OmniView-SisPorto

Service Manual for Integration with Hospital Information Systems

Contents

1. Overview

This document is intended to provide guidance to the integration of communications between Omniview, Maternum and other Hospital Information Systems (HIS).

Magnet is the module for integration with HIS. It runs as a WCF (Windows Communication Foundation) service, typically on an Omniview server, and provides a set of tools for integration.

The current document is focused on integrations using HL7 v2 and v3 messages. Some additional integration methods will also be mentioned (direct database queries, direct links to patient data).

Most messages examples are used in real environments with Omniview. It is possible to use different messages upon suggestion of the Hospital. Non HL7 integrations are also covered, though in a less detailed manner.

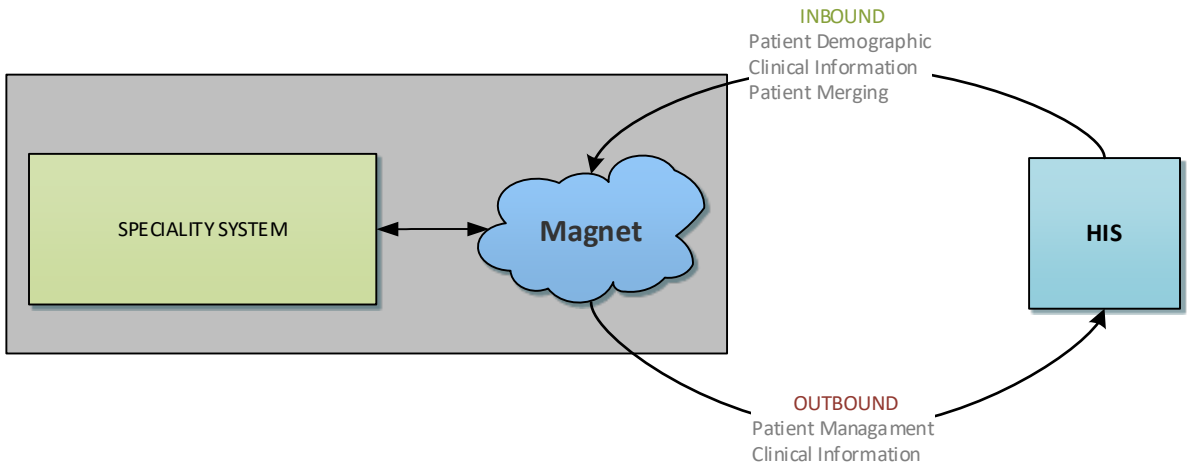
2. HIS Integration Process

Step	Description	Input	Output
1. Sharing Integration Information	Contact with HIS provider in order to supply and receive HL7 information Define which messages are to be exchanged with HIS		Magnet Configuration Form
2. User requirements signoff	Functionality specifications and user acceptance	Magnet Configuration Form	Installation Plan – Interface
3. Configuration and customization	Contact with HIS support provider to gather all required data and configuration of interface.	HIS Information Installation Plan – Interface	Installation Report – Interface
4. SIT and UAT testing	Test the interface (when possible)	Installation Report - Interface	Test Plan, Test report, Installation Report – Interface
5. Documentation for Support and Responsibilities	Documentation required for maintenance and support of the interface		Support Documentation

3. Magnet Service

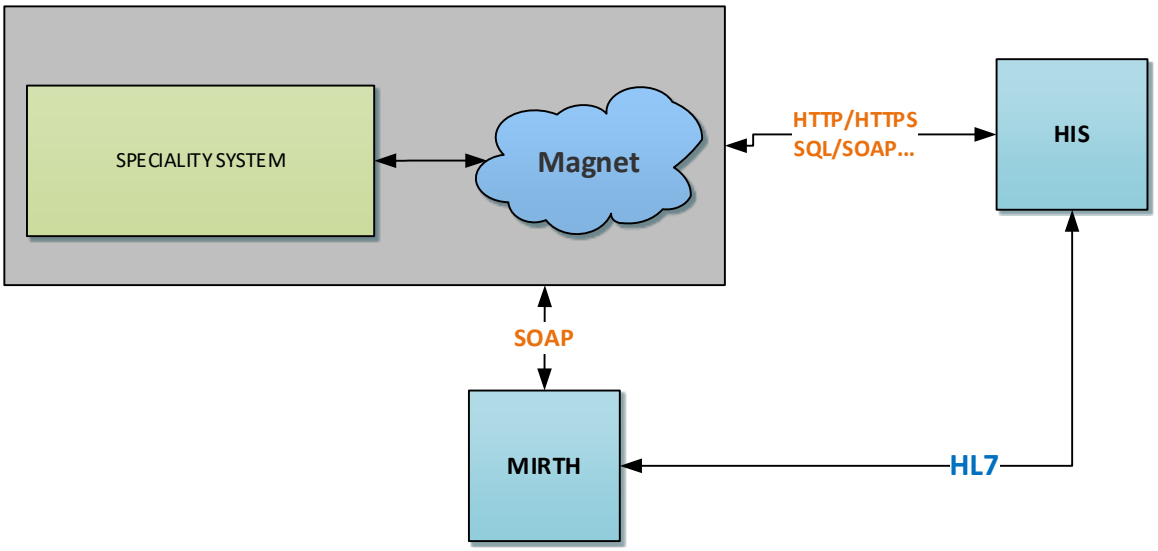
Magnet runs as a WCF service, typically on an Omniview server, and manages all messages sent to and received from the HIS. Typically, a Mirth Connect service is installed on the same machine to provide maximum flexibility in parsing incoming and outgoing HL7 messages.

Functionality



4. Supported MAGNET Communications with HIS

Methods usage



HL7 communication channels

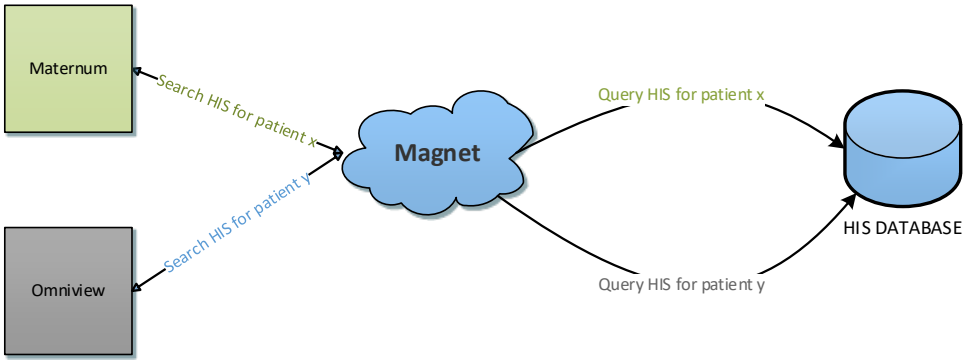
The default communication channel that will be used for HL7 v2 or v3 is the TCP/IP Listener with Minimal Lower Layer Protocol (MLLP) on port **6001**. Other possibilities for message exchanging are possible, varying with what the HIS sends.

Communications *Sources* available are:

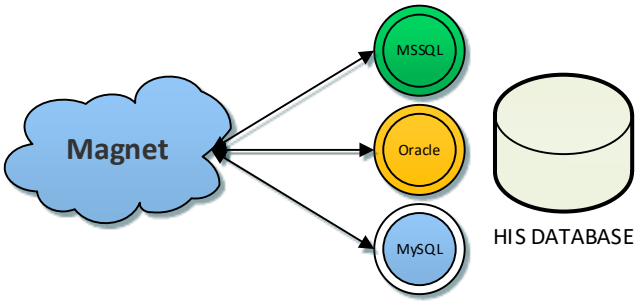
Database Reader
Channel Reader
File Reader
HTTP Listener
JMS Reader
JavaScript Reader
DICOM Listener
Web Service Listener
TCP Listener

Database Query

- MAGNET can search in a HIS provided Database Table or View.
- MAGNET will provide the results of its patient search queries to Omniview and/or Maternum.



- MAGNET uses Microsoft technologies, having its focus around an **MSSQL** database. Queries to different RDBMS, such as **ORACLE** or **MySQL**, are also possible.



MAGNET Link Requests

A remote HIS can send requests to Magnet via URL (or SOAP) to obtain data from Maternum or Omniview, as long as both ends agree on what data they are to share. Magnet's response will be according to what the HIS requests.

Examples of HIS requests via URL:

- HIS wants to know the delivery types that Patient number "1234" has:
    - *https://HISWebserver.magnet/Service.svc/web/patientdeliverytype?patientid=1234*
- HIS wants to know how many "C-Sections" where made this month:
    - *https://HISWebserver.magnet/Service.svc/web/howmanydeliverytype?dtype=1&dfrom=20130201&dto=20130230*

Examples of HIS requests via SOAP:

- HIS wants to know from Patient number "1234" the delivery type:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:tem="http://tempuri.org/">
  <soapenv:Header/>
  <soapenv:Body>
    <tem:patientdeliverytype>
      <tem:patientid>1234 tem:patientid >
    </tem:patientdeliverytype>
  </soapenv:Body>
</soapenv:Envelope>
```

- HIS wants to know how many “C-Sections” where made this month:

```
<soapenv:Envelope xmlns:soapenv="http://schemas.xmlsoap.org/soap/envelope/" xmlns:tem="http://tempuri.org/">
  <soapenv:Header/>
  <soapenv:Body>
    <tem:howmanydeliverytype>
      <tem:dtype>1</tem:dtype>
      <tem:dfrom>20130201</tem:dfrom >
      <tem:dto>20130230</tem:dto >
    </tem:howmanydeliverytype >
  </soapenv:Body>
</soapenv:Envelope>
```

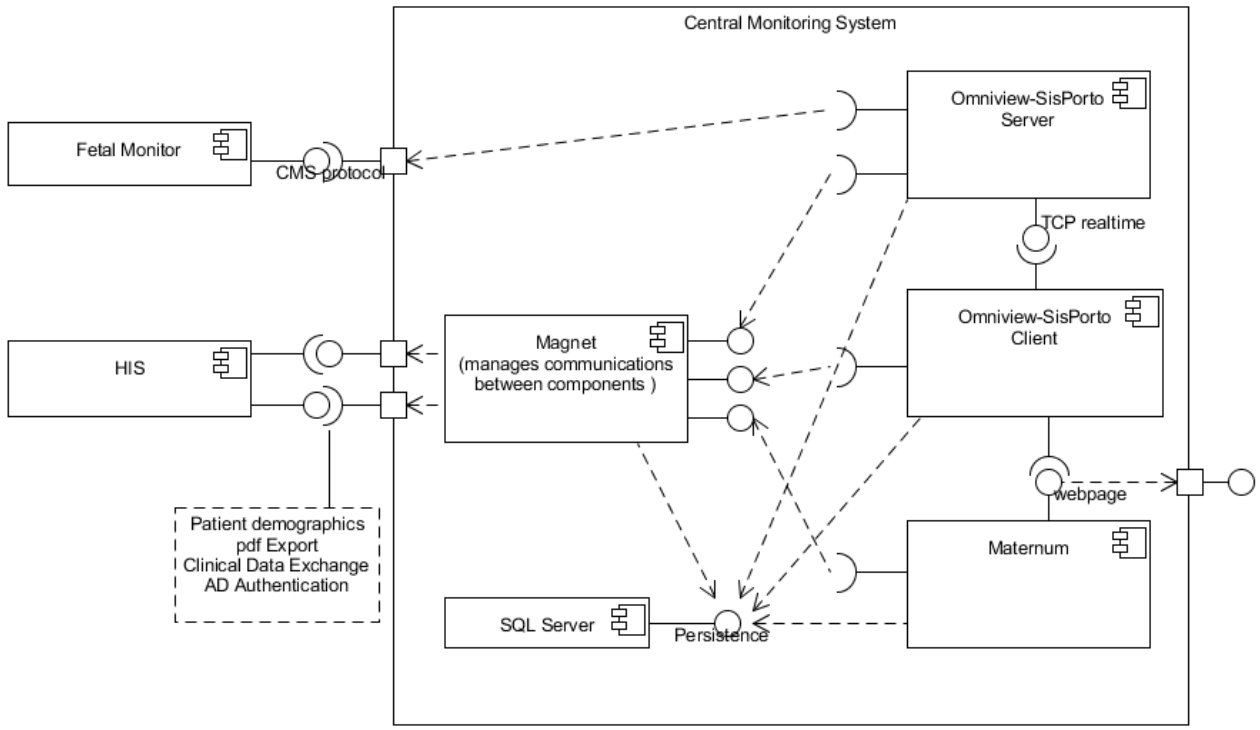
MAGNET Web Service supported Protocols

All service methods can be called using the following transport protocols:

- WSDL 1.1, 2.0
- SOAP 1.1, 1.2
- HTTP 1.1

Omniview-SisPorto system context

Magnet is often use in the Omniview-SisPorto system, providing an interface between the different modules themselves as well as the HIS.

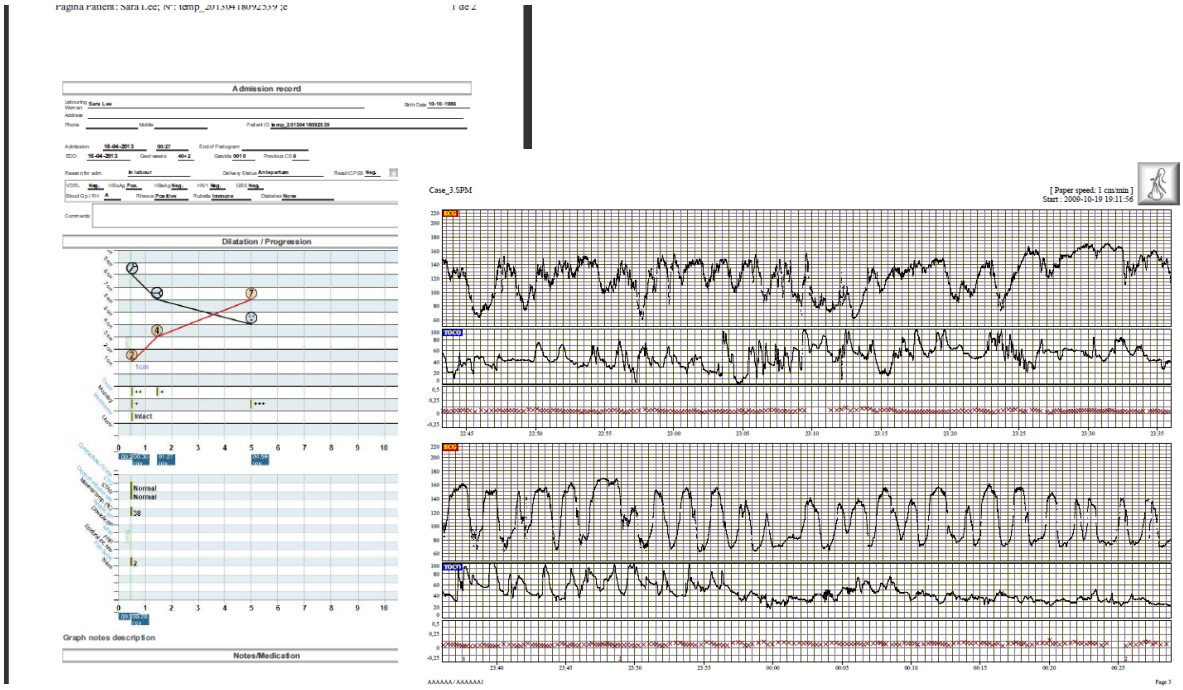


5. Pdf file format export

It is possible to export documents generated by our applications as pdf files.

With this feature, Omniview CTG tracings and Maternum's Labour and delivery notes can be saved as pdf files, to be sent to a HIS.

Using HL7 or a web service, we send either a link to a place where these Pdf files are stored and available internally to the hospital, or we sent the entirety of the PDF in base 64 encoding to a destination HIS – either embedded in the HL7 message, or in a format compliant with the expectation of the HIS.



6. HIS URL access to Maternum patient

URL access

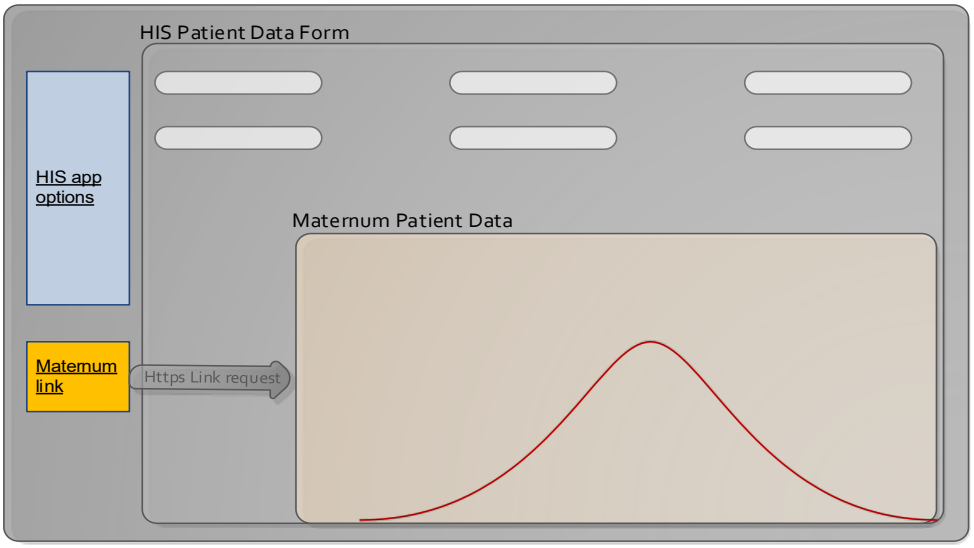
Some HIS applications require a direct access to patient data by using configured links, internally referred to as HISInterfaces.

The next example shows a patient call from a HIS application so that the user can see the patient data without going through the **Maternum Login page and patient search.**

Example of a direct patient link:

- *https://HISWebserver.maternum/list_patients.aspx?patientid=xxxxx&userid=yyyy&appcode=7FRDFGJS5*

HIS Application



Communication encryption

Maternum can be configured in one of two ways regarding the security of data that's travelling across the hospital's network.

HTTP

This is the default set of configurations, providing no additional security layer. Should a hospital's network be fully isolated from the World Wide Web, it should be enough for hospital usage.

HTTPS

This set of configurations is more complex, but provides vastly increased security for all requests. This requires the hospital to provide a valid certificate, and for that certificate to be recognized internally. The additional configuration allows the use of **SSL encryption**, resulting in all requests between Maternum and the HIS to be protected and much harder to trace to outsider attacks.

Additional security measures

Custom security measures (on top of HTTPS) may be implemented should the need arise.

HL7 Communication Messages

Messages based on the HL7 protocol can be used, either V2 or V3.

HL7 Clinical Document Architecture (CDA) can be used to structure documents as well as IHE Content Profiles.

Examples of HL7 2.4 messages

<table>
<tr><th>Message Type</th><th>Direction</th><th>Description</th><th>Action in Magnet</th><th>Example</th></tr>
<tr><td colspan="5">Obtain Patient Demographics</td></tr>
<tr><td>ADT^A01
ADT^A02
ADT^A04
ADT^A05
ADT^A08
ADT^A31</td><td>HIS=>Magnet</td><td>Informs a system of a new patient's admission, location change, or information updates</td><td>Stores information about the new patient. If it's an already existing patient, updates their data</td><td>MSH|^~\&|HIS|HP|OMNIVIEW|EXEMPLO_HIS|20200101000000||ADT^A01|XPTO0129387|P|2.5|||NE|NE
EVN|A01|20200101000000|20200101000000|||20200101000000
PID|1||NUMPACIENTE^^^^HLUZ||KRALL^DIANA|NATALIE|19701114|F|||RUA DE EXEMPLO^^CIDADE DE EXEMPLO^0000^000^000^^0||^^^^^^^^96XXXXXXXX~^^^^^^^^91XXXXXXXXX|||||||||||||||||N
PV1|1|B|PTG^^OV01^HLUZ|A|||XYZWB^GAINS^AERIS^||XYZWA^WALLACE^MARLENE^^^^^^^^^^EI|OBS||||2|||XYZWB^GAINS^AERIS^||1234567890||||||||||||||||||||||||202001010203 0</td></tr>
<tr><td>ADT^A03
ADT^A11
ADT^A12</td><td>HIS=>Magnet</td><td>Informs a system of a patient's discharge, indicating that the location they were in is now available once more.</td><td>Keeps the patient demographics, but releases the location</td><td>Same structure as above, but with additional data about the room's location</td></tr>
<tr><td colspan="5">Obtain Patient information to autofill in Maternum</td></tr>
<tr><td>QBP^Z89</td><td>Magnet=>HIS</td><td>Queries a HIS to obtain patient lab results on demand.</td><td>Waits for the RSP message from the HIS.</td><td>MSH|^~\&|SPECULUM|HOSPITAL|HIS|HOSPITAL|20200101000000||QBP^Z89|20200101010101010000X|P|2.4
QPD|Z89^RequestClinicalData^HL7|123456|@PID.3.1.1^EQ^01patientnumber01
RCP|I||R</td></tr>
<tr><td>RSP^Z90</td><td>HIS=>Magnet</td><td>Replies to a QBP^Z89 message with patient demographics.</td><td>Stores the data for access via a Maternum Partogram</td><td>MSH|^~\&|HIS|HOSPITAL|SPECULUM|HOSPITAL|2020010101000000||RSP^Z90|4921c895-bb27-4cc5-b581-7c9e6981b546|P|2.3|1|||||||
MSA|AA|20200101010101010000X||||
QAK|123456|OK|Z89^RequestClinicalData^HL7</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></td><td>QPD|Z89^RequestClinicalData^HL7|
123456|@PID.3.1.1^EQ^01patientnu
mber01
RCP|I||R||||
PID||||||||||||||||||01patientnu
mber01^^^^NP
PV1||E|||||||||||||||||63756||||
||||||
OBX|1|TX|1^BLOOD
GROUP^||AB+||||||F
OBX|2|ST|2^GESTATION AGE||40w
1d||||||F
OBX|3|ST|3^EXPECTED DELIVERY
DATE||2020-09-01||||||F
OBX|4|ST|4^PARITY||1||||||F
OBX|5|ST|5^GESTATIONS||1||||||F
OBX|6|ST|6^C-SECTIONS||0||||||F</td></tr>
<tr><td>ORU^R01</td><td>HIS=>Magnet</td><td>Sends to Magnet a list of patient information that Maternum will display.</td><td>Stores the data for access via a Maternum Partogram.</td><td>N/A</td></tr>
<tr><td colspan="5">Send PDF Files to HIS</td></tr>
<tr><td>MDM^T01</td><td>Magnet=>HIS</td><td>Sends either a full Partogram / CTG tracing in base64 format, or a link to access them.</td><td>Either stores the PDF in a place in the server that can be accessed via link, or converts the PDF to base64 to embed the HL7 message.</td><td>N/A</td></tr>
<tr><td>ORU^R01</td><td>Magnet=>HIS</td><td>Sends either a full Partogram / CTG tracing in base64 format, or a link to access them.</td><td>Either stores the PDF in a place in the server that can be accessed via link, or converts the PDF to base64 to embed the HL7 message.</td><td>MSH|^~\&|Maternum||HOSPITAL-
NAME||20200101000000||ORU^R0
1|20200101000000000328|P|2.4
PID|1||123456789||HCCCCC^||1
990-01-01T00:00:00|||
PV1|1|O|||||||||||||||||||||
||||||||
OBR|1|||PARTOGRAMA|||2020-
01-01T00:00:00|||||||||||||
OBX|1||||^^Partogram^Full^<b
ase 64 pdf here></td></tr>
<tr><td colspan="5">Send other information to HIS</td></tr>
<tr><td>ORU^R01</td><td>Magnet=>HIS</td><td>Sends information to a HIS for specific Maternum fields.</td><td>Translates the information stored in Maternum to the format of the HIS.</td><td>MSH|^~\&|SPECULUM||HIS||2020
010101000000||ORU^R01|202001
0101000000X425YZ|P|2.4|||||
|||
PID|||0123456789||NOME DA
PACIENTE||||||||||||||||||||
|||||
OBR||||PARTOGRAM</td></tr>
</table>

				OBX|0001|ST|HL7^Membranas||Membranas Rotas||||||F|||01/01/2020 08:17||| OBX|0002|ST|HL7^Contracções||2,00||||||F|||01/01/2020 05:43||| OBX|0003|ST|HL7^Sistólica||113||||||F|||01/01/2010 02:01||| OBX|0004|ST|HL7^Diastólica||60||||||F|||01/01/2010 02:01||| OBX|0005|ST|HL7^Diastólica||62||||||F|||01/01/2020 03:09||| OBX|0006|ST|HL7^Diastólica||61||||||F|||01/01/2020 03:43||| OBX|0007|ST|HIS^RitmoCardiacoMaterno||79||||||F|||01/01/2010 02:01||| OBX|0008|ST|HIS^RitmoCardiacoMaterno||78||||||F|||01/01/2020 03:09||| OBX|0009|ST|HIS^Plaquetas||22||||||F||||||
Other messages				
OMG^O19	HIS=>Magnet	Request a CTG's details.	None	MSH|^~\&|HIS||OMNIVIEW||2011^08||OMG^O19|18291373|P|2.4|||||||| PV1||E|BUrg MED||||||1| PID|||12345^^^HFF^MR~U2011123456^^^HFF^AN||TEST^TEST||19650617000000|M ORC|NW|3173251^OrderID||5553472|Activo|1^^^20110808000200^20110808000200^Urgent|||2011^08|45584^ Doctor John Doe||45584^Doctor John Doe|||2011^08||||||||| OBR||3173251^OrderID||1^CTG|||||||||||45584^Doctor John Doe
RQI^I03	Magnet=>HIS	Queries a HIS to obtain patient demographics on demand.	Waits for the RSP message from the HIS.	MSH|^~\&|Omniview|Hospital_Name|HIS_Name|Maternity_Name|20090305191620||RQI^I03^RQI_I01|c3977dde-21c4-48f8-934c-9b0a2d43aa78|P|2.4|||| PID|1||PatientID^^^^IDType
RPR^I03	HIS=>Magnet	Replies to a RQI^I03 message with patient demographics.	Stores the data for access via a Maternum Partogram	MSH|^~\&|HIS_Name|Hospital_Name|Omniview|Hospital_Name|Message_Date|| RPR^I03^RPR_I03|Message_ID|P|2.4 MSA|Acknowledgement_Code|Message_ID PID|1||PatientID^^^IDType||^MARY

				||20011024103000|F|||ADDRESS L1^^^^^^P^|||||||||| ||||||||||X **PID**|2||PatientID^^^IDType||JONES ^MARY||20011024103000|F|||ADDRES S L1^^^^^^P^|||||||||| ||||||||||X