cables are connected to a Black-Box serial multiplexor. Each serial cable is a 9-pin to 9-pin connection with an Rx-Tx crossover. The Black-Box multiplexor appears as 8 additional serial ports to the computer. Each direct USB device also appears as new serial port to the computer.

## 2-Lab Communication Monitor:

When the Lab computer is started, each serial port is assigned a port number (COM). These ports are mapped to the system by a file “C:\LabDataCollect\FileReader.ini”. The format for the file is:

COM<sub>x</sub>=FILETYPE=NAME: Where x= port number , FILETYPE=LD\_CSV, LD\_TXT, or LD\_BC, and the NAME is the machine name. The filetype defines the data (CSV=comma delimited, TXT=Text, and BC=Beckman-Coulter).

A service running on the lab computer which monitors the above serial ports and processes the raw data, stores it in a date/time encoded file on the server. The txt and csv data is a simple data dump of the printed copy. The BC data is a group of data packets which include both the numeric data and graphic data (due to the handshaking, this takes several seconds to process – note the wait symbol on the BC while this is being sent).

The raw data is stored in the [\\SRV00PRX\LabData\RAW](#) directory.

NOTE: Do not unplug/replug the USB cables when the system is running. It will re-assign the port numbers and then nothing will be collected. Turn the machine off before changing cabling, or reboot the machine after complete.

NOTE: When turning on/off the Abaxis machines, the serial port will appear/disappear. This will be handled by the software. Basically, the software will disconnect the port interrupt if it goes offline, then scan for its presents every 30 seconds until it comes back online, then reconnect the interrupt.

## 3-Lab File Parsing Service:

The next service that is used is a parsing service. This is run from the server [\\SRV00PRX](#). It monitors the RAW directory and when a file is written there, it will parse it and extract the test results. These results are then written to the Database. Both the RAW and PARSED files are written to the PARSED directory on the server for reference. To follow conventions established in the lab, the patient date of birth is used as the identifying field of each record. If a result is read that cannot be matched to a current patient, the system records it as a unknown with the existing patient number. When the technician sees that results have not been returned after the test is complete, he will be responsible to check the unknowns, and correctly ID them. This covers two scenerios: 1- user enters wrong ID number. 2-test is run without request (sometimes patients go directly to the lab).

## 4-Database:

A SQL Database is stored on the [\\SRV00PRX](#) server. It contains several tables and views used by this system.

-LabTest = Lists all of the lab tests available.

-TestResult=Lists the tests results sent from the equipment, and which tests they result from.

-Provider=List of providers at the Clinic.

-LabRequest, LabRequestDetail = Requests from providers.

-LabResultHead, LabResultDetail= Result lists for the tests.

Views are used to show the status of lab requests and the results for each provider.

#### 5-LabRequest Software:

This is an internal website hosted on [\\SRV00PRX](#) port 8009. It is viewed and used in the patient rooms, where tests can be requested and results can be viewed. The details are described in the UserManual Section below.

The page shows lab tests, defined in the database, and allows the user to select which tests to run. Special section provided for special tests and notes. When the results are complete, they can be viewed and signed off. The final step is to write the signed off data to the EMR import directory (HL7 format) and be read back to the patient record.

#### 6-Lab Management Software:

This is an internal website hosted on [\\SRV00PRX](#) port 8010. It is viewed in the Lab, and shows the status of test requests and results. The purpose of this interface is to alert the technicians to new lab test requests, verify the data from the machines, enter manual tests, and maintain the test/result database.

# Request Manual

The Request page can be used in every room. The Requests are sent to the Lab Computer. The results are directed back to the patient rooms based on provider. Assuming that each provider will be assessing another patient by the time the lab tests are complete, they will be alerted to the results when they are ready.

Main Screen:

The screenshot shows a web browser window with the following elements:

- Browser:** Firefox, Patient Room Page, URL: srv00prc:8009/Default.aspx
- Page Header:** Medical Center LAB, Provider: Visitor, Date: 7/13/2012
- Navigation:** Request, View, History
- Form Fields:** Patient Name: Test Patient, Patient No: 123456, DOB: 1/10/1955, Rm: 1, Submit button
- Test Selection:** A grid of checkboxes for various lab tests. The "Lipid Panel" checkbox is checked.
- Additional Options:** Special, Venipuncture, Finger Stick, Specimen Handling
- Notes:** Notes to LAB: (empty text area)
- Status:** 0 Pending, 0 Ready

The provider is selected at the top of the screen, and will remain in place (in the patient room) while the web page is opened. The user is responsible for entering the name, number, date of birth, and tests to run. The patient is tracked through the lab by the DOB and by EMR by Patient No. On a new panel, the user can use the dropdown to select the patient (which is exported from the EMR). When selected, all pertinent information is recorded in the header. When a minimum of the information is entered, the Submit button will be displayed. Additionally, the user can enter notes at the bottom of the screen.

When all complete, press the submit button and the request will be sent to the Lab, and the screen will be cleared.

After sending the data to the Lab, the screen will look like this:

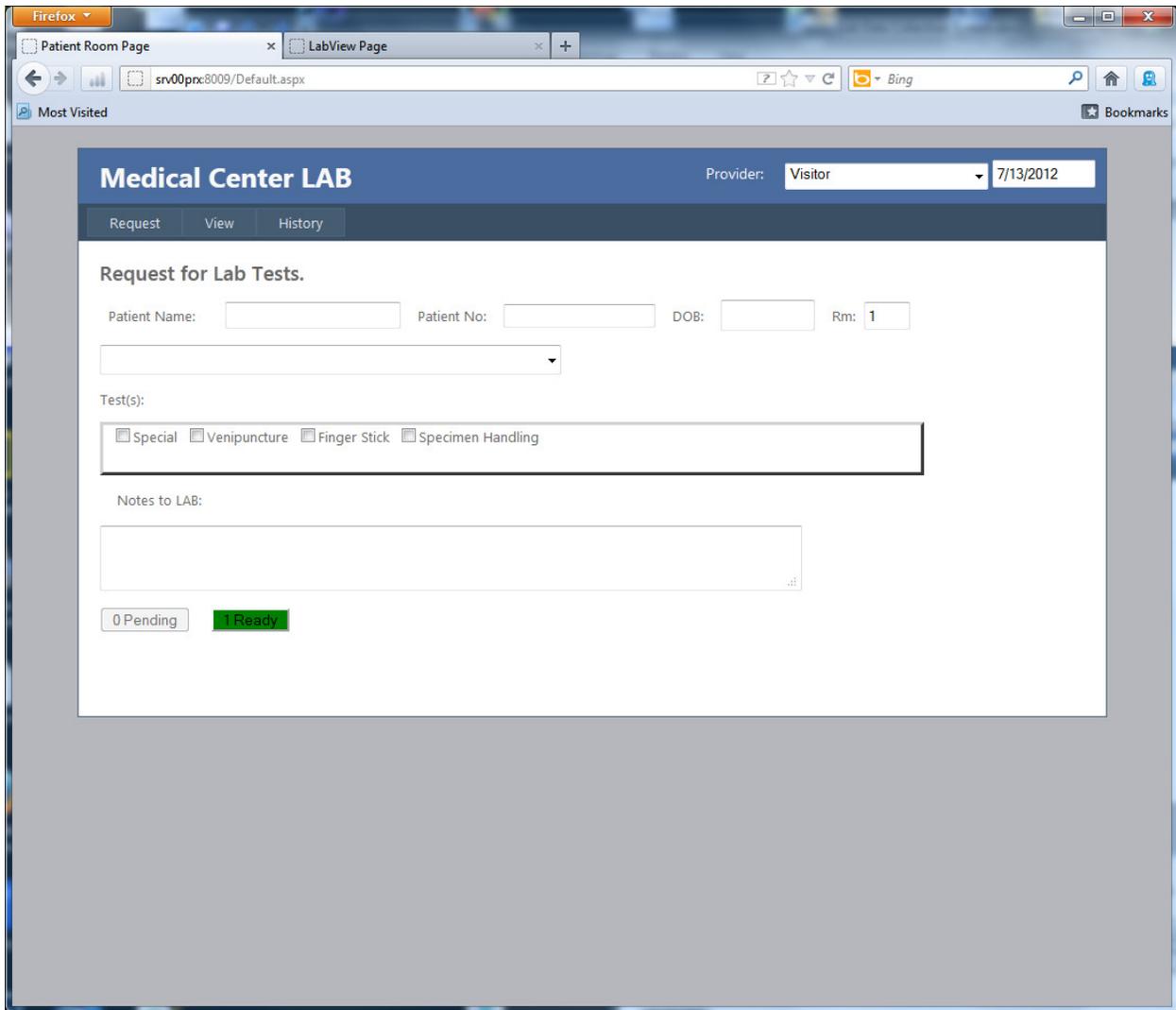
The screenshot shows a web browser window with the following elements:

- Browser: Firefox
- Page Title: Patient Room Page
- Address Bar: srv00prx:8009/Default.aspx
- Search: Bing
- Page Header: Medical Center LAB
- Page Header: Provider: Visitor, 7/13/2012
- Navigation: Request, View, History
- Section: Request for Lab Tests.
- Form Fields: Patient Name, Patient No., DOB, Rm: 1
- Test Selection: Special, Venipuncture, Finger Stick, Specimen Handling
- Notes: Notes to LAB:
- Status: 1 Pending, 0 Ready

The panel is ready for the next patient to be entered. Note that the bottom left has a button showing that 1 test is pending. This will track your request to the lab. When the results are ready, the second button will display ready.

### Results (Ready):

When results are ready, the ready button will turn green.



Pressing the button or selecting the View Tab will take you to the View screen.

Medical Center LAB

Provider: Visitor 7/13/2012

Request View History

View Lab Results.

Patient	DOB	LabTest	Status	
Test, Patient	1/1/1950	Lipid Panel	ResultReady	201205231138170398 <a href="#">View</a>
Sample, Patient	12/27/1984	SPEC	SendOut	201205241101230707 <a href="#">View</a>
Sample, Patient	12/27/1984	SPEC	SendOut	201205241101230718 <a href="#">View</a>
Another, Patient	5/30/1958	SPEC	SendOut	201205291006300111 <a href="#">View</a>

Note here that by this time the provider has requested four tests for three different patients. The other tests are special procedures that were sent to an outside lab. When the results are returned, the lab technicians will enter the results and they will show as ready. We'll look at the Lipid panel by pressing the VIEW link on the first line. Which will bring us to this panel.

The screenshot shows a web browser window with the following details:

- Browser: Firefox
- Address Bar: <http://srv00pnc80...01205231138170398>
- Page Title: LabView Page
- URL: [srv00pnc8009/Detail.aspx?Name=Test, Patient&Link=201205231138170398](http://srv00pnc8009/Detail.aspx?Name=Test, Patient&Link=201205231138170398)
- Search: Bing
- Page Content:
  - Medical Center LAB
  - Provider: Visitor
  - Date: 7/13/2012
  - Request | View | History
  - LAB Results: 201205231138170398 Lipid Panel
  - Table of Lab Results (see below)
  - Yellow bar
  - SignOff button

LabTest	Result	Range	Units	Time	Tech	Notes
CHOL	218	-	mg/dL	12:18 PM	DAB	
HDL	42	-	mg/dL	12:18 PM	DAB	
TRIG	116	-	mg/dL	12:18 PM	DAB	
TC/H	5.2(c)	-		12:18 PM	DAB	
LDL	153(c)	-	mg/dL	12:18 PM	DAB	
VLDL	23(c)	-	mg/dL	12:18 PM	DAB	

Test results are shown here, along with a note from the lab. When the provider has seen this, he presses signoff to log it and clear it from the list. This can be done later in the day if needed.

At this point, a provider can check for previous test on this patient by pressing the history button.

**Medical Center LAB** Provider:  7/13/2012

Request View History

Date of Service:  Date of Birth:

Patient	DOB	LabTest	Status		
test pat1	1/1/1950	BMP	Complete	201203080909310988	<a href="#">View</a>
Test, Patient	1/1/1950	CBC & Diff	Complete	201204251504240651	<a href="#">View</a>
Test, Patient	1/1/1950	CKMB	Complete	201204251504240661	<a href="#">View</a>
Test, Patient	1/1/1950	CMP	Complete	201204251504240674	<a href="#">View</a>
Test, Patient	1/1/1950	Myoglobin	Complete	201204251504240689	<a href="#">View</a>
Test, Patient	1/1/1950	Troponin 1	Complete	201204251504240700	<a href="#">View</a>
Test, Patient	1/1/1950	Lipid Panel	ResultReady	201205231138170398	<a href="#">View</a>
Test, Patient	1/1/1950	PSA	Complete	201205231138170409	<a href="#">View</a>
Test, Patient	1/1/1950	TSH	Complete	201205231138170447	<a href="#">View</a>

Any of these can be reviewed by pressing the view link. CBC & Diff for example. Additionally, by going to this screen, a user can retrieve lab information on past tests by choosing a date of birth or a date of service. This function can be used if a patient calls in for lab results. The left side of the screen shows the database listing of the test, the right shows the “paper copy” as it was printed on the machine. This can be pasted into notes or reprinted.

Firefox

http://srv00pnc8009/History.aspx

srv00pnc8009/History.aspx

Most Visited

Bookmarks

## Medical Center LAB

Provider: Visitor 7/13/2012

Request View History

Date of Service:  Date of Birth: 1/1/1950 20120425150 Test Patient

LabTest	Result	Range	Units	Time	Tech	Notes
WBC	10.3	3.8 - 10.8		3:09 PM	sd	
LY%	27.1	20.5 - 51.1		3:09 PM	sd	
MO%	5.1	1.7 - 9.3		3:09 PM	sd	
GR%	67.8	42.2 - 75.2		3:09 PM	sd	
LY#	2.8	1.2 - 3.4		3:09 PM	sd	
MO#	0.5	0.1 - 0.6		3:09 PM	sd	
GR#	7.0	1.4 - 6.5		3:09 PM	sd	
RBC	5.21	4.20 - 5.80		3:09 PM	sd	
Hgb	16.0	13.2 - 17.1		3:09 PM	sd	
Hct	47.1	38.5 - 50.0		3:09 PM	sd	
MCV	90.4	80.0 - 100.0		3:09 PM	sd	
MCH	30.6	27.0 - 33.0		3:09 PM	sd	
MCHC	33.9	32.0 - 36.0		3:09 PM	sd	
RDW	13.4	11.6 - 13.7		3:09 PM	sd	
Plt	243.	140. - 400.		3:09 PM	sd	
MPV	8.6	5.0 - 15.0		3:09 PM	sd	

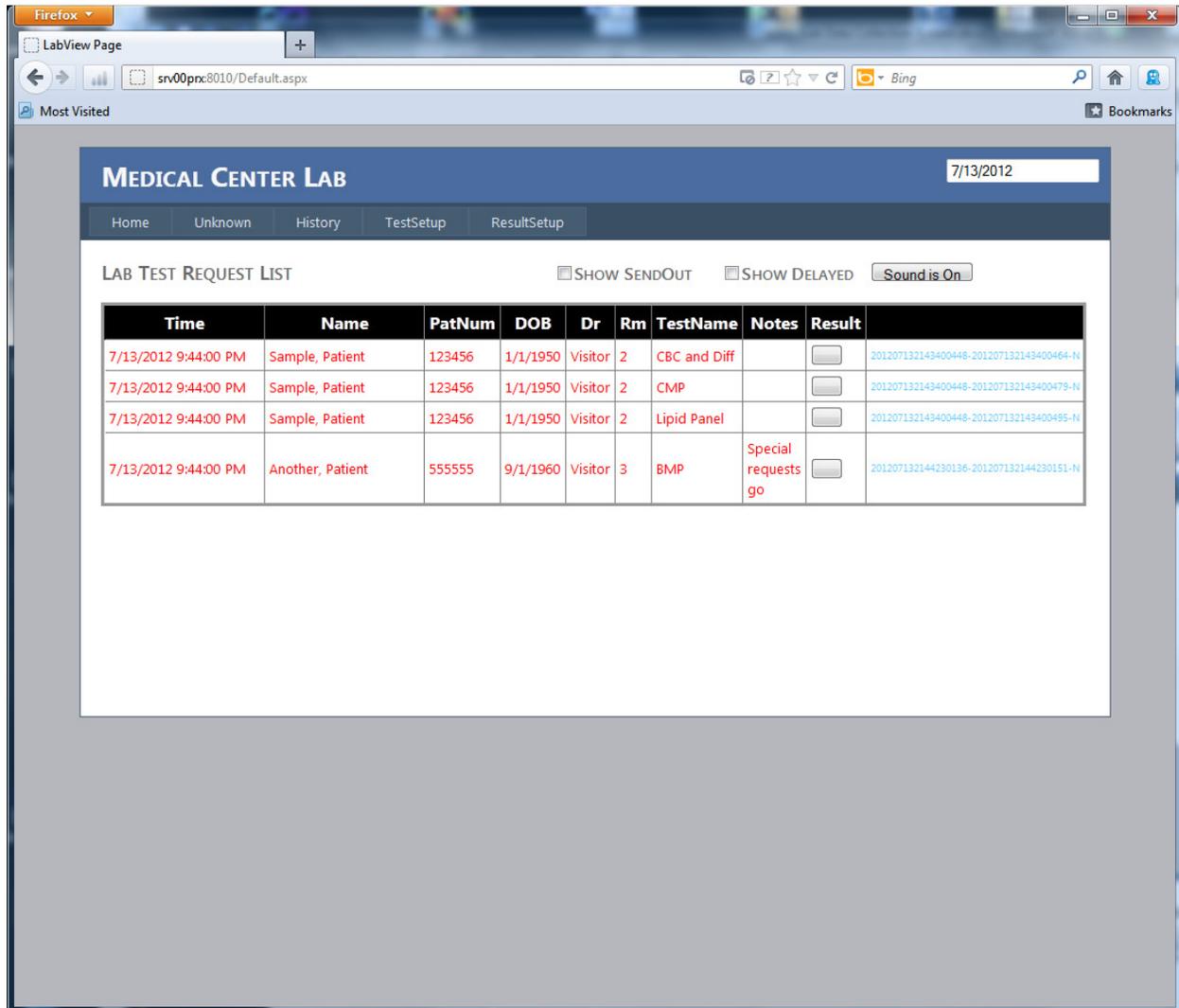
Patient: 01011950

WBC	10.3	3.8 - 10.8	x10 <sup>3</sup> /uL
LY%	27.1	20.5 - 51.1	%
MO%	5.1	1.7 - 9.3	%
GR%	67.8	42.2 - 75.2	%
LY#	2.8	1.2 - 3.4	x10 <sup>3</sup> /uL
MO#	0.5	0.1 - 0.6	x10 <sup>3</sup> /uL
GR#	7.0	1.4 - 6.5	x10 <sup>3</sup> /uL
RBC	5.21	4.20 - 5.80	x10 <sup>6</sup> /uL
Hgb	16.0	13.2 - 17.1	g/dL
Hct	47.1	38.5 - 50.0	%
MCV	90.4	80.0 - 100.0	fL
MCH	30.6	27.0 - 33.0	pg
MCHC	33.9	32.0 - 36.0	g/dL
RDW	13.4	11.6 - 13.7	%
Plt	243.	140. - 400.	x10 <sup>3</sup> /uL
MPV	8.6	5.0 - 15.0	fL

## Lab Manual:

The lab has a display of pending tests and is used to verify test results that return to the patient rooms.

When a request is made from the patient room, the panel will display it. Items displayed in Red have just arrived for processing, after two minutes, they will return to Black. Additionally, a warning sound will be issued for several seconds (depending on the wav file selected). This can be enabled/disabled using the sound button.



The screenshot shows a web browser window with the address bar displaying 'srv00prc8010/Default.aspx'. The page title is 'MEDICAL CENTER LAB' and the date '7/13/2012' is shown in the top right. The main content area is titled 'LAB TEST REQUEST LIST' and includes a table with the following data:

Time	Name	PatNum	DOB	Dr	Rm	TestName	Notes	Result	
7/13/2012 9:44:00 PM	Sample, Patient	123456	1/1/1950	Visitor	2	CBC and Diff		<input type="checkbox"/>	201207132143400448-201207132143400464-N
7/13/2012 9:44:00 PM	Sample, Patient	123456	1/1/1950	Visitor	2	CMP		<input type="checkbox"/>	201207132143400448-201207132143400479-N
7/13/2012 9:44:00 PM	Sample, Patient	123456	1/1/1950	Visitor	2	Lipid Panel		<input type="checkbox"/>	201207132143400448-201207132143400495-N
7/13/2012 9:44:00 PM	Another, Patient	555555	9/1/1960	Visitor	3	BMP	Special requests go	<input type="checkbox"/>	201207132144230136-201207132144230151-N

Here we see tests requested. It is displayed in time order (oldest first). If this is an automatic test, the results will be indicated by a green highlight in the result column. If it is a manual test, pressing the button in the result column allow the user to enter the results.

Manual Test Results:

We'll select the Mono to enter manually. Press the "result" button to get the entry screen.

The screenshot shows a web browser window displaying a medical lab interface. The browser is Firefox, and the address bar shows the URL: `http://srv00pxc:8010/TestResult.aspx?Head=201207132144230136&Link=201207132149520026`. The page title is "MEDICAL CENTER LAB" and the date is 7/13/2012. The navigation menu includes "Home", "Unknown", "History", "TestSetup", and "ResultSetup". The main content area is titled "TEST RESULTS" and features a dropdown menu with "Mono" selected. Below this, there are input fields for patient information: "Another, Patient", "555555", and "9/1/1960". A table with columns "Result Name", "Result", "UOM", and "Range" is present, with an "Add" button. A "Results" button is also visible. A text area for "Special requests go here..." is on the right. At the bottom, there are buttons for "Complete", "Delay", "Sent Out", "Not Performed", and "Remove", along with a "Tech:" field and two ID numbers: 201207132149520026 and 201207132144230136.

The Mono test shows at the top of the screen. The user selects the results from the dropdown list (alternately, there is a Result tree which shows the results grouped by type), and enters the value. They can also enter notes in the right panel and enter their initials in at the bottom left. When complete, press "complete". At this point the results are sent back to the provider.

Other Options: There are several other options available at this point. First, some tests are sent out to other labs. This is identified by pressing the Sendout button. Also, some tests are run in batches. This is identified by pressing the Delay button. Both of these signal to the provider that the results will not be immediately available.

Another possibility is that the test is not performed for one reason or another. This is indicated by the Not Performed button. Finally, the test can be deleted by pressing the Remove button. Note that nothing is actually deleted or removed from the database, all requests are stored.

## Automatic Tests:

Auto results are shown by a green indicator on the result tab.

The screenshot shows a Firefox browser window displaying a web application for a medical center lab. The page title is 'MEDICAL CENTER LAB' and the date is '7/16/2012'. The navigation menu includes 'Home', 'Unknown', 'History', 'TestSetup', and 'ResultSetup'. The main content area is titled 'LAB TEST REQUEST LIST' and includes checkboxes for 'SHOW SENDOUT' and 'SHOW DELAYED', along with a 'Sound is On' button. The table below lists three test requests:

TIME	NAME	PATNUM	DOB	DR	RM	TESTNAME	NOTES	RESULT	
7/13/2012 9:44:00 PM	SAMPLE, PATIENT	123456	1/1/1950	VISITOR	2	CBC AND DIFF		<input type="checkbox"/>	<a href="#">201207132143400448-201207132143400464-N</a>
7/13/2012 9:44:00 PM	ANOTHER, PATIENT	555555	9/1/1960	VISITOR	3	BMP	SPECIAL REQUESTS GO	<input type="checkbox"/>	<a href="#">201207132144230136-201207132144230151-N</a>
7/13/2012 9:44:00 PM	ANOTHER, PATIENT	555555	9/1/1960	VISITOR	3	MONO	SPECIAL REQUESTS GO	<input type="checkbox"/>	<a href="#">201207132144230136-201207132149520026-N</a>

Proceed to the result page by pressing the green button under results, which will take you to the verification page.

Firefox

http://srv00pxc:8010/201207132143400464

srv00pxc:8010/TestResult.aspx?Head=201207132143400448&Link=201207132143400464

Most Visited

Home Unknown History TestSetup ResultSetup

TEST RESULTS CBC & Diff

Sample, Patient 123456 1/1/1950 PID2012071321434004

Result	Value	Units	Range	Inc	Mach	
WBC	7.4	x10 <sup>3</sup> /uL	3.8-10.8	<input checked="" type="checkbox"/>	BC	20120716151251003800
LY%	27.7	%	20.5-51.1	<input checked="" type="checkbox"/>	BC	20120716151251003801
MO%	5.5	%	1.7-9.3	<input checked="" type="checkbox"/>	BC	20120716151251003802
GR%	66.8	%	42.2-75.2	<input checked="" type="checkbox"/>	BC	20120716151251003803
LY#	2.0	x10 <sup>3</sup> /uL	1.2-3.4	<input checked="" type="checkbox"/>	BC	20120716151251003804
MO#	0.4	x10 <sup>3</sup> /uL	0.1-0.6	<input checked="" type="checkbox"/>	BC	20120716151251003805
GR#	4.9	x10 <sup>3</sup> /uL	1.4-6.5	<input checked="" type="checkbox"/>	BC	20120716151251003806
RBC	4.03	x10 <sup>6</sup> /uL	4.20-5.80	<input checked="" type="checkbox"/>	BC	20120716151251003807
Hgb	12.2	g/dL	13.2-17.1	<input checked="" type="checkbox"/>	BC	20120716151251003808
Hct	37.4	%	38.5-50.0	<input checked="" type="checkbox"/>	BC	20120716151251003809
MCV	92.8	fL	80.0-100.0	<input checked="" type="checkbox"/>	BC	20120716151251003810
MCH	30.3	pg	27.0-33.0	<input checked="" type="checkbox"/>	BC	20120716151251003811
MCHC	32.6	g/dL	32.0-36.0	<input checked="" type="checkbox"/>	BC	20120716151251003812
RDW	15.7	%	11.6-13.7	<input checked="" type="checkbox"/>	BC	20120716151251003813
Plt	225.	x10 <sup>3</sup> /uL	140.-400.	<input checked="" type="checkbox"/>	BC	20120716151251003814
MPV	7.7	fL	5.0-15.0	<input checked="" type="checkbox"/>	BC	20120716151251003815

Result Name Result UOM Range Add

Results

Tech: Complete Delay Sent Out Not Performed Remove

Here you'll see the results from that test. Results can be sent to the provider by checking the Include checkbox. Not all results need to be sent. In some cases, a test may be run more than once, the technician can either send both results, or only send one (in case of a sample error). If two sets of results were delivered to the system, they would both be shown on this screen. The technician can individually check/uncheck what is needed, or may click on the machine name (BC in this case), and all results from the selected test will be toggled. Note: the numbers in the right column are database info only and not needed, unless a problem occurs.

The Lab reviews the results and enters a note if needed and presses complete. This is the same for a manual test. This test will then disappear from the lab page.

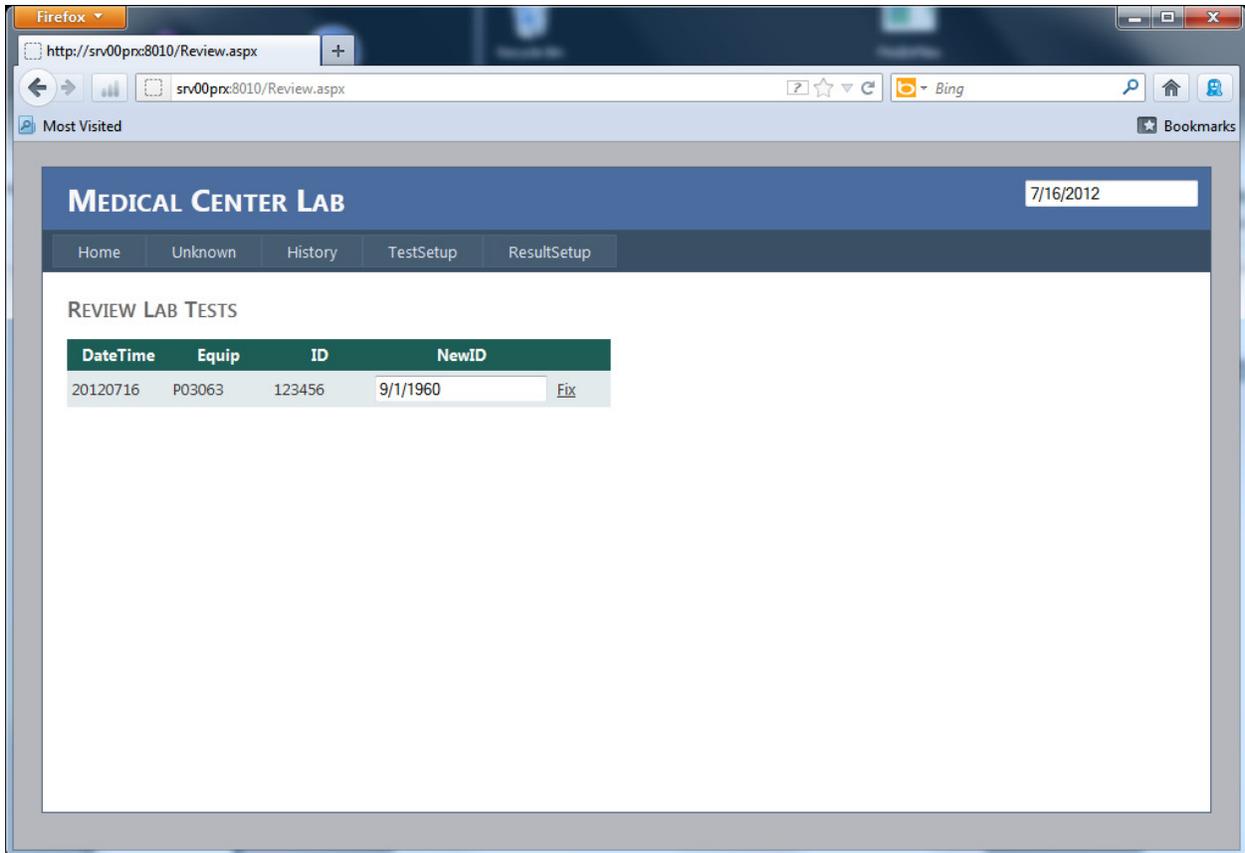
At some point, an automatic test may be complete but the results are not shown. This may be because the ID of the patient is not found. There is an Unknown page to help match these together.

The screenshot shows a web browser window with the following details:

- Browser: Firefox
- Address Bar: <http://srv00prx:8010/Review.aspx>
- Page Title: MEDICAL CENTER LAB
- Date: 7/16/2012
- Navigation: Home, Unknown, History, TestSetup, ResultSetup
- Section: REVIEW LAB TESTS
- Table:

DateTime	Equip	ID	NewID	
20120716	P03063	123456	<input type="text"/>	<a href="#">Fix</a>

Here you see that an ID of 123456 was entered for this patient and it doesn't match anyone in the system. It was generated from the equipment with the displayed ID number. If you know that this was run for the patient waiting for lab results, just enter the correct DOB in the New ID.



Finally, press the FIX link on the right. The unknown reference will disappear and the results will show ready for your patient.

Firefox

http://srv00pxc:801...201207132144230151

srv00pxc:8010/TestResult.aspx?Head=201207132144230136&Link=201207132144230151

Most Visited

Bookmarks

**MEDICAL CENTER LAB** 7/16/2012

Home Unknown History TestSetup ResultSetup

TEST RESULTS

Another, Patient

Result	Value	Units	Range	Inc	Mach	
GLU	110	MG/DL	73-118	<input checked="" type="checkbox"/>	P03063	20120716152307064800
BUN	14	MG/DL	7-22	<input checked="" type="checkbox"/>	P03063	20120716152307064801
CA	8.8	MG/DL	8.0-10.3	<input checked="" type="checkbox"/>	P03063	20120716152307064802
CRE	1.2	MG/DL	0.6-1.2	<input checked="" type="checkbox"/>	P03063	20120716152307064803
NA+	138	MMOL/L	128-145	<input checked="" type="checkbox"/>	P03063	20120716152307064804
K+	3.4	MMOL/L	3.6-5.1	<input checked="" type="checkbox"/>	P03063	20120716152307064805
CL-	100	MMOL/L	98-108	<input checked="" type="checkbox"/>	P03063	20120716152307064806
tCO2	31	MMOL/L	18-33	<input checked="" type="checkbox"/>	P03063	20120716152307064807
HEM	0		-	<input type="checkbox"/>	P03063	20120716152307064809
LIP	0		-	<input type="checkbox"/>	P03063	20120716152307064810
ICT	0		-	<input type="checkbox"/>	P03063	20120716152307064811

Result Name  Result  UOM  Range  -

Special requests go here....

Follow the same procedures as before to send these to the provider.

## Test Setups:

The lab is responsible for test setups. This is done under the test setup tab.

The screenshot shows a web browser window with the URL `http://srv00pxc8010/TestSetup.aspx`. The page title is "MEDICAL CENTER LAB" and the date is "7/16/2012". The navigation menu includes "Home", "Unknown", "History", "TestSetup", and "ResultSetup". The "TestSetup" tab is active, showing "Test Definitions".

	Abbrev	FullName	TypeOfTest	CPT	Display
<a href="#">Edit</a>	AAT Panel	AAT Panel		82384	Y
<a href="#">Edit</a>	Amylase	Amylase		82150	Y
<a href="#">Edit</a>	BMP	BMP	test	80048	Y
<a href="#">Edit</a>	CBC & Diff	CBC and Diff	Manual	85026	Y
<a href="#">Edit</a>	CKMB	CKMB		82553	Y
<a href="#">Edit</a>	CK-MB	CK-MB, Quantitative		82553	N
<a href="#">Edit</a>	CKMB, Q	CKMB, Quantitative		82553	Y
<a href="#">Edit</a>	CMP	CMP	Manual	80053	Y
<a href="#">Edit</a>	CRP	CRP		86140	Y
<a href="#">Edit</a>	Drug Screen	Drug Screen		99000M	Y
<a href="#">Edit</a>	Drug Screen, IH	Drug Screen - In House		99000Q	Y
<a href="#">Edit</a>	ESR	ESR		85651	Y
<a href="#">Edit</a>	GGT	GGT	Manual	82977	Y
<a href="#">Edit</a>	Glucose	Glucose		82962	Y
<a href="#">Edit</a>	H.Pylon	H.Pylori		87339	Y

Below the table, there are pagination links "1 2 3" and a "New Lab Test:" form with an input field and an "Add" button.

You can edit these by pressing the edit link, then filling in the correct data. The Display field on the right determines if the test will be shown in the patient rooms. Since data will already be in the database, the tests cannot be deleted. They can only be hidden from the providers. To enter a new test, use the New Lab Test entry, then press ADD.

## ResultSetup:

The lab also maintains the result names. Under the ResultSetup you'll see a similar screen.

Firefox

http://srv00pxc8010/ResultSetup.aspx

srv00pxc8010/ResultSetup.aspx

Most Visited

Bookmarks

**MEDICAL CENTER LAB** 7/16/2012

Home Unknown History TestSetup ResultSetup

Result Definitions

	ID	Name	RangeLow	RangeHigh	UOM
<a href="#">Edit</a>	ALB	Albumin	3.3	5.5	G/DL
<a href="#">Edit</a>	ALP	Alkaline Phosphatase	53	128	U/L
<a href="#">Edit</a>	ALT	Alanine Aminotransferase	10	47	U/L
<a href="#">Edit</a>	AMY	Amylase	14	97	U/L
<a href="#">Edit</a>	AST	Aspartate Aminotransferase	11	38	U/L
<a href="#">Edit</a>	bHCG	Pregnancy, Quantitative			
<a href="#">Edit</a>	BIL	Direct Bilirubin			
<a href="#">Edit</a>	BLO	Unk			
<a href="#">Edit</a>	BloodSugar	Glucose			
<a href="#">Edit</a>	BUN	Blood Urea Nitrogen	7	22	MG/DL
<a href="#">Edit</a>	CA	Calcium	8	10.3	MG/DL
<a href="#">Edit</a>	CHOL	Cholesterol			mg/dL
<a href="#">Edit</a>	CKMB	CKMB			
<a href="#">Edit</a>	CL-	Chloride	98	108	MMOL/L
<a href="#">Edit</a>	CRE	Creatinine	.6	1.2	MG/DL

1 2 3 4 5 6 7

TestResult:

In the same way as the Tests are entered, results are entered. Important to note that the ID MUST MATCH the format sent by the lab machine for any automatic tests. This is how it is linked.

The Lab also has a history viewer, the same the request .

Firefox

http://srv00pxc8010/History.aspx

srv00pxc8010/History.aspx

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## MEDICAL CENTER LAB

7/16/2012

Home Unknown History TestSetup ResultSetup

Date of Service:  Date of Birth:

Patient	DOB	LabTest	Status		
test pat1	1/1/1950	BMP	Complete	201203080909310988	<a href="#">View</a>
Test, Patient	1/1/1950	CBC & Diff	Complete	201204251504240651	<a href="#">View</a>
Test, Patient	1/1/1950	CKMB	Complete	201204251504240661	<a href="#">View</a>
Test, Patient	1/1/1950	CMP	Complete	201204251504240674	<a href="#">View</a>
Test, Patient	1/1/1950	Myoglobin	Complete	201204251504240689	<a href="#">View</a>
Test, Patient	1/1/1950	Troponin 1	Complete	201204251504240700	<a href="#">View</a>
Test, Patient	1/1/1950	Lipid Panel	ResultReady	201205231138170398	<a href="#">View</a>
Test, Patient	1/1/1950	PSA	Complete	201205231138170409	<a href="#">View</a>
Test, Patient	1/1/1950	TSH	Complete	201205231138170447	<a href="#">View</a>
Sample, Patient	1/1/1950	CBC & Diff	ResultReady	201207132143400464	<a href="#">View</a>
Sample, Patient	1/1/1950	CMP		201207132143400479	<a href="#">View</a>
Sample, Patient	1/1/1950	Lipid Panel		201207132143400495	<a href="#">View</a>

Firefox | http://srv00pxc8010/History.aspx | srv00pxc8010/History.aspx | Bing | Bookmarks

**MEDICAL CENTER LAB** 7/16/2012

Home   Unknown   History   TestSetup   ResultSetup

Date of Service:    Date of Birth:      

LabTest	Result	Range	Units	Time	Tech	Notes
WBC	7.4	3.8 - 10.8		3:13 PM	aa	
LY%	27.7	20.5 - 51.1		3:13 PM	aa	
MO%	5.5	1.7 - 9.3		3:13 PM	aa	
GR%	66.8	42.2 - 75.2		3:13 PM	aa	
LY#	2.0	1.2 - 3.4		3:13 PM	aa	
MO#	0.4	0.1 - 0.6		3:13 PM	aa	
GR#	4.9	1.4 - 6.5		3:13 PM	aa	
RBC	4.03	4.20 - 5.80		3:13 PM	aa	
Hgb	13.2	13.2 - 17.1		3:13 PM	aa	
Hct	37.4	38.5 - 50.0		3:13 PM	aa	
MCV	92.8	80.0 - 100.0		3:13 PM	aa	
MCH	30.3	27.0 - 33.0		3:13 PM	aa	
MCHC	32.6	32.0 - 36.0		3:13 PM	aa	
RDW	15.7	11.6 - 13.7		3:13 PM	aa	
Plt	225.	140. - 400.		3:13 PM	aa	
MPV	7.7	5.0 - 15.0		3:13 PM	aa	

Patient: 001011950  
1/1/1950

WBC	7.4	3.8 - 10.8	x10 <sup>3</sup> /uL
LY%	27.7	20.5 - 51.1	%
MO%	5.5	1.7 - 9.3	%
GR%	66.8	42.2 - 75.2	%
LY#	2.0	1.2 - 3.4	x10 <sup>3</sup> /uL
MO#	0.4	0.1 - 0.6	x10 <sup>3</sup> /uL
GR#	4.9	1.4 - 6.5	x10 <sup>3</sup> /uL
RBC	4.03	4.20 - 5.80	x10 <sup>6</sup> /uL
Hgb	12.2	13.2 - 17.1	g/dL
Hct	37.4	38.5 - 50.0	%
MCV	92.8	80.0 - 100.0	fL
MCH	30.3	27.0 - 33.0	pg
MCHC	32.6	32.0 - 36.0	g/dL
RDW	15.7	11.6 - 13.7	%
Plt	225.	140. - 400.	x10 <sup>3</sup> /uL
MPV	7.7	5.0 - 15.0	fL