

# Message Mapping Guide (MMG) Development Update: Status of Work, Lessons Learned, and Enhancements

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## Overview

- **Status of MMG development work**
- **Lessons Learned from the 1<sup>st</sup> Year of NMI\***
- **Diagram of Steps in MMG development**
- **Message Restructuring and Content Changes**
- **Data Element Assessment for Harmonization**

\*National Notifiable Diseases Surveillance System Modernization Initiative

# Status of Message Mapping Guides (MMGs)

## ❑ Pilot test-ready MMGs

- Generic v2 MMG
  - Must be used with all new disease-specific MMGs
  - Sent alone as case notification for specific conditions
- Hepatitis
- Sexually Transmitted Diseases, except for congenital syphilis
- Congenital Syphilis

## ❑ Mumps and Pertussis MMGs will be pilot test-ready in August 2015

## ❑ New MMG Development Priorities

- Arboviral, Varicella, Invasive Pneumococcal Disease (IPD)

## **Some of the Lessons Learned this Year Related to Process (1 of 2)**

- ❑ Prepare CDC Programs to work with us before MMG development begins**
  - Includes vetting of data elements & valid values with jurisdictions
- ❑ Document and verify requirements with CDC Program before MMG development begins**
- ❑ Need representation from all programmatic and technical groups at the beginning of the MMG development process**
- ❑ Build specific quality assurance (QA) steps into the process; QA should be conducted across Teams, together**

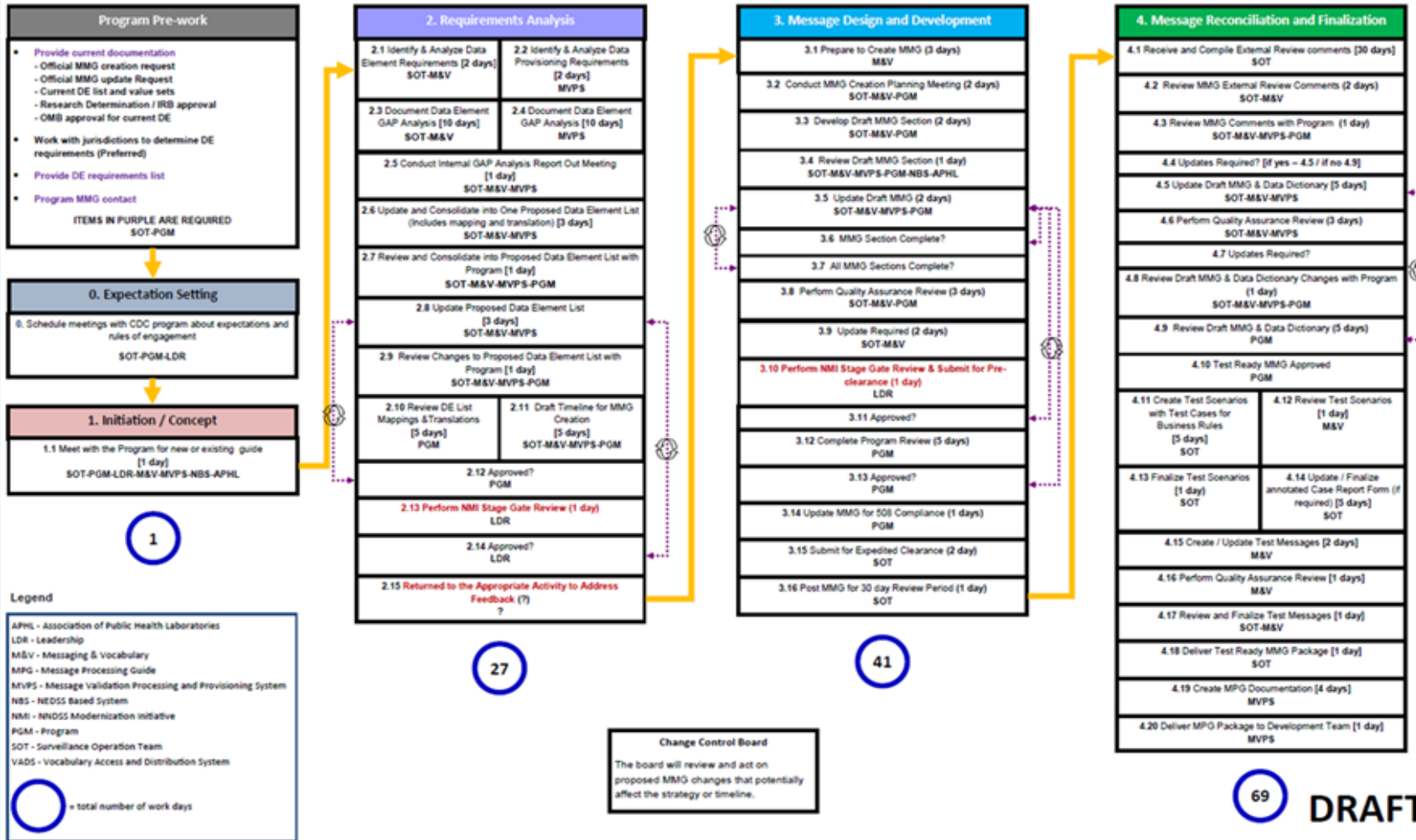
## **Some of the Lessons Learned this Year Related to Process (2 of 2)**

- ❑ Need technology tools to enable requirements to be used and managed across all Teams (MMG development, MVPS, and NBS)**
- ❑ Need better change control management**
- ❑ Need more effective governance across all Teams working in a matrix environment**

# MMG Development and Implementation Process

**DRAFT**

## Message Mapping Guide Lifecycle - Development and Implementation Process



# MMG Restructuring & Content Changes<sup>1</sup>

- Opened the HL7 structure in the PHIN message specification<sup>2</sup> to support inclusion of previously restricted OBX segments
  - Added Next of Kin (NK1), Specimen (SPM), Notes and Comments (NTE)

Old format for mother's information

```
PID|1||LocalPatID1DEM197^^^SendAppName&2.16.840.1.114222.GENv2&ISO||~^^^^^^S||20131122|F|||||
OBX|49|CWE|MTH166^Mother's State^PHINQUESTIONS||48^Texas^FIPS5_2|||||F
OBX|50|CWE|MTH167^Mother's Country of Residence^PHINQUESTIONS|||||F
OBX|51|CWE|MTH168^Mother's County of Residence^PHINQUESTIONS|||||F
OBX|52|SN|MTH169^Mother's Zip Code^PHINQUESTIONS||^46201|||||F
OBX|53|ST|MTH153^Mother's Birthdate^PHINQUESTIONS||19800806|||||F
OBX|60|CWE|MTH159^Is the mother Hispanic^PHINQUESTIONS||N^No^HL70136|||||F
OBX|61|CWE|MTH157^Mother's Race^PHINQUESTIONS||2028-9^Asian^CDCREC|||||F
```

Another style for Ethnicity:  
 OBX|60|CWE|MTH999^Mothers Ethnicity^PHINQUESTIONS||2135-2^Hispanic^CDCREC|||||F

Baby's DOB

Mother's Demographics

Use of NK1

```
PID|1||LocalPatID1DEM197^^^SendAppName&2.16.840.1.114222.GENv2&ISO||~^^^^^^S||20131122|F|||||
NK1|1||MTH|^44^44134-111^USA^^44001|||||19850213|||||2135-2^Hispanic^CDCREC|||||2028-9^Asian^CDCREC
```

<sup>1</sup> See “Case Notification Message Restructuring: A Summary of Structural and Content Changes” for more details.

<sup>2</sup> See PHIN Message Structure Specification Release 3.0.

# MMG Restructuring & Content Changes

## □ Newly implemented Laboratory and Vaccine Templates

- Support inclusion of laboratory and vaccination findings in the case notification
- Implemented to promote the use of harmonized data elements
- Are optional, can be used by jurisdictions if the elements exist within the surveillance system

A	B	C	D	E	I	J	K	L	M	N	O	P	Q	R	S	T
PHIN Variable	PHIN Variable Code System	Data Element (DE) Name	DE Identifier Sent in HL7 Message	DE Code System	May Repeat	Value Set Name (VADS Hyperlink)	Value Set Code	Valid Values	HL7 Message Context	HL7 Data Type	HL7 Usage	HL7 Cardinality	HL7 Implementation Notes	Repeating Group Element	Sample Segment	Comments
99 It simply provides a place to pass the associated laboratory																
100 Please refer to the ELR specification for more details regarding OBRs for multiple specimens, parent-child lab tests/reflex tests, susceptibilities, and other complex laboratory messages.																
101 START: LABORATORY TEMPLATE - Note that everything in this section is optional. This is not "repeating group" processing.																
102 Start of optional laboratory findings section to be used by available in the surveillance data system.																
LAB101 (proposed)	PHINQUESTION	Test Performed Name	Coded test identifier from value set	LN	N	<a href="#">Lab Test Result Name</a>	PHVS_LabTestName_CDC		OBR Segment with the test name in OBX-3 OBX-3.1=code OBX-3.2=name OBX-3.3=code system	CE	R	[1..1]	PHVS_LabTestName_CD C is the broader VADS value set from the ELR Implementation guide that contains all the lab tests  PHVS_LabTestName_Pertussis Value Set OID: 2.16.840.1.114222.4.11.4184 is the condition-specific lab test name value set from the Reportable Condition Mapping Tables (RCMT) Project			Proposed new variable- <i>awaiting CIME approval</i> . Preferred for jurisdictions who have ELR capacity; these variables could be considered 'Optional' for jurisdictions without ELR capacity.
LAB192	PHINQUESTION	Test Result - Coded Qualitative (non-organism)	NA: OBX-5	NA	Y	<a href="#">Lab Test Result Qualitative</a>	PHVS_LabTestResultQualitative_CDC		OBX-5 Observation Value for same OBX segment OBX-5.1=code OBX-5.2=name OBX-5.3=code system	CWE	RE	[0..*]				Preferred for jurisdictions who have ELR capacity; these variables could be considered 'Optional' for jurisdictions without ELR capacity.
LAB278 (proposed)	PHINQUESTION	Test Result - Coded Organism	NA: OBX-5	NA	Y	<a href="#">Microorganism</a>	PHVS_Microorganism_CDC		OBX-5 Observation Value for same OBX segment OBX-5.1=code OBX-5.2=name OBX-5.3=code system	CWE	RE	[0..*]	PHVS_Microorganism_CD C is the broader VADS value set from the ELR Implementation guide that contains all the lab result organisms Value Set Code			Proposed new variable- <i>awaiting CIME approval</i> . Preferred for jurisdictions who have ELR capacity; these variables could be considered 'Optional' for jurisdictions without ELR capacity.



# MMG Restructuring & Content Changes

- Standard identifiers for the question concept are used where applicable (based upon LOINC, SNOMED, RXNORM)
- Detailed HL7 mapping information, including implementation notes with sample segments
- Data elements coming from the value set (e.g. “Signs & Symptoms” and “Complications”)

	A PHIN Variable	B PHIN Variable Code System	C Data Element (DE) Name	D DE Identifier Sent in HL7 Message	E DE Code System	F Data Element Description	G Data Type	H CDC Priority	I May Repeat	J Value Set Name (VADS Hyperlink)	K Value Set Code	L Valid Values	M HL7 Message Context	N HL7 Data Type	O HL7 Usage	P HL7 Cardinality	Q HL7 Implementation Notes	
1	INV163	PHINQUESTION	Condition Code	NA: OBR-31	NA	The Condition or Event Code value is used with the Message Profile Identifier to convey the condition for MMWR reporting.	Coded	R	N			10190 - Pertussis	OBR-31 Reason for Study in the OBR segment with an OBR-4 value of '68991-9'Epidemiologic Information^LN'	CE	R	[1..1]	The Event Code string value to use in OBR-31 is the literal value: '10190^Pertussis^NND'	
3	START: EPIDEMIOLOGIC INFORMATION SECTION: The observations in this section will be mapped under a "Epidemiologic Information" category OBR segment with an OBR-4 value of '68991-9'Epidemiologic Information^LN'																	
4	56831-1	LN	Signs & Symptoms	Value Set Concept Code from "PHVS_SignsAndSymptoms_Pertussis_NND"	SCT	Signs & symptoms of Pertussis	Coded	P	N	<a href="#">Yes No Unknown (Y/N/U)</a>	PHVS_YesNoUnknown_CDC	Y=Yes N=No U=Unknown	OBX segment with OBX-3.1= Value Set Concept Code from PHVS_SignsAndSymptoms_Pertussis_NND OBX-5=value from value set PHVS_YesNoUnknown_CD C	CWE	RE	[0..1]	Signs and Symptoms Value Set concept codes that would come in OBX-3 have been enumerated below for Pertussis	
5	56831-1	LN	Cough	43727002	SCT	Did the subject develop a cough during this illness?	Coded	P	N	<a href="#">Yes No Unknown (Y/N/U)</a>	PHVS_YesNoUnknown_CDC	Y=Yes N=No U=Unknown	OBX segment with OBX-3.1=49727002 OBX-5=value from value set	CWE	RE	[0..1]		
6	56831-1	LN	Cough Onset Date	INV550	PHINQUESTION	Cough onset date	Date	P	N				OBX segment with OBX-3.1=INV550 OBX-5=date in YYYYMMDD format	DT	RE	[0..1]	For unknown date, it is recommended to populate OBX-5 with '99999999'	
7	56831-1	LN	Paroxysmal Cough	43025008	SCT	Did the patient's illness include the symptom of paroxysmal cough?	Coded	P	N	<a href="#">Yes No Unknown (Y/N/U)</a>	PHVS_YesNoUnknown_CDC	Y=Yes N=No U=Unknown	OBX segment with OBX-3.1=43025008 OBX-5=value from value set	CWE	RE	[0..1]		
8	56831-1	LN	Whoop	60537006	SCT	Did the patient's illness include the symptom of whoop?	Coded	P	N	<a href="#">Yes No Unknown (Y/N/U)</a>	PHVS_YesNoUnknown_CDC	Y=Yes N=No U=Unknown	OBX segment with OBX-3.1=60537006 OBX-5=value from value set	CWE	RE	[0..1]		
9	56831-1	LN	Post-tussive Vomiting	424580008	SCT	Did the patient's illness include the symptom of post-tussive vomiting?	Coded	P	N	<a href="#">Yes No Unknown (Y/N/U)</a>	PHVS_YesNoUnknown_CDC	Y=Yes N=No U=Unknown	OBX segment with OBX-3.1=424580008 OBX-5=value from value set	CWE	RE	[0..1]		
10	56831-1	LN	Apnea	1023001	SCT	Did the patient's illness include the symptom of apnea?	Coded	P	N	<a href="#">Yes No Unknown (Y/N/U)</a>	PHVS_YesNoUnknown_CDC	Y=Yes N=No U=Unknown	OBX segment with OBX-3.1=1023001 OBX-5=value from value set	CWE	RE	[0..1]		

# MMG Restructuring & Content Changes

- Incorporated instructions for conveying “unknown”

Data Element (DE) Name	DE Identifier Sent in HL7 Message	DE Code System	Data Element Description	Data Type	CDC Priority	HL7 Message Context	HL7 Data Type	HL7 Usage	HL7 Cardinality	HL7 Implementation Notes	Sample Segment
Number of previous pregnancies	75201-4	LN	Number of Mother's previous pregnancies	Numeric	P	OBX segment with OBX-3.1=75201-4 OBX-5.2=Numeric value	SN	RE	[0..1]	For unknown number of previous pregnancies, it is recommended to populate OBX-5 with '99'.	OBX nn SN 75201-4^Number of Mother's previous pregnancies^LN ^1     F
Number of live births (total)	75202-2	LN	Number of Mother's live births	Numeric	P	OBX segment with OBX-3.1=75202-2 OBX-5.2=Numeric value	SN	RE	[0..1]	For unknown number of live births, it is recommended to populate OBX-5 with '99'.	OBX nn SN 75202-2^Number of Mother's live births^LN ^1     F
Last menstrual period (LMP)-(before delivery)	75203-0	LN	Date of Mother's last menstrual period (MMDDYYYY)	Date	P	OBX segment with OBX-3.1=75203-0 OBX-5=date in YYYYMMDD format	DT	RE	[0..1]	For unknown date, it is recommended to populate OBX-5 with '99999999'.	OBX nn DT 75203-0^Last menstrual period (LMP)-(before delivery)^LN  99999999     F
Date of first prenatal visit	75200-6	LN	Date of Mother's first prenatal visit (MMDDYYYY)	Date	P	OBX segment with OBX-3.1=75200-6 OBX-5=date in YYYYMMDD format	DT	RE	[0..1]	For unknown date, it is recommended to populate OBX-5 with '99999999'.	OBX nn DT 75200-6^Date of first prenatal visit^LN  20130315     F

# MMG Restructuring & Content Changes

- **Used 3 OBR segments to create sections in message**
  - Helps to organize content and helps map data elements from data source
  - Three segments
    - **Epidemiological** – for all case report data elements, including epi-interpreted laboratory information
    - **Laboratory** – optional segment for lab data elements from a Laboratory Information System (LIS) or Electronic Laboratory Report (ELR), or from faxed or paper lab reports
    - **Vaccine** – optional segment to send core data elements from an Immunization Information System (IIS) or from a non-electronic vaccination card or report

# Data Element Assessment for Harmonization

- ❑ **NNDSS staff collected data elements from three Office of Management and Budget (OMB) packages**
  - OMB Control # 0920-0728 (NNDSS consolidated package)
  - OMB Control # 0920-0573 (HIV)
  - OMB Control # 0920-0026 (Tuberculosis)
- ❑ **Repository of data elements created**
- ❑ **Reviewed 5942 data elements for 90 NNCs and Generic**

## Data Element Assessment

- ❑ **Grouped elements into 6 high level categories:**
  - Demographics (n=379)
  - Clinical (n=1031)
  - Treatment (n=304)
  - Laboratory (n=1403)
  - Vaccine (n=224)
  - Epidemiological (n=2601) (This category Includes a variety of sub-categories such as travel, food exposures, social history, etc.)
- ❑ **Created “Summary Reports” to describe categories, sub-categories, and themes that might be good candidates for harmonization**

# Category: Epidemiologic Information

## Sub-Category: Travel

- ❑ **52 conditions out of 90 ask questions about travel**
- ❑ **12 themes**

Theme	In-Scope (Y/N)	Page Numbers
Any Travel	Y	5
Foreign Travel	Y	6
Domestic Travel	Y	7
Travel Destination(s)	Y	7-8
Foreign Destination	Y	8-9
Domestic Destination	Y	9-10
Destination Type	Y	10
Date(s) of Travel	Y	11-14
Duration of Travel	Y	14
Reason for Travel	Y	15
Immigrated	Y	16
Mode of Travel	Y	16-17

## Sub-Category: Travel

### Theme: Any Travel

#### ❑ 12 conditions ask this question 12 different ways

Condition	Label/name	Description
Anthrax	Travel	Traveled out of county, state, or country?
Babesiosis	Travel	In the eight weeks before symptom onset or diagnosis (use earlier date), did the case-patient travel (check all that apply)?
Brucellosis	Travel	In the 6 months prior to illness onset did the subject travel outside of the state of residence?
Cholera	TRAVEL	Exposure to travel outside home state in previous 7 days?
Cryptosporidiosis	Travel Prior To Onset	Did the patient travel prior to onset of illness?
Cryptosporidiosis	Travel Questions Indicator	If patient has traveled, then display the following questions
Giardia	Travel Prior To Onset	Did the patient travel prior to onset of illness?
Giardia	Travel Questions Indicator	If patient has traveled, then display the following questions
Leptospirosis	Travel	Did the subject travel out of the county, state, or country in the 30 days prior to symptom onset?
Novel Influenza A	Epi Risk - Travel	In the 10 days prior to illness onset, did the patient travel?
Rabies, Human	Travel	Did the patient have a recent (prior 12 months) history of travel?
SARS	Travel to SARS area	In the 10 days prior to symptom onset did the patient have travel to foreign or domestic area with documented or suspected recent local transmission of SARS cases?
STEC	Any travel	Patient spent all or some of the 7 days before illness onset outside of their state of residence
Vibriosis	TRAVEL	Exposure to travel outside home state in previous 7 days?

# Data Element Assessment Summary Report

*Last updated: 4/29/2015*

## Data Element Harmonization Project

### Harmonization Summary Report

Category: **EPIDEMIOLOGIC INFORMATION**

Sub-Category: **TRAVEL**

#### INDEX

- **Summary**
- **Part I – Category Scope Identification** – basic information defining the team and the scope of its investigation
- **Part II – Theme Information** – a list of the data elements within each theme of the travel sub-category.
- **Part III – Discussion Points & Recommendations** – team-based advice on harmonized data elements.
- **Part IV – Appendix – Previous Efforts and Current Resources** – information on previous harmonization efforts and data elements currently available in PHIN Vocabulary Access and Distribution System (VADS).



# Data Element Harmonization Proposal

- ❑ **Goal: Harmonize NNDSS data elements across CDC programs in order to lessen the burden on jurisdictions for collecting and reporting the data**
- ❑ **Recommended Approach**
  - NNDSS staff to identify candidate data elements while developing new MMGs; develop background information
  - Workgroups with representation across CDC led by CDC programs; consider SurvSAG role
  - Reporting jurisdictions and CSTE involvement
  - Up front: establish ground rules, agree on how to adjudicate disagreements, define success and outcomes
  - Carefully document all discussions and decisions
  - Surveillance Leadership Board to provide oversight of process

# Data Element Harmonization Proposal

- ❑ **Create a data element repository of harmonized elements to allow easy identification and use**
  - Review potential repositories (PHIN VADS, NLM, etc); plan for continuously maintaining and curating the repository
  
- ❑ **DHIS will incorporate harmonized data elements into MMGs as they are developed or updated**

## NNDSS Web Site

- URL to the NNDSS Web Site: <http://wwwn.cdc.gov/nndss/>
- URL to the Draft MMG web site:  
<http://wwwn.cdc.gov/nndss/message-mapping-guides.html>



**If you have questions, please contact :**  
William Morrill ([wem1@cdc.gov](mailto:wem1@cdc.gov) ) or  
Ruth Jajosky ([raj3@cdc.gov](mailto:raj3@cdc.gov))

# Appendix

# Vaccine Template

- ❑ Establishes templates to represent laboratory and vaccine data elements in the HL7 message across all MMGs
  - Similar information transmitted in a structured format
  - Allows similar data to be processed in the same way
  - Does not change format for data collection

## Vaccine Template Data Elements

Vaccine administered product type

Vaccine administered date

Vaccine dose number

Vaccine product manufacturer

Vaccine Lot Number

Vaccine Lot Expiration Date

Vaccine Event information source

Immunization Schedule used

Exemption/refusal reason (not applicable to every vaccine)

## Vaccine Messaging Template

OBR= Vaccine Information

OBX-3: Data Element Name  
(question)

OBX-5: Value (answer)

## Repeating Groups

(Multiple Data Elements linked  
using OBX-4 sub-id)

# Laboratory Template

Data Element Name - OBX	HL7 Field	Data Element Name - SPM	HL7 Field	Data Element Name - OBR	HL7 Field
Test Performed Name	OBX-3	Specimen ID	SPM-2	Filler Order #	OBR-3
Test Result - Coded Qualitative (non-organism)	OBX-5	Specimen Type	SPM-4	Test Ordered Name	OBR-4
Test Result - Coded Organism	OBX-5	Specimen Source Site	SPM-8	Observation Date/Time	OBR.7
Test Result - Numeric	OBX-5	Specimen Description	SPM-14	Results Rpt/Status Chng - Date/Time	OBR.22
Units of Measure	OBX-6	Specimen Collection Date/Time	SPM-17	Result Status	OBR.25
Test Result - Text	OBX-5			Reason for Study	OBR.31
Test Result -Interpretation Flag	OBX-8				
Test Result - Reference Range	OBX-7				
Observation Result Status	OBX-11				
Specimen collection date	OBX-14				
Test Method	OBX-17				
Specimen Analyzed Date	OBX-19				
Performing Laboratory Name	OBX-23				
Performing Person Name	OBX-25				
Test Result Comments	NTE Segment				



**For more information please contact Centers for Disease Control and Prevention**

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Visit: <http://www.cdc.gov> | Contact CDC at: 1-800-CDC-INFO or <http://www.cdc.gov/info>

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