Implementation Guide for Transmission of Laboratory, Pharmacy and Supply Orders as Public Health Information using Version 2.3.1 of the Health Level Seven (HL7) Standard Protocol

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Centers for Disease Control and Prevention

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Revision History

Date	Author	Comments
30-Oct-02	J. Marc Overhage	Initial draft
1-Mar-03	J. Marc Overhage	Extensive revision based on feedback from reviewers
5-May-03	Scott Robertson	Editorial revision for internal consistency and integrity check against HL7 v2.3.1.
27-May-03	Scott Robertson	Final editorial changes to move document out of "draft" status

Credits

A working group (members are listed in the Appendix) convened by the CDC and eHealth Foundation's Public Private Collaboration created materials that formed the basis for this implementation guide.

Introduction

There is a strong logical link between a clinician's notions of what is wrong with a patient and what is ordered to care for that patient. Even before results of test are available, orders for them are often recorded in electronic systems. Other aspects of medical care such as ventilator management might be determined or inferred from other orders such as those for supplies or ancillary services. Because orders are one of the earliest electronically available sources of information about episodes of medical care, they may be a useful source of information for detecting the onset, increase, or spread of a public health problem. For example:

Presentation or Preliminary Assessment	Characteristic Orders
Gastroenteritis	stool culture, stool O&P, stool for Norwalk virus or rotavirus detection.
Influenza-like illness	direct test for influenza, influenza culture, acute serum for antibodies to respiratory viruses, chest X-ray
Lower respiratory illness	sputum culture, blood culture, chest X-ray, arterial blood

	gasses, intubation
CNS infection	lumbar puncture, CSF culture, blood culture

More specificity might be gained by combining orders, like chest X-ray PLUS sputum culture, or by imposing age restrictions.

Scope

This guide does not stand alone – it should be read in conjunction with CDC's "*Implementation Guide for Transmission of Laboratory-Based Reporting of Public Health Reporting Information using Version 2.3.1 of the Health Level Seven (HL7) Standard Protocol*" and the HL7 Version 2.3.1 standard.

This guide focuses on diagnostic test or clinical observation orders, supplies and pharmacy orders. Test orders could include a broad spectrum of diagnostic testing and clinical observations such as vital signs, electrocardiograms, cultures and serology depending on the institution's processes. Which supplies are represented in messsages will also be highly dependent on local processes.

In addition to surveillance applications of orders, public health may need to monitor use of specific antibiotics or other medications used in either the inpatient or outpatient setting. These applications may require more details about the order and the medication administration process than surveillance. Tracking the administration of aspirin after recognition of acute myocardial infarction in the inpatient setting for example, requires messages that contain not only ordering but administration data. These uses are out of scope for the current version of this implementation guide. HL7 is the NEDSS messaging standard so this guide focuses exclusively on HL7 order messages. However, the NCPDP standard is used for a large volume of outpatient prescription messaging.

Public health officials will specify which orders are needed for specific public health purposes using LOINC codes, NDC (and later RxNORM) codes or ECRI UMDNS codes. Orders that are not associated with a specific patient such as orders for supplies to replenish unit or floor stock should not be sent to public health.

Definitions

Filler: (also **Performer**) the application responding to, i.e., performing, a request for services (orders) or producing an observation. The filler can also originate requests for services (new orders), add additional services to existing orders, replace existing orders, put an order on hold, discontinue an order, release a held order, or cancel existing orders.

Order: a request for a service from one application to a second application. The second application may in some cases be the same; i.e., an application is allowed to place orders with itself.

Order detail segment: one of several segments that can carry order information. Examples are OBR and RXO. Future ancillary-specific segments may be defined in subsequent releases of the Standard if they become necessary.

Placer: (also **Requestor**) the application or individual originating a request for services (order).

Placer order group: a list of associated orders coming from a single location regarding a single patient.

Conventions

In order to provide concrete guidance, each message use case will be presented in three versions: as a message segment structure, message schema and message example.

Message Segment Structure

Also known as the HL7 Abstract Message Syntax. This format specifies the order of HL7 segments and segment groups, whether they are optional or mandatory, and whether or not they repeat. It does not include detailed information about the data elements within the segments. It illustrates the overall structure of the message.

Message Schema

This format describes how data elements within segments are valued, typically using generic terms (e.g. date of birth, medical record number). It illustrates the content of the message.

Message Example

This format provides a concrete example of individual data elements within the segments of a message. It illustrates the formatting of individual data elements.

Generic Order Message

	Generic order message
MSH	message header
PID	patient identification
[PV1]	Patient visit information
[{ AL1 }]	Allergy Information
{	--- Order Begin
ORC	order control
OBR | RDQ | RXO | RXE	*Order detail segment(s)* Observation request, or Requistion Detail, or Pharmacy Order Request, or Pharmacy Encoded Order
[{ NTE }]	notes and comments
{	--- Observation Begin
[OBX]	Observation
[{ NTE }]	notes and comments
}	--- Observation End
}	--- Order End

The generic order message in the table above represents a superset of all order messages. It supports the several use cases including orders for

- diagnostic tests,
- medications, and
- supplies.

Segment Definitions

The Segment Attribute Table summarizes the field content of a specified segment. The column headers for the Segment Attribute Table are described as follows:

Segment Attribute Table Header Definitions

Header Text	**Description**

Header Text	Description
SEQ	The sequence of the elements as they are numbered in the segment.
LEN	The length of the element.
DT	The data type of the element.
OPT	Whether the field is required, optional, or conditional in a segment as defined by HL7 2.3.1. These do not refer to requirements for reporting in the context of this guide. The designations are: *R* Required. *O* Optional. *C* Conditional on the trigger event or on some other field(s). The field definitions following the segment attribute table should specify the algorithm that defines the conditionality for the field. *X* Not used with this trigger event. *B* Left in for backward compatibility with previous versions of HL7. The field definitions following the segment attribute table should denote the optionality of the field for prior versions.
RP/#	Indicates if element repeats. IF the number of repetitions is limited, the number of allowed repetitions is given.
TBL#	Specific table reference. Tables defined in HL7 v2.3.1 and used in this guide are listed in Appendix B.
ITEM#	HL7 unique item number for each element.
Element Name	Descriptive name of element in the segment.
OPT for ELR	Whether the field is required or ignored specifically in the context of this guide. The designations are: *R* Required. *I* Ignored.
IMPLEMENTATION COMMENTS	Addition comments related to the use of the field in the context of this guide.

The field definitions following the Segment Attribute Table serve to clarify, extend or constrain the meaning or intent of the field in the context of this guide. Not all fields present in a segment will have accompanying narrative.

Use Cases

Clinical Scenario

In order to provide consistent examples, this guide uses the following common clinical scenario: Michael Able presents at the emergency department at MyHospital with symptoms of cough, fever and malaise. Dr M J Welby evaluates the patient and orders a chest radiograph. Based on symptoms and the radiographic findings, Dr Welby prescribes an initial dose of ciprofloxicin intravenously. The patient deteriorates and requires tracheal intubation and mechanical ventilation. The respiratory therapist in the emergency department records an order for a "ventilator" and "endotracheal tube #8" that will allow MyHospital to generate a charge for the ventilator setup.

Diagnostic testing

When a provider orders a diagnostic test, even without a provider order entry system, there is usually an electronic order generated either in an institutional order management system (entered by a clerk for example) or by the laboratory information system (entered by laboratory personnel). This order may be available a long time before the actual result for certain tests. For example, results from some cultures may require days to weeks to become available. Diagnostic test orders may also provide information that diagnostic tests have been ordered for which results are not electronically available. An order for a chest radiograph in an environment without electronic access to radiology reports, for example. Even in environments with a sophisticated radiology information system, results may be delayed for days.

Message Segment Structure

ORM^O01^ORM_O01	General Order Message	Chapter
MSH	Message Header	2
PID	Patient Identification	3
[{ AL1 }]	Allergy Information	3
ORC	Order Control	4
OBR	Observation request	4

The General Order Message segment structure, above, is a subset of the ORM_O01 structure defined in HL7 v2.3.1 Chapter 4. This subset constitutes the minimum necessary message structure to communicate an order for a diagnostic test in the context of this Implementation Guide. Additional segments, as defined in HL7 v2.3.1, may be present in the message, but are not required and are not detailed in this Implementation Guide.

Message Schema

```
MSH|^~\&| sending application | sending facility |
   receiving application ||||ORM^O01^ORM_O01| message
   control id |P|2.3.1…<cr>
PID||| patient ids || patient name …<cr>
[{ AL1| set id | allergy type | allergen …<cr> }]
ORC| order control code | requestor's order number |
   processor's order number ||||| transaction date-time |
   enterer Id || ordering provider ID | enterer's location
   …<cr>
```

```
OBR| set id | requestor's order number | processor's order
    number | test ordered ||| observation date-time …<cr>
```

Message Example

The following message example represents the initial order in the clinical scenario presented above. Specifically, a new order by Dr M J Welby (entered by ward clerk Mary Gilbert) in the ER at MyHospital for a Portable Chest X-ray of Michael Able. In this case there are no allergies communicated and only the requestor's order number is available. Since this is a new order is being sent from the order management system to the radiology system, no processor order number has been assigned.

```
MSH|^~\&|MyHospital|MyHospital^543876^CMS|LocalRadiology|||
    |ORM^O01^ORM_O01|00001|P|2.3.1<cr>
PID|||1234321^^^MyHospital^MR||Able^Michael^D^^^^L<cr>
ORC|NW|0889436^MyHospital|||||20011001081234|A99887^Gilber
    t^Mary^^^^^MyHospital||1234567^Welby^M^J^Jr^Dr^^MyHospit
    al|ER<cr>
OBR|1|0889436^MyHospital||24632-2^Portable Chest^LN<cr>
```

Pharmacy

When a provider orders a medication, even without a provider order entry system, there is usually an electronic order generated either in an institutional order management system (entered by a clerk for example) or by the pharmacy system (entered by pharmacy personnel). Depending on the details of the environment, there may or may not be subsequent messages indicating dispensing, administration and other activity related to this order.

Message Segment Structure

ORM^O01^RDO_O01	Pharmacy/Treatment Order Message	Chapter
MSH	Message Header	2
PID	Patient Identification	3
[{ AL1 }]	Allergy Information	3
ORC	Order Control	4
RXO	Pharmacy/Treatment Order	4
{ RXR }	Pharmacy/Treatment Route	4

RDE^O01^RDE_R01	Pharmacy/Treatment Encoded Order Message	Chapter
MSH	Message Header	2
PID	Patient Identification	3
[{ AL1 }]	Allergy Information	3
ORC	Order Control	4
RXE	Pharmacy/Treatment Encoded Order	4
{ RXR }	Pharmacy/Treatment Route	4

The Pharmacy/Treatment Order Message and Pharmacy/Treatment Encoded Order Message segment structures, above, are subsets of the RDO_O01 and RDE_O01 structures defined in HL7 v2.3.1 Chapter 4. These subsets constitute the minimum necessary message structure to communicate a pharmacy order in the context of this Implementation Guide. Additional segments, as defined in HL7 v2.3.1, may be present in the message, but are not required and are not detailed in this Implementation Guide.

Two message structures are presented as HL7 v2.3.1 defines distinct messages depending on message origination. A hospital order entry system, acting as a Placer, would send an ORM message to the pharmacy system, acting as the Filler. The pharmacy system would send an RDE message to a hospital order entry system. The content is similar in both messages, however the ORM message reports the prescriber's request, while the RDE message reports what how the pharmacy has interpreted the order. The content of the request is sufficiently different from the content of the interpretation that HL7 v2.3.1 provides these different messages (ORM versus RDE), structures (RDO_O01 versus RDE_O01) and target segments (RXO versus RXE).

Message Schema

```
MSH|^~\&| sending application | sending facility |
   receiving application ||||ORM^O01^RDO_O01| message
   control id |P|2.3.1…<cr>
PID||| patient ids || patient name …<cr>
[{ AL1| set id | allergy type | allergen …<cr> }]
ORC| order control code | requestor's order number |
   processor's order number ||||| transaction date-time |
   enterer Id || ordering provider ID | enterer's location
   …<cr>
RXO| quantity/timing | medication code | amount to be given ||
   give amount units | dosage form …<cr>
RXR| route of administration …<cr>



MSH|^~\&| sending application | sending facility |
   receiving application ||||RDE^O01^RDE_O01| message
   control id |P|2.3.1…<cr>
PID||| patient ids || patient name …<cr>
[{ AL1| set id | allergy type | allergen …<cr> }]
ORC| order control code | requestor's order number |
   processor's order number ||||| transaction date-time |
   enterer Id || ordering provider ID | enterer's location
   …<cr>
RXE| quantity/timing | medication code | amount to be given ||
   give amount units …<cr>
RXR| route of administration …<cr>
```

Message Example

The following message example represents the order for ciprofloxacin in the clinical scenario presented above. Specifically, a new order by Dr M J Welby, Jr (entered by ward clerk Mary Gilbert) in the ER at MyHospital for a single intravenous dose of ciprofloxacin 200mg to be administered to Michael Able. This message also contains information that the patient is allergic to penicillins. Since this is a new order is being sent from the order management system to the pharmacy system, the pharmacy order number has yet to be assigned.

```
MSH|^~\&|MyHospital|MyHospital^543876^CMS|LocalPharmacy||||
   ORM^O01^RDO_O01|00015|P|2.3.1<cr>
```

```
PID|||1234321^^^MyHospital^MR||Able^Michael^D^^^^L<cr>
AL1|1|DA|^Penicillin<cr>
ORC|NW|0889475^MyHospital|||||||20011001084135|A99887^Gilber
    t^Mary^^^^^MyHospital||1234567^Welby^M^J^Jr^Dr^^MyHospit
    al|ER<cr>
RXO|1^Once|0026-8562^Ciprofloxicin
    Inj^NDC|200||mg^milligram^ISO+|^Injection …<cr>
RXR|IV^Intravenous^HL70162<cr>
```

Supply

Even in environments with provider order entry, the only indication that certain treatments or diagnostic tests are being used may come from orders for supplies that are generated primarily for charge capture. A clerk, technician or nursing personnel will often enter these orders.

Message Segment Structure

ORM^O01^OMS_O01	Stock Requisition Order Message	Chapter
MSH	Message Header	2
PID	Patient Identification	3
[{ AL1 }]	Allergy Information	3
ORC	Order Control	4
RQD	Requisition Detail	4

The Stock Requisition Order Message segment structure, above, is a subset of the OMS_O01 structure defined in HL7 v2.3.1 Chapter 4. This subset constitutes the minimum necessary message structure to communicate a supply order in the context of this Implementation Guide. Additional segments, as defined in HL7 v2.3.1, may be present in the message, but are not required and are not detailed in this Implementation Guide.

Message Schema

```
MSH|^~\&| sending application | sending facility |
    receiving application ||||ORM^O01^OMS_O01| message
    control id |P|2.3.1…<cr>
PID||| patient ids || patient name …<cr>
[{ AL1| set id | allergy type | allergen …<cr> }]
```

```
ORC| order control code | requestor's order number |
   processor's order number ||||| transaction date-time |
   enterer Id || ordering provider ID | enterer's location
   …<cr>
RQD| requisition line number | ordered item ||| order
   quantity | order unit of measure …<cr>
```

Message Example

The following message example represents the order for ventilator setup in the clinical scenario presented above. Specifically, a new order by Dr M J Welby, Jr (entered by respiratory therapist Martin James) in the ER at MyHospital for a ventilator and endotrachial tube #8, to be used in therpeutic management of Michael Able. Since this is a new order is being sent from the order management system to the materials management system, the materials management order number has yet to be assigned.

```
MSH|^~\&|MyHospital|MyHospital^543876^CMS|LocalPharmacy||||
   ORM^O01^RDO_O01|00015|P|2.3.1<cr>
PID|||1234321^^^MyHospital^MR||Able^Michael^D^^^^L<cr>
AL1|1|DA|^Penicillin<cr>
ORC|NW|0889587^MyHospital|||||||2001100114505|R32412^James^M
   artin^^^^^MyHospital||1234567^Welby^M^J^Jr^Dr^^MyHospita
   l|ER<cr>
RQD|1|10-053^endotracheal tube #8^UMD|||1|UT^unit^L|
ORC|NW|0889588^MyHospital|||||||2001100114505|R32412^James^M
   artin^^^^^MyHospital||1234567^Welby^M^J^Jr^Dr^^MyHospita
   l|ER<cr>
RQD|2|15-613^ventilator cirucuit^UMD|||1|UT^unit^L|
```

Segment Definitions

The HL7 General Order Message (ORM) is the starting point. Unneeded contents were pared away to form the recommended message. The format includes minimal segments:

MSH --Message Header

PID -- Patient Identification

[AL1] – Allergy

ORC -- Common Order

OBR -- Observation Request

RQD -- Requisition Detail

RXO -- Pharmacy/Treatment Order

RXE -- Pharmacy/Treatment Encoded Order

MSH Segment – Message Header

See *Implementation Guide for Transmission of Laboratory-Based Reporting of Public Health Reporting Information using Version 2.3.1 of the Health Level Seven (HL7) Standard Protocol* for additional discussion of this segment.

MSH – Message Header Segment attributes

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM #	ELEMENT NAME	OPT for ELR	IMPLEMENTATION COMMENTS
1	1	ST	R			00001	Field separator		
2	4	ST	R			00002	Encoding characters		
3	180	HD	O			00003	Sending application		
4	180	HD	O			00004	Sending facility		
5	180	HD	O			00005	Receiving application		
6	180	HD	O			00006	Receiving facility		
7	26	TS	O			00007	Date/Time of message		
8	40	ST	O			00008	Security		
9	7	CM	R		0076 / 0003	00009	Message type		
10	20	ST	R			00010	Message control ID		
11	3	PT	R			00011	Processing ID		
12	60	VID	R		0104	00012	Version ID		
13	15	NM	O			00013	Sequence number		
14	180	ST	O			00014	Continuation pointer		

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM #	ELEMENT NAME	OPT for ELR	IMPLEMENTATION COMMENTS
15	2	ID	O		0155	00015	Accept acknowledgment type		
16	2	ID	O		0155	00016	Application acknowledgment type		
17	2	ID	O			00017	Country code		
18	10	ID	O	Y	0211	00692	Character set		
19	60	CE	O			00693	Principal language of message		
20	20	ID	O		0356	01317	Alternate character set handling scheme		

MSH field definitions

MSH-4 Sending facility (HD) 00004

```
Components:  <namespace ID (IS)>  ^  <universal ID (ST)>  ^  <universal ID
             type  ID>
```

Definition: In order to clearly identify the sending institution, the sending facility field should be constructed as follows: The sending institution will use the CMS Provider of Services (POS) code (available for download at http://www.cms.hhs.gov/data/download/default.asp) to identify itself in this field. They should include the text name of the institution, followed by the unique CMS Provider of service identifier and finally, the identifier type "CMS". For example:

```
MSH|^~\&||MyHospital^543876^CMS|…<cr>
```

If the CMS identifier is for a multifacility or multiple location entity, append an integer identifier to the CMS POS code using a decimal to separate them. For example

```
MSH|^~\&||MyFirstHospital^543876.1^CMS|…<cr>
```

PID Segment - Patient Identification

See *Implementation Guide for Transmission of Laboratory-Based Reporting of Public Health Reporting Information using Version 2.3.1 of the Health Level Seven (HL7) Standard Protocol* for a discussion of this segment.

AL1 Segment – Allergy Information

The AL1 segment contains patient allergy information of various types. Most of this information will be derived from user-defined tables. Each AL1 segment describes a single patient allergy.

AL1 – Allergy Information Segment attributes

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM #	ELEMENT NAME	OPT for ELR	IMPLEMENTATION COMMENTS
1	4	SI	R			00203	Set ID - AL1	R	
2	2	IS	O		0127	00204	Allergy Type	I	
3	60	CE	R			00205	Allergy Code/Mnemonic/Description	R	Only allergies with coded values in this field will be stored and any text entries sent will be ignored
4	2	IS	O		0128	00206	Allergy Severity	I	
5	15	ST	O	Y		00207	Allergy Reaction	I	
6	8	DT	O			00208	Identification Date	I	

AL1 field definitions

AL1-2 Allergy Type (IS) 00204

> Definition: This field identifies the type of allergy being reported. Refer to User-defined Table 0127 – Allergy Type for suggested values.

AL1-3 Allergy code/mnemonic/description (CE) 00205

```
        Components:   <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^
                 <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of
                 alternate coding system (ST)>
```

> Definition: This field identifies the agent the patient has an allergy to. For drugs, the agent should be identified using the NDC coding system to be replaced by RxNorm when available. For other agents, free text may be used but public health systems may not store uncoded results.

ORC Segment – Common Order

See *Implementation Guide for Transmission of Laboratory-Based Reporting of Public Health Reporting Information using Version 2.3.1 of the Health Level Seven (HL7) Standard Protocol* for a discussion of this segment.

RQD - Requisition Detail Segment

RQD contains the detail for each requisitioned item. See assumptions above.

RQD – Requisition Detail Segment attributes

SEQ	LEN	DT	OPT	RP/#	TBL#	ITEM #	ELEMENT NAME	OPT for ELR	IMPLEMENTATION COMMENTS
1	4	SI	O			00275	Requisition Line Number	I	
2	60	CE	O			00276	Item Code - Internal	I	
3	60	CE	R			00277	Item Code - External	R	The external item code represented using the ECRI UMDNS code is the essential data in this segment.
4	60	CE	O			00278	Hospital Item Code	I	
5	6	NM	O			00279	Requisition Quantity	I	
6	60	CE	O			00280	Requisition Unit of Measure	I	
7	30	IS	O		0319	00281	Dept. Cost Center	O	
8	30	IS	O		0320	00282	Item Natural Account Code	I	
9	60	CE	O			00283	Deliver To ID	I	
10	8	DT	O			00284	Date Needed	I	

RQD field definitions

RQD-3 Item code - external (CE)   00277

```
Components:  <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^
             <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of
             alternate coding system (ST)>
```

Definition: This field contains the ECRI UMDNS code the supply being ordered.

RQD-7 Dept. cost center (IS)   00281

Definition: This field contains the code from *user-defined table 0319 - Department cost center* that identifies the department that the supply being

ordered is linked to in the sending institution. These linkages may be different in different institutions.

RXO - pharmacy/treatment order segment

This is the "master" pharmacy/treatment order segment. It contains order data not specific to components or additives. Unlike the OBR, it does not contain status fields or other data that are results-only.

It can be used for any type of pharmacy order, including inpatient (unit dose and compound unit dose), outpatient, IVs, and hyperalimentation IVs (nutritional IVs), as well as other non-pharmacy treatments, e.g., respiratory therapy, oxygen, and metabolites.

RXO – Pharmacy/treatment Order Segment attributes

SEQ	LEN	DT	OPT	RP/#	TBL #	ITEM #	ELEMENT NAME	OPT For ELR	Implementation Comments
1	100	CE	R			00292	Requested Give Code	R	
2	20	NM	R			00293	Requested Give Amount - Minimum	R	
3	20	NM	O			00294	Requested Give Amount - Maximum	R	
4	60	CE	R			00295	Requested Give Units	R	
5	60	CE	O			00296	Requested Dosage Form	R	
6	200	CE	O	Y		00297	Provider's Pharmacy/Treatment Instructions	I	
7	200	CE	O	Y		00298	Provider's Administration Instructions	I	
8	200	CM	O			00299	Deliver-To Location	I	
9	1	ID	O		0161	00300	Allow Substitutions	I	
10	100	CE	O			00301	Requested Dispense Code	I	
11	20	NM	O			00302	Requested Dispense Amount	I	
12	60	CE	O			00303	Requested Dispense Units	I	
13	3	NM	O			00304	Number Of Refills	I	
14	60	XCN	C	Y		00305	Ordering Provider's DEA Number	I	
15	60	XCN	C	Y		00306	Pharmacist/Treatment Supplier's Verifier ID	I	
16	1	ID	O		0136	00307	Needs Human Review	I	
17	20	ST	C			00308	Requested Give Per (Time	I	

SEQ	LEN	DT	OPT	RP/#	TBL #	ITEM #	ELEMENT NAME	OPT For ELR	Implementation Comments
							Unit)		
18	20	NM	O			01121	Requested Give Strength	I	
19	60	CE	O			01122	Requested Give Strength Units	I	
20	200	CE	O	Y		01123	Indication	I	
21	6	ST	O			01218	Requested Give Rate Amount	I	
22	60	CE	O			01219	Requested Give Rate Units	I	
23	10	CQ	O			00329	Total Daily Dose	I	

RXO field definitions

RXO-1 Requested give code (CE) 00292

```
          Components:  <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^
                       <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of
                       alternate coding system (ST)>
```

Definition: This field identifies the medical substance or product ordered to be given to the patient; it is equivalent to *OBR-4-universal service ID* in function. The request-to-dispense fields, which define the type and amount of what is to be issued to the patient (see *RXO-10 requested dispense code*, *RXO-11-requested dispense amount*, and *RXO-12-requested dispense units*), do not necessarily correlate with the instructions of what amount is to be "given" or administered with each dose, and may or may not be specified with the order. For example, the "give" part of the order may convey the field-representation of *give 15 mg of Librium every 6 hours*, while the request to dispense part of the order may convey *issue 30 tablets of 10 mg generic equivalent for this outpatient prescription*. When the give code does not include the dosage form, use *RXO-5-requested dosage form*. The requested give code should be provided as an NDC (National Drug Code) with the NDC code, the name of the drug and the coding system specified. When RxNorm codes become available, they should be used instead, again specifying the code, text name and coding system.

RXO-2 Requested give amount - minimum (NM) 00293

Definition: This field is the ordered amount. In a variable dose order, this is the minimum ordered amount. In an order in which a specific dose is specified, this is the exact amount of the order.

RXO-3 Requested give amount - maximum (NM)   00294

   Definition: In a variable dose order, this is the maximum ordered amount. In an
   order in which a specific dose is specified, this field is not used.

RXO-4 Requested give units (CE)   00295

```
Components:  <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^
             <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of
             alternate coding system (ST)>
```

Definition: This field indicates the units for the give amount. Units should follow the
HL7 Version 2.3.1 convention specified in Chapter 7.

RXO-5 Requested dosage form (CE)   00296

```
Components:  <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^
             <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of
             alternate coding system (ST)>
```

   Definition: This field indicates the manner in which the medication is aggregated
   for dispensing, e.g., tablets, capsules, suppositories. In some cases, this
   information is implied by the dispense/give code in *RXO-1-requested give code* or
   RXO-10-requested dispense code. Use when both *RXO-1-requested give code*
   and *RXO-10-requested dispense code* do not specify the drug/treatment form.

RXE - pharmacy/treatment encoded order segment

The RXE segment details the pharmacy or treatment application's encoding of the order.
It also contains several pharmacy-specific order status fields, such as *RXE-16-number of
refills remaining, RXE-17-number of refills/doses dispensed, RXE-18-D/T of most recent
refill or dose dispensed*, and *RXE-19-total daily dose.*

Note that *ORC-7-quantity/timing* has a different meaning from *RXE-1-quantity/timing*
and *RXG-3-quantity/timing*. The pharmacy or treatment department has the "authority"
(and/or necessity) to schedule dispense/give events. Hence, the pharmacy or treatment
department has the responsibility to encode this scheduling information in *RXE-1-
quantity/timing* and *RXG-3-quantity/timing. ORC-7-quantity/timing* does not change: it
always specifies the requested give/dispense schedule of the original order.

RXE – Pharmacy/treatment Encoded Order Segment attributes

SEQ	LEN	DT	OPT	RP/#	TBL #	ITEM #	ELEMENT NAME	OPT For ELR	Implementation Comments
1	200	TQ	R			00221	Quantity/Timing	I	
2	100	CE	R		0292	00317	Give Code	R	

SEQ	LEN	DT	OPT	RP/#	TBL #	ITEM #	ELEMENT NAME	OPT For ELR	Implementation Comments
3	20	NM	R			00318	Give Amount – Minimum	R	
4	20	NM	O			00319	Give Amount - Maximum	R	
5	60	CE	R			00320	Give Units	R	
6	60	CE	O			00321	Give Dosage Form	R	
7	200	CE	O	Y		00298	Provider's Administration Instructions	I	
8	200	CM	C			00299	Deliver-to Location	I	
9	1	ID	O		0167	00322	Substitution Status	I	
10	20	NM	C			00323	Dispense Amount	I	
11	60	CE	C			00324	Dispense Units	I	
12	3	NM	O			00304	Number of Refills	I	
13	60	XCN	C	Y		00305	Ordering Provider's DEA Number	I	
14	60	XCN	O	Y		00306	Pharmacist/Treatment Supplier's Verifier ID	I	
15	20	ST	C			00325	Prescription Number	I	
16	20	NM	C			00326	Number of Refills Remaining	I	
17	20	NM	C			00327	Number of Refills/Doses Dispensed	I	
18	26	TS	C			00328	D/T of Most Recent Refill or Dose Dispensed	I	
19	10	CQ	C			00329	Total Daily Dose	I	
20	1	ID	O		0136	00307	Needs Human Review	I	
21	200	CE	O	Y		00330	Pharmacy/Treatment Supplier's Special Dispensing Instructions	I	
22	20	ST	C			00331	Give Per (Time Unit)	I	
23	6	ST	O			00332	Give Rate Amount	I	
24	60	CE	O			00333	Give Rate Units	I	
25	20	NM	O			01126	Give Strength	I	
26	60	CE	O			01127	Give Strength Units	I	
27	200	CE	O	Y		01128	Give Indication	I	
28	20	NM	O			01220	Dispense Package Size	I	
29	60	CE	O			01221	Dispense Package Size Unit	I	
30	2	ID	O		0321	01222	Dispense Package Method	I	

RXE field definitions

RXE-1 Requested give code (CE) 00292

```
Components:  <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^
             <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of
             alternate coding system (ST)>
```

Definition: This field identifies the medical substance or product ordered to be given to the patient; it is equivalent to *OBR-4-universal service ID* in function. The request-to-dispense fields, which define the type and amount of what is to be issued to the patient (see *RXO-10 requested dispense code*, *RXO-11-requested dispense amount*, and *RXO-12-requested dispense units*), do not necessarily correlate with the instructions of what amount is to be "given" or administered with each dose, and may or may not be specified with the order. For example, the "give" part of the order may convey the field-representation of *give 15 mg of Librium every 6 hours*, while the request to dispense part of the order may convey *issue 30 tablets of 10 mg generic equivalent for this outpatient prescription*. When the give code does not include the dosage form, use *RXO-5-requested dosage form*. The requested give code should be provided as an NDC (National Drug Code) with the NDC code, the name of the drug and the coding system specified. When RxNorm codes become available, they should be used instead, again specifying the code, text name and coding system.

RXE-2 Requested give amount - minimum (NM) 00293

Definition: This field is the ordered amount. In a variable dose order, this is the minimum ordered amount. In an order in which a specific dose is specified, this is the exact amount of the order.

RXE-3 Requested give amount - maximum (NM) 00294

Definition: In a variable dose order, this is the maximum ordered amount. In an order in which a specific dose is specified, this field is not used.

RXE-4 Requested give units (CE) 00295

```
Components:  <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^
             <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of
             alternate coding system (ST)>
```

Definition: This field indicates the units for the give amount. Units should follow the HL7 Version 2.3.1 convention specified in Chapter 7.

RXE-5 Requested dosage form (CE)   00296

```
Components:  <identifier (ST)> ^ <text (ST)> ^ <name of coding system (ST)> ^
             <alternate identifier (ST)> ^ <alternate text (ST)> ^ <name of
             alternate coding system (ST)>
```

Definition: This field indicates the manner in which the medication is aggregated for dispensing, e.g., tablets, capsules, suppositories. In some cases, this information is implied by the dispense/give code in *RXO-1-requested give code* or *RXO-10-requested dispense code*. Use when both *RXO-1-requested give code* and *RXO-10-requested dispense code* do not specify the drug/treatment form.

Appendix A – Members of the CDC eHealth Initiative Public Private Collaboration Working Group on Orders

- Raymond Aller, 4Medica

- Camilla Couderc, Siemens

- David Edelstein, 4Medica

- Bill Hogan, University of Pittsburgh

- Richard Hopkins, SAIC

- Theresa Horan, CDC

- Dan Jernigan, CDC

- J. Marc Overhage, Regenstrief Institute, Indiana University School of Medicine

- Karen Sieber, Cerner

- Helen Stevens, McKesson

- Mead Walker, CDC

Appendix B – Tables

User-defined Table 0127 – Allergy Type

Value	Description
DA	Drug allergy
FA	Food allergy
MA	Miscellaneous allergy
MC	Miscellaneous contraindication

HL7 Table 0038 - Order status

Value	Description
A	Some, but not all, results available
CA	Order was canceled
CM	Order is completed
DC	Order was discontinued
ER	Error, order not found
HD	Order is on hold
IP	In process, unspecified
RP	Order has been replaced
SC	In process, scheduled

HL7 Table 0074 - Diagnostic service section ID

Value	Description
AU	Audiology
BG	Blood gases
BLB	Blood bank
CUS	Cardiac Ultrasound
CTH	Cardiac catheterization
CT	CAT scan
CH	Chemistry
CP	Cytopathology
EC	Electrocardiac (e.g., EKG, EEC, Holter)
EN	Electroneuro (EEG, EMG,EP,PSG)
HM	Hematology
ICU	Bedside ICU Monitoring

Value	Description
IMG	Diagnostic Imaging
IMM	Immunology
LAB	Laboratory
MB	Microbiology
MCB	Mycobacteriology
MYC	Mycology
NMS	Nuclear medicine scan
NMR	Nuclear magnetic resonance
NRS	Nursing service measures
OUS	OB Ultrasound
OT	Occupational Therapy
OTH	Other
OSL	Outside Lab
PAR	Parasitology
PAT	Pathology (gross & histopath, not surgical)
PHR	Pharmacy
PT	Physical Therapy
PHY	Physician (Hx. Dx, admission note, etc.)
PF	Pulmonary function
RAD	Radiology
RX	Radiograph
RUS	Radiology ultrasound
RC	Respiratory Care (therapy)
RT	Radiation therapy
SR	Serology
SP	Surgical Pathology
TX	Toxicology
URN	Urinalysis
VUS	Vascular Ultrasound
VR	Virology
XRC	Cineradiograph

HL7 Table 0123 - Result status

Value	Description
O	Order received; specimen not yet received

Value	Description
I	No results available; specimen received, procedure incomplete
S	No results available; procedure scheduled, but not done
A	Some, but not all, results available
P	Preliminary: A verified early result is available, final results not yet obtained
C	Correction to results
R	Results stored; not yet verified
F	Final results; results stored and verified. Can only be changed with a corrected result.
X	No results available; Order canceled.
Y	No order on record for this test. (Used only on queries)
Z	No record of this patient. (Used only on queries)

HL7 Table 0085 - Observation result status codes interpretation

Value	Description
C	Record coming over is a correction and thus replaces a final result
D	Deletes the OBX record
F	Final results; Can only be changed with a corrected result.
I	Specimen in lab; results pending
N	Not asked; used to affirmatively document that the observation identified in the OBX was not sought when the universal service ID in OBR-4 implies that it would be sought.
O	Order detail description only (no result)
P	Preliminary results
R	Results entered -- not verified
S	Partial results
X	Results cannot be obtained for this observation
U	Results status change to final without retransmitting results already sent as 'preliminary.' E.g., radiology changes status from preliminary to final
W	Post original as wrong, e.g., transmitted for wrong patient

HL7 Table 0119 – Order Control Codes

Value	Description
AF	Order/service refill request approval
CA	Cancel order/service request
CH	Child order/service
CN	Combined result
CR	Canceled as requested

Value	Description
DC	Discontinue order/service request
DE	Data errors
DF	Order/service refill request denied
DR	Discontinued as requested
FU	Order/service refilled, unsolicited
HD	Hold order request
HR	On hold as requested
LI	Link order/service to patient care problem or goal
NA	Number assigned
NW	New order/service
OC	Order/service canceled
OD	Order/service discontinued
OE	Order/service released
OF	Order/service refilled as requested
OH	Order/service held
OK	Order/service accepted & OK
OP	Notification of order for outside dispense
OR	Released as requested
PA	Parent order/service
PR	Previous Results with new order/service
PY	Notification of replacement order for outside dispense
RE	Observations/Performed Service to follow
RF	Refill order/service request
RL	Release previous hold
RO	Replacement order
RP	Order/service replace request
RQ	Replaced as requested
RR	Request received
RU	Replaced unsolicited
SC	Status changed
SN	Send order/service number
SR	Response to send order/service status request
SS	Send order/service status request
UA	Unable to accept order/service
UC	Unable to cancel
UD	Unable to discontinue
UF	Unable to refill

Value	Description
UH	Unable to put on hold
UM	Unable to replace
UN	Unlink order/service from patient care problem or goal
UR	Unable to release
UX	Unable to change
XO	Change order/service request
XR	Changed as requested
XX	Order/service changed, unsol.