Interfacing Patient and Vital Signs Monitors
Capturing Temperature Source in a Single Query Field

It was my first experience working with Meditech that made me really think outside of the box to see if we could get temperature source in its own query field. There was no way the clinical staff would accept Meditech's recommendation. The following steps are one solution that I have deployed at several hospitals. First, determine if your Patient Monitors or Vital Signs Monitors use MDIL or EMFC Codes. The next fact you need to determine is what types of temperature source your monitors will be utilizing.

> Determine if your monitors will be using MDIL or EMFC Codes. Next determine the type of temperature source the monitors will send.

Looking at Meditech PCS

Mapping to PCS AssessmentsThere are two ways to that you can handle the temperature source. Please note, you may want to mirror the manual process of documenting vital sign. You can use a standard query field; however, you can also utilize a group response with your query field. Both of these methods can be programmed in your interface engine for patient monitors and/or vital signs monitors. Next, you will need to map your MDIL Codes with your query mnemonics. Let's look at an HL7 transaction from a monitor.

My First Experience
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I remember all too well my first experience working with interfacing the Vital Signs Monitors to Meditech 6.X. We were in the process of integrating our Philips VS3 Monitors to our Vital Signs Assessment in PCS. Like most monitors, there are multiple ways to take a temperature. The monitor will send a unique code (MDIL or EMFC) in the HL7 ORU Segment, but it also sends the code for the temperature source in the same segment. I am sure my facial expression said it all when our Meditech Specialist told us that they cannot break out multiple codes from the same segment, and we would need to create a separate query field for each type of temperature. My first thought, "So much for trending temperatures for the clinician."

```
MSH|^~\&|TstPDIClient2|CGH|||20120301073329||ORU^R01^ORU_R01|US126409272012
0301073329|P|2.4|||||||||2.16.840.1.113883.9.2.1||•
PID|||M000004222|A00000004222|TEST^PATIENT^L^^||||^^|||||||||A00000004222|||||
|||||||||||||||||•
PV1||I|MED^415^01|||||||||||||||||IN|||||||||||||||||||||||||^^||||||||||||•
OBR||||SPOTCHECK|||20120301073317|20120301073317||BNURSE||||||||||||||||||||||||
||||||||||||||||||•
OBX|1|NM|0002-4bb8^SpO2^MDIL||100|0004-0220^%^MDIL|||||F||||||||||•
OBX|2|NM|0002-4a05^NBPs^MDIL||106|0004-0f20^mmHg^MDIL|||||F||||||||||•
OBX|3|NM|0002-4a06^NBPd^MDIL||61|0004-0f20^mmHg^MDIL|||||F||||||||||•
OBX|4|NM|0002-4a07^NBPm^MDIL||70|0004-0f20^mmHg^MDIL|||||F||||||||||•
OBX|5|NM|0002-4182^HR^MDIL||54|0004-0aa0^bpm^MDIL|||||F||||||0002-
4bb8^SpO2^MDIL|||•
OBX|6|NM|0401-0b54^pTemp^MDIL||98.3|0004-1140^F^MDIL|||||F||||||0002-
f110^Oral^MDIL|||•
OBX|7|NM|0002-500a^Respiration||18|0004-0ae0^rpm|||||F||||||||||•
OBX|8|SN|0002-4a04^NBP^MDIL|0|^106^/^61|0004-0f20^mmHg^MDIL|||||F||||||||||•
OBX|9|SN||0|^@3^/^18|mmHg|||||F||||||||||•
```

If you look at the sixth OBX segment highlighted above, you will notice that this is the temperature and temperature source from the vital sign monitor. Let's break this segment down:

The temperature segment from the monitor broken out:

```
OBX|6|NM|0401-0b54^pTemp^MDIL||98.3|0004-1140^F^MDIL|||||F||||||0002-f110^Oral^MDIL|||•
```

The highlight section in green is the actual temperature reading from the monitor; whereas, the highlighted section in blue is the temperature source. In order for this to work, you need to put the temperature source in a new OBX segment then insert it in the transaction. See the example below:

```
MSH|^~\&|TstPDIClient2|CGH|||20120301073329||ORU^R01^ORU_R01|US1264092720120301073329|P
|2.4|||||||||2.16.840.1.113883.9.2.1||•
PID|||M000004222|A00000004222|TEST^PATIENT^L^^||||^^|||||||||A00000004222||||||||||||||||||
|||||•
PV1||I|MED^415^01|||||||||||||||||IN|||||||||||||||||||||||||^^||||||||||||•
OBR||||SPOTCHECK|||20120301073317|20120301073317||BNURSE|||||||||||||||||||||||||||||||||||
||||||•
OBX|1|ST|0402-f958^OperID^MDIL||BNURSE|0004-0000^^MDIL|||||F||||||||||•
OBX|2|ST|0402-f95a^Notification^MDIL||Y|0004-0000^^MDIL|||||F||||||||||•
OBX|3|ST|0402-f959^pTempS^MDIL||Oral|0004-0000^^MDIL|||||F||||||||||•
OBX|4|NM|0401-0b54^pTemp^MDIL||98.3|0004-1140^F^MDIL|||||F||||||0002-f110^Oral^MDIL||
OBX|5|NM|0002-4bb8^SpO2^MDIL||100|0004-0220^%^MDIL|||||F||||||||||•
OBX|6|NM|0002-4a05^NBPs^MDIL||106|0004-0f20^mmHg^MDIL|||||F||||||||||•
OBX|7|NM|0002-4a06^NBPd^MDIL||61|0004-0f20^mmHg^MDIL|||||F||||||||||•
OBX|8|NM|0002-4a07^NBPm^MDIL||70|0004-0f20^mmHg^MDIL|||||F||||||||||•
OBX|9|NM|0002-4182^HR^MDIL||54|0004-0aa0^bpm^MDIL|||||F||||||0002-4bb8^SpO2^MDIL|||•
OBX|10|NM|0002-500a^Respiration||18|0004-0ae0^rpm|||||F||||||||||•
```

Now we need to look at the mapping between the monitor and Meditech. Your PCS Specialist will be working alongside your NMI Specialist, and they will need this mapping. I took an MDIL code that is designated as *Free Field.* This allows you to use them as a site defined code. Your mapping should look something like this:

MDIL	MDIL Description	Meditech Query Mnemonic	Response Characteristic
0401-0b54	pTemp Temperature	VS.TEMP	Numeric
0402-f959	pTempS Temperature	VS.TEMPS	Numeric
0002-500a	Resp Respiration	VS.RESP	Numeric
0002-4182	HR Heart rate	VS.PULSE	Numeric
0002-4bb8	SpO2 Oxygen saturation of arterial blood	RESP.POSAT	Numeric
0002-4a07	NBPm Non-invasive blood pressure (mean)	VS.BPM	Numeric
0002-4a04	NBP Non-invasive Blood Pressure	VS.BP	Numeric
0002-f98c	Pain Index	C.PTPI	Numeric

This is the point where you need to determine if you are going to do a standard query field or a group response query. Your HL7 programmer will need to know this mapping in order for the HL7 segment to have the correct value. Let's start with the straight query field mapping:

Monitor Temperature Source	Meditech Response
Oral	Oral
Rectal	Rectal
Axillary	Axillary
Tympanic	Tympanic

Your HL7 programmer will want to insert your Meditech Response in OBX5 which will look like this:

OBX|3|ST|0402-f959^pTempS^MDIL||Oral|0004-0000^^MDIL|||||F|||||||||||•

If you are going to use a Meditech Group Query Response, you will want to use the element mnemonic of the group response. Here is what our example:

Here is what your mapping should look like for the group query response:

Monitor Temperature Source	Meditech Response	Element Mnemonic
Oral	Oral	1
Rectal	Rectal	2
Axillary	Axillary	3
Tympanic	Tympanic	4

Your HL7 programmer will want to insert your Element Mnemonic in OBX5 which will look like this:

OBX|3|ST|0402-f959^pTempS^MDIL||1|0004-0000^^MDIL||||||F||||||||||•

The end results should look like this:

D288 IT Solutions, LLC was founded by Kevin L. Frederick in 2010, a former Vice President and CIO of a health system, who was always in search of a company that could assist him in seeing the "big picture" and then help him achieve it in a practical approach.

 D288 IT Solutions started in the early years with general HIT consulting. However, Kevin realized quickly that there was a large need for vendor neutral integration services. In 2013, D288 IT Solutions re-launched itself focusing on integration. At the same time, we launch a series of webinar to help the health care IT professional grow in their knowledge of HL7. "It is startling the number of individuals that have no foundation of what HL7 really is." states Kevin Frederick

In 2015, D288 IT Solutions was asked by several organizations to either perform IT Operational Assessment, IT Strategic Plan, or IT Disaster Recovery Planning. They were in intrigued by our unique approach to provide useful, applicable information that was practical to running an IT Department. We quickly realized that we need to include this in our menu of services.

"It has been an honor and privilege to serve every client." says Frederick, "Founding this organization has been an amazing adventure, and I am deeply humbled to be part of this company. My only regret, is that I did not do it sooner."

The goal of D288 IT Solutions, LLC is to support the IT advances of hospitals and healthcare through integration. To come along side and assist with their strategic vision and objectives.

For more information visit us at http://www.d288itsolutions.com