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U.S. National Library of Medicine – Lister Hill Center
Sending Newborn Screening Results Electronically with HL7 Messaging

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Introduction (Overview and Explanation):

This is one example of how newborn screening HL7 messages might look.

This annotated example HL7 message, for sending results of newborn screening tests in a machine-readable format, shows a proposed approach for coding the NBS payload (the clinical questions asked on the card and the variables measured or calculated in the lab or on the newborn ward) in an HL7 version 2 messages. This approach was derived by NLM from the work of the AHIC work group, and many discussions with the HITSP NBS work group and leaders from the NBS community. It was informed by a sample of de-identified NBS messages and reports from many states.

The focus in this example message is on the "results payload" – the OBR and OBX segments. This example does not yet included all of the 'wrapper" segments, e.g. the NK1 (next of kin) segments, the specimen segment nor the visit segment, likely to be required to satisfy national requirements. We focus only on the payload at this time. Attention to the "wrapper" segments will come later. This example shows the main characteristics of how a standardized payload would appear, but does not illustrate all of the capabilities. For example OBX-13 can be used to signal that normal results should not be included in routine clinical displays to simplify clinician review. A more complete example will be forthcoming. Updates will be available at http://newbornscreeningcodes.nlm.nih.gov/

We invented the result values and normal ranges you see in this example without any attempt to be clinically correct. These formats are similar to what you would see in real messages, but a NBS lab would include its real results and local normal ranges according to its usual practices.

For clarity throughout this example, we use the terms SNOMED CT, LOINC and LOCAL; to identify the coding systems. However, in a real HL7 version 2 message, these would be represented by abbreviations SCT, LN and L respectively.

For formatting purposes, we have inserted spaces in some places before and after ^ and | symbols in the message; however, in a real HL7 version 2 message, there may or may not be spaces. We also use color coding to emphasize certain content types, as explained in the Key below, and real HL7 messages would not contain color coding.

Key to identifying types of content in OBR and OBX segment fields:

HL7 version 2.x messages consist of "records" called segments; these are represented as ASCII Text – with data fields and sub-fields separated by delimiters.

- Segments always begin with a 3-letter designation (e.g. OBR, OBX, MSH, PID, NK1)
- Vertical bars or pipes (|) separate fields in a segment
- Hats (^) separate subfields
- Ampersands (&) separate subfield components
- Tildes (~) separate repeating values within a field

HL7 payload segments and content

- Each kind of segment is distinguished by a leading three character code. The order/report header segment identifies the panel, carries other information that applies to all of the observations within the panel, and is identified by a leading OBR. The observation segment—that carries answers to questions, and the value of measured and computed results – is identified by a leading "OBX".

- Example OBX segment:

  OBX|4|NM|53160-8^Propionylcarnitine (C3)^LOINC^3403^ C3^LOCAL|1|5.17 |umol/L|4.62-5.50|N|||F||| 20090714074205

- The fields in a segment are identified by counting delimiters. The first field in the OBX segment, OBX-1, begins after the first field delimiter (the vertical bar). The second one (OBX-2) follows immediately after the second delimiter, and so on.
- OBX-1 carries the sequence number to distinguish multiple OBX segments
- OBX-2 contains the data type of the test result (e.g. ST = string, NM = numeric, CE = coded entry).
- **OBX-3 contains the observation ID – includes code, print text and code system – it is always a coded item and it represents the "question."** HL7 permits senders to include both the Universal LOINC code and the local code for a given observation, andd laboratories commonly send both. Within the OBX-3 fields in our NBS message example we display the **universal code in red** and the **local code in Turquoise** as follows: **LOINC Code^Print Text^LOINC^Local Code^Print Text^LOCAL**

- OBX-4 (sub ID – allows nesting of OBX segments and repeat OBX segments with the same OBX-3 observation ID code)
- **OBX-5 contains the observation value or test result/impression (the payload). We display them in green for emphasis in the example message. It is the "answer" to the question posed in OBX-3**
    - It may be numeric (e.g. for glucose test results). If numeric, you must fill in units and normal range OBX field attributes
    - It may be coded (e.g. discharge diagnosis, or normal finding)
    - It may be other data types.
- **OBX-6 Units of Measure. We display them in blue for emphasis within the example message**
- **OBX-7 Reference Ranges. We display them in pink for emphasis in the example message**
- OBX-8 Abnormal Flags: Per HL7 v 2.5.1, we use N for normal, H for high, and L for low. The v 2.7 HL7 results message includes codes for Positive and Negative.
- OBX-13 enables hiding content when message is sent to specified recipients or types of recipients (e.g. clinical providers versus public health reporting)
- More fields exist, and are defined by the HL7 version 2.5.1 specification: http://www.hl7.org/implement/standards/v2messages.cfm

Annotated Example NBS HL7 Message:

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NBS Message Section 1:
Administrative Segments of HL7 message –
Message description, patient identification

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MSH|^~\&|Sending Application OID|Sending Facility OID|Receiving Application OID|Receiving Facility OID|200907152000| |ORU| |P|2.5.1||||||

PID|1|000001| ||SAMPLE^PATIENT|MOTHER'S MAIDEN NAME|200905051826|F^Female^HL7||2054-5^Black or Afreican American^HL7|100 SOUTH ST^^BETWEEN^STATE^ZIP||555-555-5555|||||0000000000000000001|555-55-5555||666-66-6666|N^Not Hispanic or Latino^HL7|South Street Hospital|Y|2

NK1|1|Jones^Mary|MTH^Mother^HL70064|address|phone number||||||||||date of birth|

ORC|RE|2001178109|10A1912102||||||200907061145|DZE||045728^DOCTOR^JANE ^A^^^MD^^^^178| ||200907101133| |||| |UNKNOWN SUBMITTER^1111^000001|NONE^^UNKNOWN ^UN^99999|555-555-5555|100 W FIRST STREET^^CITY^STATE^ZIP|USA|NEED Ordering Provider Address Type

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NBS Message Section 2: Report Summary

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OBR|1|2001178109|10A1912102|54089-8^ Newborn screening panel American Health Information Community (AHIC)^LOINC|Routine||200907061145||||||| 200907152000|BLD|000001||NO|| 10A1912102||||||||10000^NEWBORN SCREEN||

OBR|2|2001178109|10A1912102|57128-1^Newborn Screening Report Summary Panel^LOINC|Routine||200907061145||||||200907152000|BLD|000001||NO|| 10A1912102||||||||10000^NEWBORN SCREEN||

OBX|1|CE|57221-3^Reason for test^LOINC|1| LA12421-6^Initial screen^LOINC|| |*|||F|||20090714143552

Full Answer List for 57718-9:

Separate routine second screen from repeat samples in response to findings on a prior screen. Need LA codes

SEQ#	Answer	Code	Answer ID
1	Initial screen		LA12421-6
2	Subsequent screen on same sample – by law		LA12422-4
3	Subsequent screen on same sample – by rule		LA12423-2
4	Subsequent screen on same sample – by strong inference		LA12424-0
5	Subsequent screen on new sample – by law		LA12425-7
6	Subsequent screen on new sample – by rule		LA12426-5
7	Subsequent screen on new sample – by strong inference		LA12427-3

**** required ****
OBX|2|CE|57718-9^Specimen quality^LOINC |1|12432-3 ^Acceptable^LOINC^ New-SNOMED CT code|| ||||F||| 20090714143552

Full Answer List for 57718-9:

SEQ#	Answer	Code	Answer ID

1	Acceptable		LA12432-3
2	No sample received		LA12433-1
3	Blood dark - heated		LA12434-9
4	Blood clotted		LA12435-6
5	Sample not blood		LA12436-4
6	Un-even saturation		LA12437-2
7	Specimen received wet		LA12438-0
8	Damaged paper		LA12439-8
9	Does not elute		LA12440-6
10	Sample too old		LA12441-4
11	Blood did not soak through		LA12442-2
12	Insufficient quantity		LA12443-0
13	Contaminated		Need LA Code

**** required ****
OBX|3|CE|57130-7^Newborn screen overall interpretation^LOINC|1| LA12430-7^Not normal requiring further filter paper testing for at least one condition^ LOINC| ||A|||F||| 20090714143552

Full Answer List for 57130-7:

SEQ#	Answer	Code	Answer ID
1	All screening is normal		LA12428-1
2	Screen is borderline for at least one condition		LA12429-9
3	Not normal requiring further filter paper testing for at least one condition		LA12430-7
4	Not normal requiring immediate serum follow-up for at least one condition		LA12431-5

**** required ****
OBX|4|CE|57131-5^NBS conditions with positive markers^LOINC|1| 128596003 ^Medium-chain acyl-coenzyme A dehydrogenase deficiency ^SNOMED CT^ LA12509-8^MCAD^LOINC | | |A|||F|||20090714143552

**** required****
OBX|5|CE|57131-5^NBS conditions with positive markers^LOINC|2| 124214007^Deficiency of steroid 11-beta-monooxygenase (disorder)^SNOMED CT ^LA12533-8^ CAH ^LOINC|| |A|||F||| 20090714143552

**** required****
OBX|6|CE|57131-5^NBS conditions with positive markers^LOINC|3| 8808004^Biotinidase deficiency (disorder)^SNOMED CT ^LA12532-0^BIO ^LOINC|| |A|||F||| 20090714143552

**** required ****
OBX|7|CE|57720-5^NBS conditions with equivocal markers^LOINC|1| LA137-2^None^LOINC|| |N|||F|||20090714143552

**** Optional - but encouraged****

**OBX|8|FT|57724-7^Newborn screen narrative summary^LOINC|1|
SUMMARY: Newborn Metabolic Screen REQUIRES FOLLOW UP
Sample Quality: Acceptable
Disorder, Screening Result, Analyte (Normal)
Amino Acids, Normal
Fatty acids, ABNORMAL MCAD SCREEN
Organic acids, Normal
TSH (CH), Normal
17-OH-Progesterone (CAH), ABNORMAL CAH SCREEN
Biotinidase, ABNORMAL BIOT SCREEN
IRT (Cystic Fibrosis), No evidence of cystic fibrosis.
Hemoglobinopathies, ABNORMAL HGB SCREEN || ||||F|||20090714143552**

**** required****
OBX|9|CE|57719-7^Conditions tested for in this NBS study ^LOINC|1| 7573000^Classical phenylketonuria (disorder)^SNOMED CT^LA12520-5 ^PKU^LOINC|| ||||F||| 20090714143552

**** required****
OBX|9|CE|57719-7^Conditions tested for in this NBS study^LOINC|2| 27718001^Maple syrup urine disease (disorder)^SNOMED CT^LA12513-0^ MSUD^LOINC||||||F||| 20090714143552

**** required ****
OBX|9|CE|57719-7^Conditions tested for in this NBS study^LOINC|3| 398680004^Citrullinemia ^SNOMED CT^LA12482-8^CIT I^LOINC|| ||||F|||20090714143552

(…and so on for all 22 Conditions tested for in this NBS study. To save space we don't include all of the OBX segments (one per condition) required in a real message)

**** required****
OBX|9|CE|57719-7^Conditions tested for in this NBS study^LOINC|22| 15188001^Hearing loss ^SNOMED CT^LA12463-8^HEAR^LOINC|| ||||F|||20090714143552

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This next OBX shows an optional full report sent as a simple HL7 FT data type.

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**** optional****
**OBX|10|FT|57129-9^full Newborn Screening summary report suitable for display or printing ^LOINC|1|NEWBORN METABOLIC SCREEN
Patient's Name: XXXXX, Date of birth: 18 Feb 2009, Time of birth: XXXX, Sex: Female, Age at collection: 43 hours, Mother's name: XXXX
 Accession number: 200902, Collected: 20 Feb 2009, Received: 25 Feb 2009, Ordering physician: Dr. XXXX
SUMMARY: Newborn Metabolic Screen REQUIRES FOLLOW UP
Sample Quality: Acceptable
Disorder, Screening Result, Analyte (Normal)**

**
Amino Acids, Normal
Fatty acids, ABNORMAL MCAD SCREEN
Screen positive for medium chain acyl-CoA dehydrogenase deficiency (MCAD). Immediate clinical follow-up and contact with metabolic specialist indicated. Result phoned to (XXX) XXX-XXXX; YYYY-MM-DD, HHMMh, by NAME. C8 = 19.71 umol/L (< 0.25 umol/L), C6 = 2.81 umol/L (< 0.25 umol/L), C10:1 = 0.71 umol/L (< 0.20 umol/L), C8/C10 = 11.324 (< 4.000), C8/C2 = 0.813 (< 0.050).
Organic acids, Normal
TSH (CH), Normal
17-OH-Progesterone (CAH), ABNORMAL CAH SCREEN
Borderline screen positive for congenital adrenal hyperplasia (CAH). Suggest clinical follow-up and repeat newborn metabolic screen.
17-OH-P = 392 nmol/L (< 190 nmol/L)
Biotinidase, ABNORMAL BIOT SCREEN
Borderline abnormal screen for biotinidase deficiency (BIOT). Slightly decreased biotinidase activity, unlikely to be significant. Suggest clinical follow-up and repeat newborn metabolic screen.
IRT (Cystic Fibrosis), No evidence of cystic fibrosis. CF mutation analysis not performed. Further testing is only required if there is clinical suspicion of cystic fibrosis. Symptoms include poor growth, loose stools or evidence of malabsorption, persistent cough, or respiratory concerns.
Hemoglobinopathies, ABNORMAL HGB SCREEN
Probable Hb S (sickle) carrier. Suggest clinical follow-up and repeat newborn metabolic screen.
 Dr. NAME, Department of Laboratory Medicine and Pathology, HOSPITAL SITE
Babies born in STATE NAME are screened for the following: amino acid disorders (PKU, MSUD, CIT), fatty acid oxidation disorders (MCHAD, LCHAD, VLCAD, CUD, TFP), organic acid disorders (MMA, PA, IVA, GA1, HMG, BIOT), endocrine disorders (CH, CAH), cystic fibrosis, galactosemia, hemoglobinopathies, infectious diseases (HIV, TOXO), and hearing loss.
Because the NMS is a screen for several metabolic disorders and not a diagnostic test, there is a possibility of false negative and false positive results. All abnormal results require follow-up. Any baby with clinical features suggestive of a metabolic disorder requires clinical and diagnostic follow-up regardless of whether the NMS result is normal or abnormal.
 Babies born in STATE NAME are screened for the following: amino acid disorders (PKU, MSUD, CIT), fatty acid oxidation disorders (MCHAD, LCHAD, VLCAD, CUD, TFP), organic acid disorders (MMA, PA, IVA, GA1, HMG, BIOT), endocrine disorders (CH, CAH), cystic fibrosis, galactosemia, hemoglobinopathies, infectious diseases (HIV, TOXO), and hearing loss.
For additional information see website www.XXXXX. || |*|||F|||20090714143552**

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Note: The above OBX segment LOINC code can optionally embed a complete report (pre-formatted) as an RTF or PDF document in the OBX-5 field. The previous example showed the FT format, but the report could also be delivered as encapsulated data (ED). It is provided as optional for producers who want to deliver an attractively formatted report for human consumption. The required parts of the Encapsulated data (ED) as defined in the HL7 manual chapter 2 are data which would have to be transmitted in 6 bit ASCII.

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NBS Message Section 3: Clinical Information (Card Variables)

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Note: This is a representative sample. Work is underway to perfect the list of questions and answers, and find agreement about the content of the answer lists.

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OBR|3|2001178109|10A1912102|57717-1^Newborn screen card data panel^LOINC|Routine||200907061145||||||200907152000 |BLD|000001||NO||10A1912102||||||||10000^NEWBORN SCREEN||

**** required ****
OBX|1|ST|57716-3^State of origin^LOINC|1|GA|| ||||F|||20090714143552

**** required ****
OBX|2|NM|8339-4^Body weight at birth^LOINC|1|2600|g|>2500|N|||F|| |20090714143552

**** required ****
OBX|3|TM|57715-5^Time of birth^LOINC|1|03:26:43||||||F| ||20090714143552

**** required ****
OBX|4|DT|21112-8^Date of birth^LOINC|1|2008-03-20||||||F|||20090714143552

**** required ****
OBX|5|CE|57722-1^Birth plurality^LOINC|1| LA12412-5 ^Twins^LOINC |||*|||F|||20090714143552

Full Answer List for 57722-1:

SEQ#	Answer Code	Code	Answer ID
1	Singleton	1	LA12411-7
2	Twins	2	LA12412-5
3	Triplets	3	LA12413-3
4	Quadruplets	4	LA12414-1
5	Quintuplets	5	LA12415-8
6	Sextuplets	6	LA12416-6
7	Septuplets	7	LA12453-9
8	Other	8	LA46-8

**** required ****
OBX|6|NM|57714-8^Gestational age at birth^LOINC|1|33|weeks|>36|L|||F||| 20090714143552

****Required –may be multiple ****
OBX|7|CE|57713-0^Clinical events that affect NBS interpretation^LOINC|1| LA12419-0^ICU stay^LOINC|||*|||F|||20090714143552

OBX|7|CE|57713-0^Clinical events that affect NBS interpretation^LOINC|1| LA12417-4^RBC transfusion before NBS specimen^LOINC| ||*|||F||| 20090714143552

Full Answer List for 57713-0:

SEQ#	Answer Code	Code	Answer ID
1	None		LA137-2
2	RBC Transfusion before NBS specimen		LA12417-4
3	TPN and/or hyperalimentation		LA12418-2
4	ICU stay		LA12419-0
5	Systemic antibiotics before NBS specimen		LA12420-8

**** required ****
***** question and codes taken from National birth record *****
OBX|8|CE|57712-2^Extent of Mother's education^LOINC|1| LA12457-0^High school graduate or GED completed ^LOINC | ||*|||F||| 20090714143552

**** required****
OBX|9|ST|57723-9^Unique bar code number current specimen^LOINC |1|37562987 | ||*|||F|||20090714143552

**** required if this is the second or later test****
OBX|9|ST|57711-4^Unique bar code number initial specimen^LOINC |1|37562987 | ||*|||F|||20090714143552

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NBS Message Section 4: Newborn Screening Results

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This example includes screening result data (identified by LOINC codes) for many markers and derived variables (e.g. ratios). The LOINC AHIC newborn screening panel report, a pdf available at http://newbornscreeningcodes.nlm.nih.gov/, includes all of the conditions and variables that could be reported by any state. Think of it as a master template from which each state could select the variables it uses.

We propose that state labs report all of the results they analyze to the state Newborn screen system regardless of whether they are positive or negative evidence for the condition

We recommend that they send all supporting results for conditions that screen positive or equivocal to all report receivers- either by marking them for hiding from routine clinical displays (using OBX-13) or by omitting them.

In OBX-8 Abnormal Flags: Per HL7 v 2.5.1, we use N for normal, H for high, and L for low. The v 2.7 HL7 results message includes codes for Positive and Negative.

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OBR|4|2001178109|10A1912102|57794-0^Newborn screening test results panel^LOINC| Routine| |200907061145||||||200907152000|BLD|000001||NO|| 10A1912102||||||||10000^NEWBORN SCREEN||

OBR|5|2001178109|10A1912102|53261-4^Amino Acid NBS panel^LOINC^ 3500^AMINO REP^Amino Acid Profile*MAIN^LOCAL| Routine| |200907061145|||||| 200907152000|BLD|000001||NO||10A1912102||||||||10000^NEWBORN SCREEN||

OBX|1|CE|46733-2 Amino acidemias NBS interpretation ^LOINC ^3500^AMINO REP^Amino Acid Profile^ LOCAL|1|Normal|N| ||||F|||20090714074206

OBX|2|TX|46733-2 Amino acidemias NBS comment-discussion^LOINC |1| Any baby with clinical features suggestive of a metabolic disorder requires clinical and diagnostic follow-up regardless of whether the NMS result is normal or abnormal. || ||||F|||20090714074206

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[Rest of AA OBX segments below are normal…may be hidden or omitted accorded to a state's practice for reporting normal results to clinical recipients]

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OBX|3|NM|53150-9^Alanine+Beta Alanine+Sarcosine ^LOINC^3501^ALA^LOCAL|1|1236.06|umol/L| ||||F||| 20090714074206

OBX|4|NM|47562-4^Arginine^LOINC^3502^ARG^LOCAL |1|5.89| umol/L|<90| |N||F|||20090714074206

OBX|5|NM|42892-0^Citrulline^LOINC^3503^CIT^LOCAL|1| 19.4| umol/L|<55|N| ||F|||20090714074206

OBX|6|NM|47679-6^Leucine(LEU)^ LOINC^3505^LEU^LOCAL|1|162.52|umol/L |<250|N|||F|||20090714074206

OBX|7|NM|47700-0^Methionine^LOINC^3506^MET^LOCAL|1|45.97|umol/L| 44-49|N|||F|||20090714074206

OBX|8|NM|29573-3^Phenylalanine^LOINC^3508^PHE^LOCAL |1|104.61| umol/L|99-135|N|||F|||20090714074206

OBX|9|NM|35571-9^Tyrosine^LOINC^3509^TYR^LOCAL|1| 281.53| umol/L| 205-223|N|||F|||20090714074206

OBX|10|NM|47799-2^Valine^LOINC^3510^VAL^LOCAL|148.56| umol/L|140-168|N|||F|||20090714074206

OBX|11|NM|3511^LEU/PHE^LEU/PHE^3511^LEU/PHE^LOCAL|1|3.65|umol/L| 3.50-3.82|H|||F|||20090714074206

OBX|12|NM|35572-7^Phenylalanine/Tyrosine ^LOINC^3512^PHE/TYR^LOCAL |1| 2.46|umol/L|1.64-2.50|N|||F|| |20090714074206

OBX|13|NM|54092-2^Citrulline/Arginine^LOINC^3513^ CIT/ARG^LOCAL|1| 5.63|umol/L|5.1-6.0|N|||F| ||20090714074206

OBX|14|NM|53156-6^Methionine/Phenylalanine ^LOINC^ 3514^MET/PHE^LOCAL|1| 0.82|umol/L|0.76-1.0|N|||F|| |20090714074206

OBR|6|2001178109|10A1912102|57084-6^Fatty acid oxidation NBS panel^LOINC|Routine||200907061145 |||||||200907152000 |BLD|000001||NO||10A1912102||||||||10000^NEWBORN SCREEN||

OBX|1|CE|46736-5^Fatty acid oxidation defects newborn screen interpretation^LOINC|1| 128596003^Medium-chain acyl-coenzyme A dehydrogenase deficiency ^SNOMED CT ^LA12509-8^MCAD^LOINC | |||||F|||20090714074206

OBX|2|TX|57709-8^Fatty acid oxidation defects newborn screen comment-discussion^LOINC|1| ABNORMAL MCAD SCREEN. Screen positive for medium chain acyl-CoA dehydrogenase deficiency (MCAD). Immediate clinical follow-up and contact with metabolic specialist indicated. Result phoned to (XXX) XXX-XXXX; YYYY-MM-DD, HHMMh, by NAME. | |||||F|||20090714074206

OBX|3|NM|45211-0^Hexanoylcarnitine(C6) ^LOINC^3412^C6^LOCAL|1| 2.81|umol/L|< 0.25|H|||F||| 20090714074205

OBX|4|NM|53175-6^Octanoylcarnitine (C8)^LOINC^ 3414^C8^LOCAL|1| 19.71|umol/L|< 0.25|H|||F|| |20090714074205

OBX|5|NM|53177-2^Octanoylcarnitine (C8)/Decanoylcarnitine (C10)^LOINC^3416^C8/C10 ^LOCAL|1| 11.324|umol/L|< 4.000|H|||F||| 20090714074205

OBX|6|NM|45198-9^Decenoylcarnitine (C10:1) ^LOINC^3418^C10:1^LOCAL|1|0.71|umol/L|< 0.20|H|||F|| |20090714074205

OBX|7|NM|53176-4^Octanoylcarnitine (C8)/ Acetylcarnitine(C2)^LOINC^ 3444^C8/C2^LOCAL|1|0.813| umol/L|<0.050|H|||F|||20090714074206

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[Rest of FAO OBX strings below are not markers for abnormal MCAD screen…may be hidden or omitted accorded to desired practice for reporting normal results to clinical recipients]

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OBX|8|NM|38481-8^Carnitine free (C0)^LOINC^ 3401^CO^LOCAL|1| 11.88|umol/L|7.50-12.00|N|||F||| 20090714074205

OBX|9|NM|50157-7^Acetylcarnitine (C2)^LOINC^3402^ C2^LOCAL|1| 31.78|umol/L| ||||F|||20090714074205

OBX|10|NM|53178-0 ^3-Hydroxyoctanoylcarnitine (C8-OH)+ Malonylcarnitine (C3-DC)^LOINC^3404^C3DC^LOCAL |1| 0.07||||||F|||20090714074205

OBX|11|NM|53166-5^Butyrylcarnitine+ Isobutyrylcarnitine (C4)^LOINC^ 3405^C4^LOCAL|1|0.84| umol/L|0.75-1.02|N|||F|||20090714074205

OBX|12|NM|50102-3^3-Hydroxybutyrylcarnitine (C4-OH)^LOINC^ 3406^C4OH^LOCAL|1| 0.59|umol/L|0.43-0.66 |N|||F|||20090714074205

OBX|13|NM|45207-8^Glutarylcarnitine(C5-DC)^LOINC^3410^C5DC^LOCAL|1|0.05|||||F|||20090714074205

OBX|14|NM|53174-9^Octenoylcarnitine (C8:1) ^LOINC^3415^C8:1^LOCAL|1|0.52|umol/L|0.21-0.72 |N|||F|||20090714074205

OBX|15|NM|45197-1^Decanoylcarnitine (C10)^LOINC^ 3417^C10^LOCAL|1|0.31|umol/L|0.28-0.40|N|||F|| |20090714074205

OBX|16|NM|53180-6^Decadienoylcarnitine (C10:2) ^LOINC^3419^C10:2^LOCAL |1|0.07|umol/L|<0.12 |N|||F|||20090714074205

OBX|17|NM|45199-7^Dodecanoylcarnitine (C12)^LOINC^ 3420^C12^LOCAL|1|0.77|umol/L|0.44-0.80|N|||F|| |20090714074205

OBX|18|NM|45200-3^Dodecenoylcarnitine (C12:1)^LOINC ^3421^C12:1^LOCAL|1|0.31|umol/L|0.28-0.50|N|||F|| |20090714074205

OBX|19|NM|53192-1^Tetradecanoylcarnitine (C14) ^LOINC^3422^C14^LOCAL|1|0.61|umol/L|0.50-0.80|N|||F|| |20090714074205

OBX|20|NM|53191-3^Tetradecenoylcarnitine (C14:1)^LOINC^ 3423^C14:1^LOCAL|1|0.48|umol/L|0.37-0.71|N|||F|| |20090714074205

OBX|21|NM|53190-5^Tetradecadienoylcarnitine (C14:2)^LOINC^ 3424^C14:2^LOCAL|1| 0.12|umol/L|0.09-0.15|N|||F|| |20090714074205

OBX|22|NM|50281-5^3-Hydroxytetradecanoylcarnitine (C14-OH)^LOINC^3425^C14-OH^LOCAL|1| 0.09|umol/L||||| F|||20090714074205

OBX|23|NM|53199-6^Palmitoylcarnitine(C16)^LOINC^ 3426^C16^LOCAL|1| 6.13|umol/L|5.86-7.16|N|||F|| |20090714074205

OBX|24|NM|53198-8^Palmitoleylcarnitine(C16:1) ^LOINC^3427^C16:1^LOCAL|1| 0.09|umol/L| |||| F|||20090714074205

OBX|25|NM|50121-3^3-Hydroxypalmitoleylcarnitine (C16:1-OH)^LOINC^3428^C16:1-OH^LOCAL|1|0.13|umol/L |0.10-0.15|N|||F|| |20090714074205

OBX|26|NM|50125-4^3-Hydroxypalmitoylcarnitine (C16-OH)^LOINC^3429^C16-OH^LOCAL|1|0.17|umol/L|0.09-0.19|N|||F|| |20090714074205

OBX|27|NM|53241-6^Stearoylcarnitine (C18)^LOINC^ 3430^C18^LOCAL|1|0.26|umol/L|<0.31|N|||F|||20090714074205

OBX|28|NM|53202-8^Oleoylcarnitine (C18:1)^LOINC^ 3431^C18:1^LOCAL|1|2.42|umol/L|2.39-2.50|N|||F|| |20090714074205

OBX|29|NM|50113-0^3-Hydroxyoleoylcarnitine (C18:1-OH)^LOINC^3432^C18:1-OH^LOCAL|1|0.09|umol/L|0.08-0.10|N|||F| ||20090714074205

OBX|30|NM|45217-7^Linoleoylcarnitine (C18:2)^LOINC^ 3433^C18:2^LOCAL|1|0.63|umol/L|0.62-0.65|N|||F|| |20090714074205

OBX|31|NM|50132-0^3-Hydroxystearoylcarnitine (C18-OH)^LOINC^3434^C18-OH^LOCAL|1|0.08|umol/L|0.07-0.10|N|| |F|||20090714074205

OBX|32|NM|53233-3^Carnitine free (C0)/ Palmitoylcarnitine (C16)^LOINC^3435^C0/C16^LOCAL |1|67.04|umol/L| ||||F|||20090714074205

OBX|33|NM|54462-7^(C3-DC)^LOINC^3438^C3DC^LOCAL |1|N/A|||||| F|||20090714074205

OBX|34|NM|53167-3^Butyrylcarnitine+ Isobutyrylcarnitine (C4)/Acetylcarnitine (C2)^LOINC^ 3439^C4/C2^LOCAL|1|0|umol/L| ||||F|||20090714074206

OBX|35|NM|53168-1^Butyrylcarnitine+ Isobutyrylcarnitine (C4)/Propionylcarnitine (C3)^ LOINC^3440^C4/C3^LOCAL|1|0.26|umol/L| ||||F||| 20090714074206

OBX|36|NM|53185-5^Glutarylcarnitine (C5-DC)+3-Hydroxydecanoylcarnitine(C10-OH) /Octanoylcarnitine (C8)^LOINC^ 3443^C5DC/C8^LOCAL|1|0.36|umol/L| |0.21-0.72|N||F|||20090714074206

OBX|37|NM|53193-9^Tetradecenoylcarnitine (C14:1)/Acetylcarnitine(C2) ^LOINC^3445^C14:1/C2^LOCAL|1|0.51|umol/L| |0.37-.070|N||F||| 20090714074206

OBX|38|NM|53194-7^Tetradecenoylcarnitine (C14:1)/Dodecenoylcarnitine (C12:1) ^LOINC^3446^C14:1/C12:1^LOCAL|1|1.53|umol/L|| ||F||| 20090714074206

OBX|39|NM|53195-4^Tetradecenoylcarnitine (C14:1)/Palmitoylcarnitine (C16)^LOINC^3447^ C14:1/C16^LOCAL|1|0.47|umol/L| |0.37–0.70|N||F||| 20090714074206

OBX|40|NM|53236-6^Carnitine.free (C0)+Acetylcarnitine (C2)+Propionylcarnitine (C3)+Palmitoylcarnitine (C16)+Oleoylcarnitine (C18:1)+Stearoylcarnitine (C18)/Citrulline(C2) ^LOINC^3448^C16/C2^LOCAL|1|0.09|umol/L| ||||F||| 20090714074206

OBX|41|NM|53235-8^Carnitine free (C0)/Palmityolcarnitine (C16)+Stearoylcarnitine (C18) ^LOINC^3449^C0/C16+C18^LOCAL|1|45.87| umol/L|||||F|||20090714074206

OBR|7|2001178109|10A1912102|57085-3^Organic acid NBS panel^LOINC|Routine||200907061145 ||||||200907152000|BLD|000001||NO||10A1912102||||||||10000^NEWBORN SCREEN||

OBX|1|CE|46744-9^Organic acidemias NBS interpretation^LOINC|1| New-SNOMED CT^OA^SNOMED CT^ LA6626-1^Normal ^LOINC^ | |||||F|||20090714074206

OBX|2|TX|57708-0^ Organic acidemias NBS comment-discussion^LOINC|1| Any baby with clinical features suggestive of a metabolic disorder requires clinical and diagnostic follow-up regardless of whether the NMS result is normal or abnormal. ||||||F||| 20090714074206

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Because there were no positive markers, for OA, the OBX segments below may be hidden or omitted accorded to desired practice for reporting normal results to clinical recipients.

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OBX|3|NM|50157-7^Acetylcarnitine (C2)^LOINC^3402^ C2^LOCAL|1|31.78| umol/L| ||||F|||20090714074205

OBX|4|NM|53160-8^Propionylcarnitine (C3)^LOINC^3403^ C3^LOCAL|1|5.17|umol/L|4.62-5.50|N|||F||| 20090714074205

OBX|5|NM|53178-0 ^3-Hydroxyoctanoylcarnitine (C8-OH)+ Malonylcarnitine (C3-DC)^LOINC^3404^C3DC^LOCAL |1|0.07||||||F|||20090714074205

OBX|6|NM|53166-5^Butyrylcarnitine+ Isobutyrylcarnitine (C4)^LOINC^ 3405^C4^LOCAL|1|0.84| umol/L|0.75-1.02|N|||F|||20090714074205

OBX|7|NM|45222-7^Methylmalonylcarnitine (C4-DC)^ LOINC^3407^C4DC^LOCAL|1|3.16|umol/L|||||F|||20090714074205

OBX|8|NM|45216-9^Isovalerylcarnitine+ Methylbutyrylcarnitine (C5)^LOINC^3408^C5^LOCAL|1| 0.43|umol/L|0.39-0.48|N|||F||| 20090714074205

OBX|9|NM|53170-7^Tiglylcarnitine (C5:1)^LOINC^3409^C5:1^LOCAL |1|0.1|umol/L|0.09-0.24|N|||| F|| 20090714074205

OBX|10|NM|45207-8^Glutarylcarnitine(C5-DC)^LOINC^3410^C5DC^LOCAL |1|0.05|||||F|||20090714074205

OBX|11|NM|50106-4^3-Hydroxyisovalerylcarnitine (C5-OH)^LOINC^3411^C5-OH^LOCAL|1|0.26|| ||||F||| 20090714074205

OBX|13|NM|53187-1^Methylglutarylcarnitine (C6-DC)^LOINC^ 3413^C6DC^LOCAL|1|0.11|umol/L|0.10-0.12|N|||F|| |20090714074205

OBX|14|NM|53162-4^Propionylcarnitine (C3)/ Carnitine.free (C0)^LOINC^3436^C3/C0^LOCAL|1|0.03| umol/L| ||||F|||20090714074205

OBX|15|NM|53163-2^Propionylcarnitine (C3)/ Acetylcarnitine (C2)^LOINC^3437^C3/C2^LOCAL|1|0.15| umol/L|||||F|||20090714074205

OBX|16|NM|54462-7^(C3-DC)^LOINC^3438^C3DC^LOCAL |1| |||||| F|||20090714074205

OBX|17|NM|53167-3^Butyrylcarnitine+ Isobutyrylcarnitine (C4)/ Acetylcarnitine (C2)^LOINC^ 3439^C4/C2^LOCAL|1|0|umol/L| ||||F|||20090714074206

OBX|18|NM|53168-1^Butyrylcarnitine+ Isobutyrylcarnitine (C4)/ Propionylcarnitine (C3)^ LOINC^3440^C4/C3^LOCAL|1|0.26|umol/L| ||||F||| 20090714074206

OBX|19|NM|53240-8^Isovalerylcarnitine+ Methylbutyrylcarnitine (C5)/ Propionylcarnitine (C3)^LOINC^3441^C5/C3^LOCAL|1|0.31|umol/L| ||||F|||20090714074206

OBX|20|NM|53172-3^3-Hydroxyisovalerylcarnitine (C5-OH)/Octanoylcarnitine (C8)^LOINC^3442^C5OH/C8^LOCAL |1|0.436|umol/L|0.35-0.70|N||F||| 20090714074206

OBX|21|NM|53185-5^Glutarylcarnitine (C5-DC)+3-Hydroxydecanoylcarnitine (C10-OH) /Octanoylcarnitine (C8)^LOINC^3443^C5DC/C8^LOCAL|1| 3.63|umol/L| |0.21-0.72|H||F|||20090714074206

OBR|8|2001178109|10A1912102|54078-1^Cystic Fibrosis NBS Panel^LOINC^3300^Cystic Fibrosis(IRT)*MAIN^ LOCAL|Routine||200907061145|||||| 200907152000|BLD|000001||NO||10A1912102||||||||10000^NEWBORN SCREEN|| UNSAT^ Retest-Prior Unsatisfactory

OBX|1|CE|46769-6^Cystic fibrosis newborn screen interpretation^LOINC|1| New-SNOMED CT^CF^SNOMED CT^ New-LP^No evidence of cystic fibrosis^ LOINC || ||||F||| 20090714095202

OBX|2|TX|57707-2^Cystic fibrosis newborn screen comment-discussion^LOINC|1| No evidence of cystic fibrosis. CF mutation analysis not performed. Further testing is only required if there is clinical suspicion of cystic fibrosis. Symptoms include poor growth, loose stools or evidence of malabsorption, persistent cough, or respiratory concerns.|| ||||F||| 20090714095202

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Because there were no positive markers for CF, the OBX segments below may be hidden or omitted accorded to desired practice for reporting normal results to clinical recipients.

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OBX|3|ST|54083-1^CFTR gene mutations found^LOINC^ 3300^CF^LOCAL |1|Within Normal Limits|| ||||F||| 20090714095202

OBX|4|NM|54083-1^CFTR gene mutations found [Identifier] in Blood dot (filter paper) Nominal^LOINC^3309^CF QUANT^LOCAL|1|22.02|| ||||F||| 20090714095202

OBR|9|2001178109|10A1912102|57086-1^Congenital adrenal hyperplasia newborn screening panel^LOINC^2500^CAH (Hydroxyprogesterone)*MAIN^LOCAL|Routine|| 200907061145||||||200907152000|BLD|000001||NO||10A1912102||||||||10000^NEW BORN SCREEN||

OBX|1|CE|46758-9^Congenital adrenal hyperplasia NBS interpretation^LOINC |1| 124214007^Deficiency of steroid 11-beta-monooxygenase ^SNOMED CT^ LA4259-3 ^Borderline^LOINC|| ||||F|||20090714095202

OBX|2|TX|57706-4^Congenital adrenal hyperplasia NBS comment-discussion ^LOINC|1| Borderline screen positive for congenital adrenal hyperplasia (CAH).

Suggest clinical follow-up and repeat newborn metabolic screen. |||||F||| 20090714095202

OBX|3|NM|38473-5^17 Hydroxy progesterone (17 OH ^LOINC^2509^CAH QUANT^LOCAL |1|182|nmol/L|< 190 nmol/L |H|||F||| 20090714095202

OBR|10|2001178109|10A1912102|54090-6 ^Thyroid newborn screening panel^LOINC^2100^Congenital Hypothyroidism (T4)*MAIN^LOCAL|Routine|| 200907061145||||||200907152000|BLD|000001||NO||10A1912102||||||||10000^NEW BORN SCREEN ||

OBX|1|CE|46762-1^Primary congenital hypothyrodism NBS interpretation^LOINC^2100^T4^LOCAL|1| 190268003^Congenital Hypothyroidism^SNOMED CT ^LA6626-1^Normal CH^LOINC|||||| F|||20090713145433

OBX|2|TX|57705-6^Primary congenital hypothyrodism NBS comment-discussion^LOINC^2100^T4^LOCAL|1| Any baby with clinical features suggestive of a metabolic disorder requires clinical and diagnostic follow-up regardless of whether the NMS result is normal or abnormal. ||||| F|||20090713145433

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Because there were no positive markers for CH, the OBX segments below may be hidden or omitted accorded to desired practice for reporting normal results to clinical recipients]

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OBX|3|NM|31144-9^Thyroxine^LOINC^2109^T4 QUANT^LOCAL |1|10.36| mcg/dL|<25|N|||F|||20090713145433

OBX|4|NM|29575-8^Thyrotropin^LOINC^2409^TSH QUANT^ LOCAL|1|1.2| mIU/L|<8|N|||F|||20090714070235

OBR|11|2001178109|10A1912102|54079-9^Galactosemia NBS Panel^LOINC^ 2000^Galactose (GALT/Gal-I-P)*MAIN^ LOCAL|Routine|| 200907061145|||||| 200907152000|BLD|000001||NO||10A1912102||||||||10000^NEWBORN SCREEN||

OBX|1|CE|46737-3^Galactosemia NBS interpretation^LOINC^ |1| 398664009 ^ Deficiency of UTP-hexose-1-phosphate uridylyltransferase ^SNOMED CT^LA6626-1^Normal GALT Screen ^LOINC |||*|||F||| 20090714143552

OBX|2|TX|57704-9^Galactosemia NBS comment-discussion^LOINC|1| Any baby with clinical features suggestive of a metabolic disorder requires clinical and

diagnostic follow-up regardless of whether the NMS result is normal or abnormal. |||*|||F||| 20090714143552

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Because there were no positive markers for GALT, the OBX segments below may be hidden or omitted accorded to desired practice for reporting normal results to clinical recipients]

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OBX|3|NM|54084-9^Total Galactose [Mass/volume] in Blood dot (filter paper)^LOINC^2001^TOT GAL^LOCAL |1|1.6|mg/dL|<11|N|||F||| 20090714143552

OBR|12|2001178109|10A1912102|54081-5 Hemoglobinopathies newborn screening panel^LOINC^3200^Hemoglobin*MAIN^LOCAL |Routine||200907061145||||||200907152000|BLD|000001||NO||10A1912102||||||||10000^NEWBORN SCREEN||

OBX|1|CE|46740-7^ Hemoglobin disorders NBS interpretation^LOINC^ 3200a^HGB inp^LOCAL|1|16402000^ Probable Hb S (sickle)-carrier^SNOMED CT ^LA11999-2^Probable Hb S (sickle)-carrier^LOINC|||||F||| 20090714145203

Full Answer List for 46740-7:

SEQ #	Answer	Code	Answer ID
1	Normal hemoglobins	165399006	LA11995-0
2	Probable Hb C-carrier	76050008	LA11996-8
3	Probable Hb D-carrier	7391009	LA11997-6
4	Probable Hb E-carrier	46248003	LA11998-4
5	Probable Hb O-Arab carrier		LA12061-0
6	Probable Hb S (sickle)-carrier	16402000	LA11999-2
7	Probable Hb C-disease	51053007	LA12000-8
8	Probable Hb C beta-thalassemia	61777009	LA12001-6
9	Probable Hb D-disease	66729008	LA12002-4
10	Probable Hb D beta-thalassemia		LA12003-2
11	Probable Hb beta zero-thalassemia	40108008	LA12004-0
12	Probable Hb E-disease	25065001	LA12005-7
13	Probable Hb E beta-thalassemia	234392002	LA12006-5
14	Probable Hb SS-disease (sickle cell anemia)	127040003	LA12007-3
15	Probable Hb S beta-thalassemia	127042006	LA12008-1
16	Probable Hb SC-disease	35434009	LA12009-9
17	Probable Hb SD-disease	25472008	LA12010-7
18	Probable Hb SE-disease	47024008	LA12011-5
19	Probable Hb S O-Arab disease	127048005	LA12012-3
20	Probable Hb S plus Hb other than A,C,D,E,O-Arab disease		LA12013-1
21	Probable Hb disease other than A,C,D,E,H,O-Arab,S disease		LA12014-9

22	Probable Hb disease other than C,D,E,S,O-Arab		LA12058-6

OBX|2|TX|57703-1^ Hemoglobin disorders NBS comment-discussion^LOINC^ 3200a^HGB inp^LOCAL|1| Suggest clinical follow-up and repeat newborn metabolic screen. ||||||F||| 20090714145203

OBX|3|CE|54105-2^Hemoglobin Pattern by isoelectric focusing^LOINC^ 3200^HGB^LOCAL|1|16402000^Hb F,A,S^SNOMED CT ^LA11979-4^ Hb F,A,S^LOINC ||||||F||| 20090714145203

Full Answer List for 54105-2:

SEQ #	Answer	Code	Answer ID
1	Hb F,A (normal)	165399006	LA11974-5
2	Hb F,A,C	76050008	LA11976-0
3	Hb F,A,D	7391009	LA11977-8
4	Hb F,A,E	46248003	LA11978-6
5	Hb F,A,O-Arab		LA12060-2
6	Hb F,A,S	16402000	LA11979-4
7	Hb F,C	51053007	LA11980-2
8	Hb F,C,A	61777009	LA11981-0
9	Hb F,D	66729008	LA11982-8
10	Hb F,D,A		LA11983-6
11	Hb F Only	40108008	LA11984-4
12	Hb F,E	25065001	LA11985-1
13	Hb F,E,A	234392002	LA11986-9
14	Hb F,S	127040003	LA11987-7
15	Hb F,S,A	127042006	LA11988-5
16	Hb F,S,C	35434009	LA11989-3
17	Hb F,S,D	25472008	LA11990-1
18	Hb F,S,E	47024008	LA11991-9
19	Hb F,S,O-Arab	127048005	LA11992-7
20	Hb F,S and other than A,C,D,E,O-Arab		LA11993-5
21	Hb F, and other than A,C,D,E,H,O-Arab,S		LA11994-3
22	Hb F,A and other than C,D,E,S,O-Arab		LA12057-8

OBR|13|2001178109|10A1912102|54082-3^ Infectious diseases newborn screening panel^LOINC|Routine||200907061145 ||||||200907152000|BLD|000001||NO|| 10A1912102||||||||10000^NEWBORN SCREEN||

OBX|1|CE|57702-3^Infectious diseases NBS interpretation^LOINC|1| New-SNOMED CT^Normal infectious diseases Screen^SNOMED CT^LA6626-1^Normal ^LOINC||||F||| 20090714122420

Full Answer List for 57702-3:

SEQ#	Answer Code	Code	Answer ID
1	Normal		LA6626-1
2	Borderline		LA4259-3
3	Suspect HIV		LA12446-3
4	Suspect TOXO		LA12447-1

OBX|2|TX|57701-5^Infectious diseases NBS comment-discussion^LOINC|1| Any baby with clinical features suggestive of a metabolic disorder requires clinical and diagnostic follow-up regardless of whether the NMS result is normal or abnormal. ||||F|||20090714122420

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Because there were no positive markers for infectious diseases, the OBX segments below may be hidden or omitted accorded to desired practice for reporting normal results to different report recipients]

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OBX|3|NM|54086-4^ HIV 1+2 IgG Ab [Presence] in Dried blood spot ^LOINC|1| New-SNOMED^Negative^ SNOMED ^LA6626-1^Normal^LOINC |||Neg|||F||| 20090714122420

OBX|4|NM|54087-2^Toxoplasma gondii IgG Ab [Presence] in Dried blood spot^LOINC|1|New-SNOMED^Negative^ SNOMED ^ LA6626-1^Normal^LOINC |||Neg|F|||20090714122420

OBX|5|NM|54087-2^Toxoplasma gondii IgM Ab [Presence] in Dried blood spot^LOINC|1| New-SNOMED^Negative^ SNOMED ^ LA6626-1^Normal^LOINC |||Neg|F|||20090714122420

OBR|14|2001178109|10A1912102|54108-6^Hearing Loss NBS Panel ^LOINC|Routine||200907061145||||G||| 200907152000| |000001||NO ||10A1912102||||||||| ||

OBX|1|CE|54106-0^Newborn hearing screen method^LOINC|1|New-SNOMED CT^ Normal ^SNOMED CT ^ LA10388-9 ^ABR^LOINC || |N|||F||| 20090714143552

OBX|2|CE|54106-0^Newborn hearing screen method^LOINC|2|New-SNOMED CT^ Normal ^SNOMED CT^LA10389-7^OAE^LOINC || |N|||F||| 20090714143552

Full Answer List for 54106-0:

SEQ#	Answer Code	Code	Answer ID
1	Automated acoustic brain stem response	AABR	LA10387-1
2	Acoustic brain stem response	ABR	LA10388-9
3	Otoacoustic emissions	OAE	LA10389-7
4	Distortion product otoacoustic emisions	DPOAE	LA10390-5
5	Transient otoacoustic emissions	TOAE	LA10391-3
6	Methodology unknown		LA12406-7

OBX|3|CE|46770-4^Hearing loss NBS interpretation^ LOINC|1|New-SNOMED CT^Normal^SNOMED CT^LA12448-9^Pass both ears^LOINC || |N|||F||| 20090714143552

Full Answer List for 46770-4:

SEQ#	Answer Code	Code	Answer ID
1	Pass both ears		LA12448-9
2	Pass R –refer L		LA12449-7
3	Pass L- refer R		LA12450-5
4	Refer L and R		LA12451-3

OBX|4|TX|57700-7^Hearing loss NBS comment-discussion^ LOINC|1| Any baby with clinical features suggestive of a metabolic disorder requires clinical and diagnostic follow-up regardless of whether the NMS result is normal or abnormal. || ||||F|||20090714143552

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Because there were no positive markers for infectious diseases, the OBX strings below may be hidden or omitted accorded to desired practice for reporting normal results to different report recipients]

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OBX|5|CE|54107-8^Newborn hearing screen - bilateral^LOINC|1| 164059009^Hearing loss^SNOMED CT ^LA10392-1^Pass^LOINC || ||||F|||20090714143552

Full Answer List for 54107-8:

SEQ#	Answer Code	Code	Answer ID
1	Pass	164059009	LA10392-1
2	Refer	183924009	LA10393-9
3	Parental refusal		LA6644-4
4	Attempted, but unsuccessful – technical fail		LA12408-3
5	Not performed		LA7304-4
6	Not performed, medical exclusion – not indicated		LA12409-1
7	Results unknown		LA12410-9

OBX|6|CE|54108-6^Newborn hearing screen - left^LOINC|1| 164059009^Hearing loss^SNOMED CT ^LA10392-1^Pass^LOINC || ||||F|||20090714143552

Full Answer List for 54108-6:

SEQ#	Answer Code	Code	Answer ID
1	Pass	164059009	LA10392-1
2	Refer	183924009	LA10393-9
3	Parental refusal		LA6644-4

4	Attempted, but unsuccessful – technical fail		LA12408-3
5	Not performed		LA7304-4
6	Not performed, medical exclusion – not indicated		LA12409-1
7	Results unknown		LA12410-9

OBX|7|CE|54109-4^ Newborn hearing screen - right |1|164059009^Hearing loss^SNOMED CT ^LA10392-1^Pass^LOINC || ||||F|||20090714143552

Full Answer List for 54109-4:

SEQ#	Answer Code	Code	Answer ID
1	Pass	164059009	LA10392-1
2	Refer	183924009	LA10393-9
3	Parental refusal		LA6644-4
4	Attempted, but unsuccessful – technical fail		LA12408-3
5	Not performed		LA7304-4
6	Not performed, medical exclusion – not indicated		LA12409-1
7	Results unknown		LA12410-9

OBR|15|2001178109|10A1912102|27053-1^ Biotinidase New Born Screening Panel^LOINC^2200^Biotinidase Assay*MAIN^LOCAL |Routine||200907061145|||||| 200907152000|BLD|000001||NO||10A1912102||||||||10000^NEWBORN SCREEN||

OBX|1|CE|46761-3^Biotinidase deficiency newborn screen interpretation^LOINC^2200^BIO^LOCAL |1|New-SNOMED CT^Abnormal BIOT screen^SNOMED CT^NewLP^Abnormal BIO screen^LOINC||||F||| 20090714122420

OBX|2|TX|57699-1^Biotinidase deficiency newborn screen comment-discussion^LOINC^2200^BIO^LOCAL |1| Borderline abnormal screen for biotinidase deficiency (BIOT). Slightly decreased biotinidase activity, unlikely to be significant. Suggest clinical follow-up and repeat newborn metabolic screen.||||F||| 20090714122420

OBX|3|NM|38478-4^Biotinidase^LOINC^2209^BIO QUANT^LOCAL|1|10.1|units|>10 |N|||F|||20090714122420

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About LOINC and SNOMED CT Coding Standards:

A coding and terminology framework is essential to standardizing laboratory reporting and enabling interoperability of information exchange across Electronic Health Record (EHR) platforms. Coding standards used in this example message include LOINC and SNOMED CT.

Logical Observation Identifiers Names and Codes (LOINC®) is a terminology standard for identification of laboratory tests and other measurements. It is available free of charge in a database that carries universal codes and names, and other attributes, for laboratory and other kinds of tests, clinical reports, measurements, survey instruments and other observations. It was developed to enable the exchange and pooling of clinical results for clinical care, outcomes management, and research by providing a set of universal codes and names to identify laboratory tests and other clinical observations. The LOINC terminology was developed by the LOINC Committee and Regenstrief Institute and is maintained by the Regenstrief Institute, Inc., a non-profit medical research organization associated with Indiana University. You can download the database and a browser program (also no cost) from http://loinc.org/downloads. The LOINC and Regenstrief LOINC Mapping Assistant (RELMA®) Terms of Use are available at: http://loinc.org/terms-of-use.

Systematized Nomenclature of Medicine — Clinical Terms (SNOMED CT®) is a comprehensive, multilingual clinical health care terminology designed for use in electronic health record systems and in health data exchange. SNOMED CT aims to facilitate communication and interoperability in electronic health data exchange. Originally created by the College of American Pathologists (CAP) in cooperation with the UK National Health Service, SNOMED CT is now owned, maintained, and distributed by the International Health Terminology Standards Development Organisation (IHTSDO), a not-for-profit association in Denmark, with contract assistance from the CAP. It is available free of charge in IHTSDO member countries, including the U.S., in low-income countries as defined by the World Bank, and for qualified research projects in any country. The National Library of Medicine is the US Member of the IHTSDO. Information about obtaining SNOMED CT (in multiple formats) is available at http://www.nlm.nih.gov/research/umls/licensedcontent/snomedctfiles.html. A free Unified Medical Language System® (UMLS®) Metathesaurus license (which includes the IHTSDO Affiliate license) is required. It can be obtained via the same site.

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Link For Updates and Additional Information:

This example message was developed by the Lister Hill Center for Biomedical Communications (LHC), a research division of the U.S. National Library of Medicine. LHC, in collaboration with other agencies and organizations, also created and maintains the Newborn Screening Coding and Terminology Guide: http://newbornscreeningcodes.nlm.nih.gov/

Please visit this Web site to obtain updates to this example HL7 message, a catalog of NBS-related LOINC and SNOMED codes and answer lists, and other guidance and resources.