

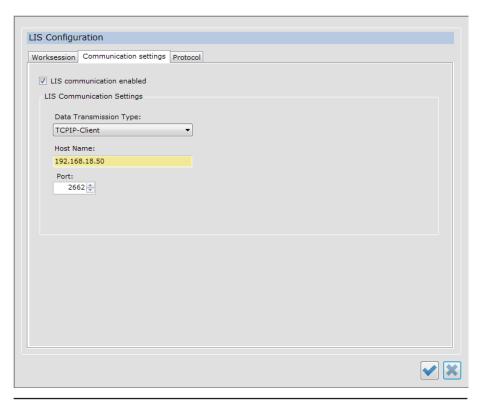
LIS testing process

Document that explains how to test the LIS communications without the analyzer. It also explains how to check the log file.

Software functionality for test requests and receiving messages

- 1. Install the software on a computer BA400
- 2. Run the program
- 3. Configure the communication parameters of the LIS. *Configuration Menu / LIS configuration*
- 4. Configure the name of the test to match between the BA400 and the LIS. Go to *Configuration menu / LIS mapping*
- 5. Verify that the LED on the top right of the screen is green. This icon indicates whether it has successfully established connection to the LIS.
- 6. If it is red, change the parameter settings to get it to be green.

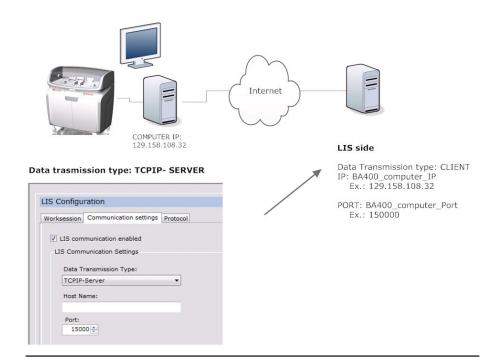
LIS configuration parameters in the BA400



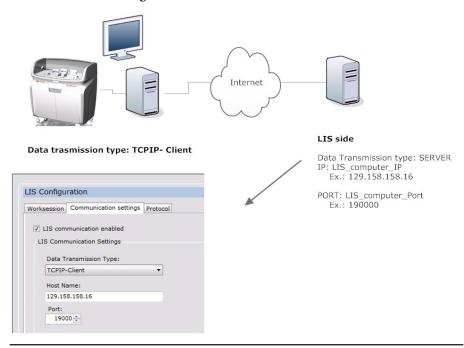
Ilustration 1 LIS configuration screen

Configure the IP and port according to the type of communication:

- 1. For ASTM communication, select one of the two options:
 - TCPIP Server (Figure 2)
 - TCPIP Client (Figure 3)
- 2. For HL7 communication, select the option:
 - Transitory Connection (Figure 4)

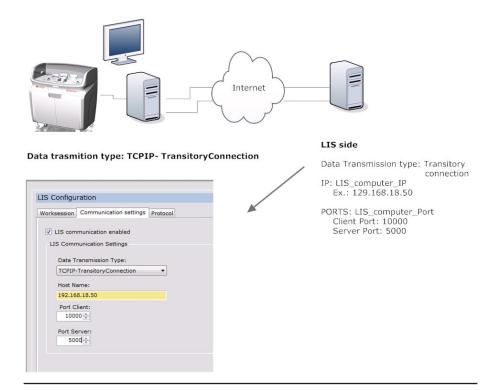


Ilustration 2 Configuration for TCP IP Server



Ilustration 3 Configuration for TCP IP client





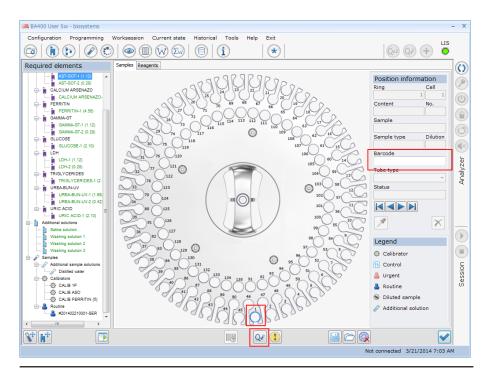
Ilustration 4 Configuration for TCP IP Tansitory connection

Host Process Query request

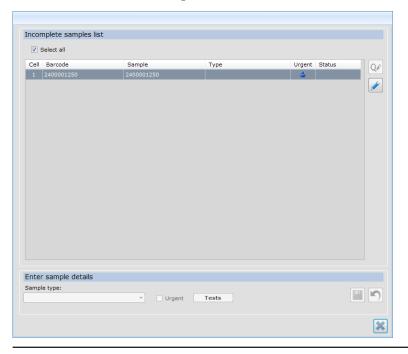
- 1. Select the menu: work session / rotor positioning.
- 2. Select sample rotor position (marked in red)
- 3. Select the text box to enter the barcode on the right. A popup window apperar where you can enter the barcode number.



- 4. Press the Host Query icon.
- See Figure 1
- A popup screen from which you can select the samples you want to do the Host Query, all or only selected. Select the samples to do the query and press the button Host Query.
- 6. At this time a message is sent to LIS, request the samples selected.
- 7. If the LIS responds correctly, the work list is created with the test for each sample.
- 8. If there is a communication failure after a timeout (can set configuration parameters LIS) a popup message informing you that it has not received any test.



Ilustration 5 Position samples in the rotor



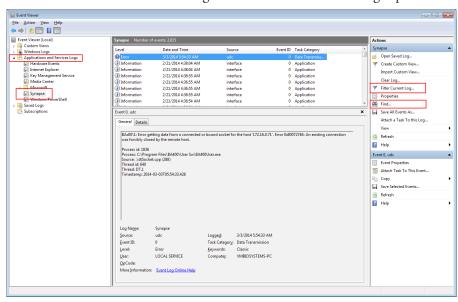
Ilustration 6 Host Query request



Checking the log of BA400

To diagnose the messages sent and received by the BA400, you can check the log screen.

- 1. Open the Event Viewer program
- 2. You will find in: Start / Control Panel / Administrative Tools / Event Viewer
- 3. Select the Applications option and Services
- 4. Select the *Synapse* option.
- See Figure 3
- 5. In the central part of screen shows the messages sorted by date and time.
- 6. These messages can be filtered to show only the errors, select the filter tool on the right.
- 7. You can also search a text string with the search tool in the right part.



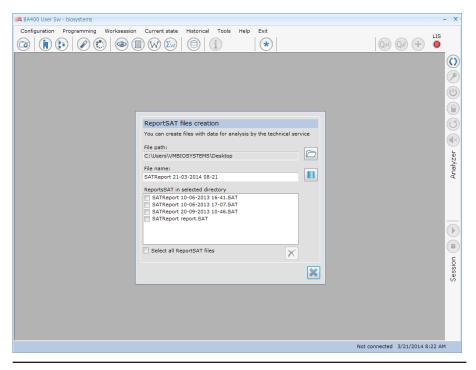
Ilustration 7 Event viewer

Sending data from the analyzez to Biosystems.

When any doubt can be consulted to Biosystems please send a screen capture and the program BA400 information. To get the BA400 information do a sat-report. It is a process that makes a copy of the database in a file and sned by email.

Follow these steps to perform the sat-report.

- 1. Select the menu: *Tools / sat-report*.
- 2. Select the folder to save the file and name in the popup window.
- 3. Click the button to save the sat-report
 - See Figure 4



Ilustration 8 Sat-report

4. Send the generated file explaining the reason of the failure and the capture of the screen.



Example of message dialogue between BA400 and LIS in ASTM

The following part is the information about patient and test that are introduced in LIS system and sent to analyzer:

JM0014

Same patient with two specimen:

- Serum
- Urine each specimen has different bar code

Bar code	Patient identifica- tion	Patient name	Test type	Test
2400002048	JM0012	Smith, John	SER	Creatinine Glucose Triglycerides Urea-Bun-UV Uric Acid Na+ K+
2400002049	JM0014	Black, Margie	SER	Creatinine Glucose Urea-Bun-UV Uric Acid Na+ K+ Cl-
4800002049	JM0014	Black, Margie	URI	Creatinine Urea-Bun-UV Uric Acid Phosporus
2400002050			SER	NO_INFO in LIS
2400002051			SER	NO_INFO in LIS

Messages dialogue

Legend: RED colour

BA400 message

BLUE colour

LIS message

Black colour

Comments about messages

<ENQ>

<ACK>

<EOT>

<ENQ>

<ACK>

<EOT>

<ACK>

```
<$TX>1H|\^&|a316b706-5bc7-4897-a09f-762e68f28b70||BA400|||||Host||P|LIS2A|201403
25172026<CR>
L | 1 | N < CR >
<ETX>9E<CR>
<ACK>
<EOT>
<ENO>
<ACK>
<$TX>1H|\^&|0e115a94-bcfc-4000-96a1-7216c4702336||BA400|||||Host||P|LIS2A|201403
25172110<CR>
0|1|2400002048\2400002049\4800002049\2400002050\2400002051||O<CR>
L | 1 | N < CR >
<ETX>3C<CR>
<ACK>
<EOT>
<ENQ>
<ACK>
Answer of patient JM0012
<STX>1H|\^&|0e115a94-bcfc-4000-96a1-7216c4702336||Modulab|||||BA400||P|LIS2A|201
40325172103<CR>
<ETB>AB<CR>
<ACK>
<STX>2P|1||JM0012||SMITH^JOHN||19800325|M<CR>
<ETB>0C<CR>
<STX>30|1|2400002048||^^^CREATININE|R|||||A||||SER||||||||0<CR>
<ETB>AF<CR>
<ACK>
<STX>40|2|2400002048||^^^GLUCOSE|R|||||A|||SER||||||||0<CR>
<ETB>E1<CR>
<ACK>
<$TX>50|3|2400002048||^^^TRIGLYCERIDES|R|||||A||||SER|||||||||0<CR>
<ETB>AB<CR>
<$TX>60|4|2400002048||^^^UREA-BUN-UV|R|||||A||||$ER|||||||||||0<CR>
<ETB>EA<CR>
<ACK>
<STX>70|5|2400002048||^^^URIC ACID|R|||||A||||SER|||||||||0<CR>
<ETB>78<CR>
<STX>00|6|2400002048||^^^Na+|R|||||A||||SER|||||||||0<CR>
<ETB>A9<CR>
<ACK>
<STX>10|7|2400002048||^^^K+|R|||||A||||SER|||||||||0<CR>
<ETB>47<CR>
<STX>20|8|2400002048||^^^C1-|R|||||A||||SER|||||||||0<CR>
<ETB>AF<CR>
Continue the answer now from patient JM0014, Serum test
<STX>3P|2||JM0014||BLACK^MARGIE|||F<CR>
<ETB>CB<CR>
<STX>40|1|2400002049||^^^CREATININE|R|||||A||||SER|||||||||0<CR>
<ETB>B1<CR>
<ACK>
```

```
<STX>50|2|2400002049||^^^GLUCOSE|R|||||A||||SER||||||||||0<CR>
<ETB>E3<CR>
<STX>60|3|2400002049||^^^UREA-BUN-UV|R|||||A||||SER|||||||||||0<CR>
<ETB>EA<CR>
<ACK>
<STX>70|4|2400002049||^^^URIC ACID|R|||||A|||SER||||||||0<CR>
<ETB>78<CR>
<ACK>
<STX>00|5|2400002049||^^^Na+|R|||||A||||SER|||||||||0<CR>
<ETB>A9<CR>
<ACK>
<STX>10|6|2400002049||^^^K+|R|||||A||||SER||||||||||0<CR>
<ACK>
<STX>20|7|2400002049||^^^Cl-|R|||||A||||SER||||||||0<CR>
<ETB>AF<CR>
<ACK>
Continue the answer now from patient JM0014, urine test
<STX>3P|3||JM0014||BLACK^MARGIE|||F<CR>
<ETB>CC<CR>
<ACK>
<$TX>40|1|4800002049||^^^CREATININE|R|||||A||||URI|||||||||||||O<CR>
<ETB>BD<CR>
<STX>50|2|4800002049||^^^URIC ACID|R|||||A||||URI|||||||||0<CR>
<ETB>80<CR>
<ACK>
<STX>60|3|4800002049||^^^PHOSPHORUS|R|||||A|||URI||||||||||0<CR>
<ETB>FA<CR>
<ACK>
<STX>70|4|4800002049||^^^UREA-BUN-UV|R|||||A||||URI|||||||||||0<CR>
<ETB>F8<CR>
<ACK>
<STX>0P|4<CR>
<ETB>54<CR>
<ACK>
Answer with No info message from patient that no exist in LIS
<ETB>36<CR>
<ACK>
<STX>2P|5<CR>
<ETB>57<CR>
<STX>30|1|2400002051|||R||||||||||||||||||Y\Q<CR>
<ETB>39<CR>
<STX>4L | 1 | F<CR>
<ETX>FF<CR>
<ACK>
<EOT>
<ENO>
<ACK>
```

Acknowledge message form BA400 to received corretly the orders

```
<STX>1H|\^&|47a182a2-edf6-4acd-96b2-ee0f49b04f3a||BA400|||||Host||P|LIS2A|201403
25172114<CR>
L | 1 | N < CR >
<ETX>A5<CR>
<ACK>
<EOT>
<ENO>
<ACK>
<EOT>
<ENQ>
<ACK>
<EOT>
<ENQ>
<ACK>
<EOT>
<ENO>
<ACK>
<EOT>
<ENO>
<ACK>
Results from patient JM0012. The configuration in upload result in BA400 is: on finish every
```

```
<$TX>1H|\^&|764078e5-6875-4063-8559-152f183d5e86||BA400|||||Host||P|LIS2A|201403
25174539<CR>
P|1||JM0012|||||<CR>
0|1|2400002048||^^Na+^|R|||||||||SER||||||20140325184538|||F<CR>
R|1|^^Na+|164.109497|mmol/L||||F||admin||20140325184538|A400^834000109<CR>
0|2|2400002048||^^^K+^|R|||||||||SER||||||20140325184538|||F<CR>
R|1|^^K+|6.40999985|mmol/L||||F||admin||20140325184538|A400^834000109<CR>
O|3|2400002048||^^^Cl-^|R|||||||||SER||||||20140325184538|||F<CR>
L | 1 | N < CR >
<ETX>F5<CR>
<ACK>
<EOT>
<ENO>
<ACK>
<EOT>
<ENQ>
25174727<CR>
P|1||JM0014||||<CR>
O|1|2400002049||^^^Na+^|R|||||||||SER||||||20140325184726|||F<CR>
R|1|^^Na+|164.205994|mmol/L||||F||admin||20140325184726|A400^834000109<CR>
0|2|2400002049||^^^K+^|R||||||||SER||||||20140325184726|||F<CR>
R|1|^^K+|6.38999987|mmol/L||||F||admin||20140325184726|A400^834000109<CR>
0|3|2400002049||^^^Cl-^|R|||||||||SER|||||||20140325184726|||F<CR>
L | 1 | N < CR >
<ETX>94<CR>
<ACK>
<EOT>
<ENO>
<ACK>
<EOT>
```

```
<ENQ>
<ACK>
<EOT>
<ENQ>
<ACK>
<EOT>
<ENO>
<ACK>
<STX>1H|\^&|c2fa1f52-5c0a-4deb-8d6a-ff2e4600f490||BA400|||||Host||P|LIS2A|201403
25175105<CR>
P|1||JM0012|||||<CR>
O|1|2400002048||^^^TRIGLYCERIDES^|R||||||||SER||||||20140325185105|||F<CR>
R|1|^^TRIGLYCERIDES|115.237061|mg/dL||||F||admin||20140325185105|A400^834000109
<CR>
L | 1 | N < CR >
<ETX>2B<CR>
<ACK>
<EOT>
<ENO>
<ACK>
<EOT>
<ENQ>
<ACK>
<$TX>1H|\^&|8f9ac1cd-2f70-424f-80c8-e16daf18f660||BA400|||||Host||P|LIS2A|201403
25175225<CR>
P|1||JM0012|||||<CR>
O|1|2400002048||^^^URIC ACID^|R||||||||SER||||||20140325185217|||F<CR>
R|1|^^URIC ACID|10.7044258|mg/dL||||F||admin||20140325185217|A400^834000109<CR>
L | 1 | N < CR >
<ETX>7F<CR>
<ACK>
<EOT>
<ENQ>
<ACK>
<EOT>
<ENQ>
<ACK>
<$TX>1H|\^&|cd5d6f43-8977-4616-b555-a59599e8e867||BA400|||||Host||P|LIS2A|201403
25175347<CR>
P|1||JM0012|||||<CR>
0|1|2400002048||^^^UREA-BUN-UV^|R||||||||SER||||||20140325185347|||F<CR>
R|1|^^UREA-BUN-UV|136.950165|mg/dL||||F||admin||20140325185347|A400^834000109<
CR>
L | 1 | N < CR >
<ETX>B3<CR>
<ACK>
<EOT>
<ENQ>
<ACK>
<$TX>1H|\^&|5b647053-0c19-46d3-afe5-0624618cac74||BA400|||||Host||P|LIS2A|201403
25175356<CR>
P|1||JM0014||||<CR>
0|1|2400002049||^^^URIC ACID^|R||||||||SER||||||20140325185356|||F<CR>
R|1|^^URIC ACID|10.8231449|mg/dL||||F||admin||20140325185356|A400^834000109<CR>
L | 1 | N < CR >
<ETX>C5<CR>
```

```
<ACK>
<EOT>
<ENQ>
<ACK>
<EOT>
<ENQ>
<ACK>
<STX>1H|\^&|3f629be4-3c26-4551-89e7-3bfe667f5e9a||BA400|||||Host||P|LIS2A|201403
25175526<CR>
P|1||JM0014||||<CR>
O|1|4800002049||^^^URIC_ACID^|R||||||||URI|||||20140325185526|||F<CR>
R|1|^^URIC ACID|9.50566101|mg/dL||||F||admin||20140325185526|A400^834000109<CR>
P|2||JM0014||||<CR>
0|1|2400002049||^^^UREA-BUN-UV^|R|||||||||SER||||||20140325185526|||F<CR>
R|1|^^UREA-BUN-UV|134.785034|mg/dL||||F||admin||20140325185526|A400^834000109<
CR>
L | 1 | N < CR >
<ETX>6D<CR>
<ACK>
<EOT>
<ENQ>
<ACK>
<STX>1H|\^&|9a5f4c78-2bee-4aec-bc2a-faeb5602c932||BA400|||||Host||P|LIS2A|201403
25180023<CR>
P|1||JM0014||||<CR>
0|1|4800002049||^^^UREA-BUN-UV^|R||||||||URI|||||20140325190023|||F<CR>
R|1|^^UREA-BUN-UV|113.53598|mg/dL||||F||admin||20140325190023|A400^834000109<
CR>
L | 1 | N < CR >
<ETX>E3<CR>
<ACK>
<EOT>
<ENQ>
<ACK>
<EOT>
<ENQ>
<ACK>
<$TX>1H|\^&|5fe262e1-96f5-4a0e-b0d4-aa6e8d8ffb8c||BA400|||||Host||P|LIS2A|201403
25180220<CR>
P|1||JM0014||||<CR>
0|1|4800002049||^^^PHOSPHORUS^|R||||||||URI|||||20140325190211|||F<CR>
R|1|^^PHOSPHORUS|9.97671032|mg/dL||||F||admin||20140325190211|A400^834000109<
CR>
L | 1 | N < CR >
```



<ETX>FF<CR>
<ACK>
<EOT>

Example of message dialogue between BA400 and LIS in HL7

The following part is the information about patient and test that are introduced in LIS system and sent to analyzer:

JM0014

Same patient with two specimen:

- Serum
- Urine each specimen has different bar code

Bar code	Patient identifica- tion	Patient name	Test type	Test
2400002048	JM0012	Smith, John	SER	Creatinine Glucose Triglycerides Urea-Bun-UV Uric Acid Na+ K+ Cl-
2400002049	JM0014	Black, Margie	SER	Creatinine Glucose Urea-Bun-UV Uric Acid Na+ K+ Cl-
4800002049	JM0014	Black, Margie	URI	Creatinine Urea-Bun-UV Uric Acid Phosporus
2400002050			SER	NO_INFO in LIS

Messages dialogue

Legend: RED colour

BA400 message

BLUE colour

LIS message

Black colour

Comments about messages

From Client Socket - Query

```
<T7>
MSH|^{\sim \& |BA400|Biosystems|Host|Host provider|20140408161403||QBP^Q11^QBP|
Q11|34ed9277-c0ab-4182-b18d-d99eaf10b84d|P|2.5.1|||ER|AL||UNICODE UTF-8|||LAB-
QPD|WOS^Work Order Step^IHE LABTF|34ed9277c0ab4182b18dd99eaf10b84d|2400002048
RCP | I | | R
<CR>
<ER>
<CR>
<TV>
MSH|^~\&|Host|Host provider|BA400|Biosystems|20140408161357||RSP^K11^RSP K11|201
40408161357|P|2.5.1|||NE|NE||UNICODE UTF-8|||LAB-27^IHE
MSA|AA|34ed9277-c0ab-4182-b18d-d99eaf10b84d
QAK|34ed9277c0ab4182b18dd99eaf10b84d|OK|WOS^Work Order Step^IHE LABTF
QPD|WOS^Work Order Step^IHE LABTF|34ed9277c0ab4182b18dd99eaf10b84d|2400002048
<CR>
<EB>
<CR>
\verb|MSH||^{-} \& | BA400| Biosystems| Host| Host| provider | 20140408161403| | QBP^Q11^QBP| And Additional Control of the contr
Q11|8c36bc63-e2c4-4345-ba4a-348c84a905e3|P|2.5.1|||ER|AL||UNICODE UTF-8|||LAB-
QPD|WOS^Work Order Step^IHE LABTF|8c36bc63e2c44345ba4a348c84a905e3|2400002049
RCP|I||R
<CR>
<EB>
<CR>
<TV>
MSH|^~\&|Host|Host provider|BA400|Biosystems|20140408161358||RSP^K11^RSP K11|201
40408161358|P|2.5.1|||NE|NE||UNICODE UTF-8|||LAB-27^IHE
MSA|AA|8c36bc63-e2c4-4345-ba4a-348c84a905e3
OAK|8c36bc63e2c44345ba4a348c84a905e3|OK|WOS^Work Order Step^IHE LABTF
QPD|WOS^Work Order Step^IHE LABTF|8c36bc63e2c44345ba4a348c84a905e3|2400002049
<CR>
<EB>
<CR>
MSH|^~\&|BA400|Biosystems|Host|Host provider|20140408161403||QBP^Q11^QBP
Q11|bb4868c7-29b8-4c0b-8345-58399bf851e3|P|2.5.1|||ER|AL||UNICODE UTF-8|||LAB-
27^IHE
QPD|WOS^Work Order Step^IHE LABTF|bb4868c729b84c0b834558399bf851e3|4800002049
RCP|I||R
<CR>
<EB>
<CR>
<TV>
\verb|MSH|/^{\&}|\\ \verb|Host||\\ \verb|Host||\\ \verb|EA400||\\ \verb|Biosystems||\\ 20140408161359|\\ |\\ \verb|RSP^K11^RSP|K11||\\ |\\ \verb|RSP^K11||\\ |\\ \align*|
40408161359|P|2.5.1|||NE|NE||UNICODE UTF-8|||LAB-27^IHE
MSA|AA|bb4868c7-29b8-4c0b-8345-58399bf851e3
QAK|bb4868c729b84c0b834558399bf851e3|OK|WOS^Work Order Step^IHE LABTF
```



```
QPD|WOS^Work Order Step^IHE LABTF|bb4868c729b84c0b834558399bf851e3|4800002049
<CR>
<EB>
<CR>
<TV>
MSH|^~\&|BA400|Biosystems|Host|Host provider|20140408161403||OBP^011^OBP
011|92e1b586-5c05-4275-afc2-1afe926c02fd|P|2.5.1|||ER|AL||UNICODE UTF-8|||LAB-
27^IHE
QPD|WOS^Work Order Step^IHE LABTF|92e1b5865c054275afc21afe926c02fd|2400002050
RCP|I||R
<CR>
<EB>
<CR>
<TVT>
MSH|^~\&|Host|Host provider|BA400|Biosystems|20140408161401||RSP^K11^RSP K11|201
40408161401|P|2.5.1|||NE|NE||UNICODE UTF-8|||LAB-27^IHE
MSA|AA|92e1b586-5c05-4275-afc2-1afe926c02fd
QAK|92e1b5865c054275afc21afe926c02fd|OK|WOS^Work Order Step^IHE LABTF
QPD|WOS^Work Order Step^IHE LABTF|92e1b5865c054275afc21afe926c02fd|2400002050
<CR>
<EB>
<CR>
```

From Server Socket - Orders

```
<TV>
MSH|^~\&|MODULAB|MODULAB|BA400|BA400|20140408155721||OML^033^OML 033|20140408155
7211|P|2.5.1|||ER|AL||UNICODE UTF-8|||LAB-28^IHE
PID|1||JM0012||JOHN^^^^^L|SMITH^^^^^L|19800325|M
SACI112400002048
ORC|NW||||||20140408155721|||||||||SERVICIO I+D^^^^^FI^^^1
TQ1|||||R
OBR|1|||CREATININE^CREATININE^BA400|||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155721||||||||||SERVICIO I+D^^^^^FI^^1
TQ1||||||R
OBR|2|||GLUCOSE^GLUCOSE^BA400||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155721||||||||||SERVICIO I+D^^^^^FI^^^1
TO1|||||R
OBR|3|||TRIGLYCERIDES^TRIGLYCERIDES^BA400||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155721|||||||||||SERVICIO I+D^^^^^FI^^^1
TO1|||||R
OBR|4|||UREA-BUN-UV^UREA-BUN-UV^BA400||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155721|||||||||||SERVICIO I+D^^^^^FI^^^1
TQ1|||||R
OBR|5|||URIC ACID^URIC ACID^BA400||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155721|||||||||SERVICIO I+D^^^^^FI^^^1
TQ1||||||R
OBR|6|||Na+^Na+^BA400|||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155721|||||||||SERVICIO I+D^^^^^FI^^^1
OBR|7|||K+^K+^BA400|||||||||123456^NOMBRE DOCTOR
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TQ1|||||R
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PID|1||JM0014||MARGIE^^^^^L|BLACK^^^^^L||F
SPM|1|4800002049||URI^URI^2.16.840.1.113883.12.70||||||P|||||||||||||||1
SAC|||4800002049
ORC|NW||||||20140408155723||||||||||SERVICIO I+D^^^^^FI^^^1
TQ1|||||R
OBR|1|||CREATININE^CREATININE^BA400|||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155723|||||||||||SERVICIO I+D^^^^^FI^^1
TQ1|||||R
OBR|2|||URIC ACID^URIC ACID^BA400||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155723|||||||||||SERVICIO I+D^^^^^FI^^^1
TQ1||||||R
OBR|3|||PHOSPHORUS^PHORUS^BA400|||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155723|||||||||SERVICIO I+D^^^^^FI^^^1
TQ1|||||R
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SAC|||2400002049
ORC|NW||||||20140408155722|||||||||||SERVICIO I+D^^^^^FI^^^1
TQ1||||||R
OBR|1|||CREATININE^CREATININE^BA400||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155722||||||||||SERVICIO I+D^^^^^FI^^^1
TQ1||||||R
OBR|2|||GLUCOSE^GLUCOSE^BA400||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155722|||||||||SERVICIO I+D^^^^^FI^^1
TQ1|||||R
OBR|3|||UREA-BUN-UV^UREA-BUN-UV^BA400||||||||||123456^NOMBRE DOCTOR
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ORC|NW||||||20140408155722|||||||||SERVICIO I+D^^^^^FI^^^1
TQ1||||||R
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ORC|NW||||||20140408155722|||||||||||SERVICIO I+D^^^^^FI^^^1
TQ1||||||R
OBR|5|||Na+^Na+^BA400||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155722||||||||||SERVICIO I+D^^^^^FI^^^1
TQ1|||||R
OBR|6|||K+^K+^BA400|||||||||123456^NOMBRE DOCTOR
ORC|NW||||||20140408155722|||||||||||SERVICIO I+D^^^^^FI^^^1
TQ1||||||R
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