



HL7 INTERFACE SPECIFICATIONS

ORM: GENERAL ORDER MESSAGE

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Introduction

This section describes HL7 Specifications. The unidirectional interface enables orders and study results to be transferred electronically.

The on-premise gateway supports HL7 Standard Versions 2.x. Version 2.5.1 or higher is expected unless otherwise noted.

Interface Workflow

ORM HL7 messages are processed by the on-premise gateway. The HL7 elements are then mapped to the appropriate fields.

Supported HL7 Escape Sequences

The following HL7 escape sequences are supported in the HL7 connector. The sequence is supported for both inbound HL7 messages and outgoing HL7 ACK and NACK responses:

Escape Sequence	Converted Character Sequence
\E\	Backslash (\)
\F\	Replaced with the field separator defined in MSH.1, usually (pipe)
\R\	Replaced with the repetition separator defined in MSH.2, usually ~ (tilde)
\S\	Replaced with the component separator defined in MSH.2, usually ^ (carat)
\T\	Replaced with the sub-component separator defined in MSH.2, usually & (ampersand)
\.br\	<p>Begin a new output line. Set the horizontal position to the current left margin and increment the vertical position by 1.</p> <p>Example: Using the following incoming message fragment:</p> <pre>A loop of colon visible in the left upper\.br\quadrant is distinctly abnormal.</pre> <p>The resulting message may be displayed like this on supported devices:</p> <pre>A loop of colon visible in the left upper quadrant is distinctly abnormal.</pre>
\Xnnnn\	<p>Hexadecimal data.</p> <p>Represents a double-byte character in hexadecimal form. The hexadecimal digits A-F can be upper or lower case.</p> <p>The hexadecimal value can be two or four hexadecimal digits long. Only the last four hexadecimal digits are used if more than four are specified. The value \X00\ is not supported. All other values are supported, but may not resolve to a visible character.</p> <p>Example: Using the following incoming message fragment:</p> <pre>Patient: Fran\X00e7\ois Leduc\X0d\ \X0a\Temperature: 37.2 \XB0\C</pre> <p>Will resolve to the following in Spok Go:</p> <pre>Patient: François Leduc Temperature: 37.2 °C</pre>

Unsupported Escape Sequences

The following escape or formatting sequences are currently not supported and will be removed from the incoming HL7 messages. These sequences will not be emitted in outbound HL7:

Escape Sequence	Converted Character Sequence
\H\	Start highlighting
\N\	End highlighting
\.sp<number>\	End current line and insert <number> spaces.
\.fi\	Begin word wrap or fill mode.
\.nf\	Begin no-wrap mode.
\.in<+/-number>\	Indent <number> of spaces.
\.ti<+/-number>\	Temporarily indent <number> of spaces.
\.sk<number>\	Skip <number> of spaces to the right.
\.ce\	End current output line and center the next line.

ORM - General Order Message

The HL7 ORM-O01 message functions as a general order message that is used to transmit information about an order. There is only one type of ORM message – the ORM-O01 message. An ORM must contain one and only one MSH segment and can contain one or more optional NTE segments.

Key:	
[]	Optional segment
{ }	1+ occurrences, repeated

Segment/Group	Name	Notes	Repeatable	Required
MSH	Message Header			✓
[{ NTE }]]]	Notes and Comments for the Header		✓	
Patient Group				✓
PID	Patient Identification			✓
NTE	Notes and Comments for the Patient		✓	
Patient Visit Group - Part of Patient Group				
PV1	Patient Visit			✓
[PV2]	Patient Visit - Additional Information			
Patient Group (Continued)				
[{ AL1 }]	Allergy Information		✓	
Order Group ¹				✓
ORC	Order Common			✓
Order Detail Group - Part of Order Group			✓	✓
OBR	Observation Request			✓ ²
[{ NTE }]	Notes and Comments for Order Detail Group		✓	
[{ DG1 }]	Diagnosis		✓	
Observation Group - Part of Order Detail Group			✓	
[{ OBX	Observation			
[{ NTE }]]]	Notes for Observation Group		✓	

1. Although HL7 specifications for an ORM-O01 states the Order Group can be repeated, we accept one and only one order group in an ORM-O01 message.

2. Although the HL7 specifications for an ORM-O01 allows the Order Detail Group and therefore the OBR segment to be optionally included, we require the inclusion of this OBR segment in order to receive a title for the order from OBR:4.2.

ORM Header Segments

An ORM must contain one and only one MSH Segment and may contain one or more optional NTE Segment.

MSH Segment

The HL7 MSH (Message Header) segment is present in every HL7 ORM message and defines the message's source, purpose and destination.

It is always the first segment in the HL7 message.

HL7 Field	Description	Required	Notes
MSH:1	Field Separator	✓	
MSH:2	Encoding Characters	✓	
MSH:3.1	Sending Application	✓	
MSH:4.1	Sending Facility	✓ ¹	
MSH:5.1	Receiving Application	✓ ¹	
MSH:6.1	Receiving Facility	✓ ¹	
MSH:7.1	Date Time	✓	
MSH:9.1	Event Type	✓	ORM
MSH:9.2	Event Trigger	✓	O01
MSH:10	Message Control ID	✓	
MSH:11.1	Processing Identifier	✓	
MSH:12	Version ID	✓	2.5.1 or greater

1. Required for possible future routing of response messages.

NTE Segment

The HL7 NTE (Notes and Comments) segment is used for sending notes and comments related to the message.

HL7 Field	Description	Required	Notes
NTE:3.1	Comment		

Patient Group

One and only one instance of the ORM Patient Group is supported in an HL7 ORM message. The patient group must contain one PID Segment and can contain one or more optional NTE segments.

PID Segment

The PID (Patient Identification) segment is required in an HL7 ORM message. This segment contains the patient's identifying information such as the patient's name, gender, account, and record numbers.

HL7 Field	Description	Required	Repeating	Notes
PID:2.1	Patient ID Number			The first ID repetition received in this field will be stored with the patient for possible inclusion in subsequent outbound messages.
PID:2.4	Patient ID Assigning Authority			
PID:2.5	Patient ID Type Code			
PID:3.1	Patient Identifier ID Numbers	✓		Multiple Patient Identifier repetitions are supported in PID:3. At least one repetition is required to be a Medical Record Number (MRN) with a type code of "MR" and a facility-specific assigning authority. All identifier repetitions received in this field will be stored with the patient for possible inclusion in subsequent outbound messages.
PID:3.4	Patient Identifier Assigning Authorities	✓		
PID:3.5	Patient Identifier Type Codes	✓		
PID:5.1	Patient Last Name	✓		
PID:5.2	Patient First Name	✓		
PID:5.3	Patient Middle Name			
PID:5.4	Patient Suffix			
PID:7.1	Patient Birth Date	✓		
PID:8.1	Patient Gender			
PID:13.1	Phone Number - Home			The phone number in the first component of each repetition will be stored with the patient.
PID:13.2	Telecommunication Use Code			"NET" is needed to accept an email address in PID:13
PID13.5	Email Address - Home			The first repetition's email address will be stored with the patient
PID:14.1	Phone Number – Work			The phone number in the first component of each repetition will be stored with the patient.
PID:14.2	Telecommunication Use Code			"NET" is needed to accept an email address in PID:14
PID14.5	Email Address - Work			The first repetition's email address will be stored with the patient
PID:15.2	Primary Language			

PID:18.1	Patient Account Number			
PID:18.4	Patient Account Assigning Authority			This field is required if a Patient Account Number is provided in PID:18.1
PID:29	Patient Death Date and Time			
PID:30	Patient Death Indicator			

1. Multiple Patient Identifier repetitions are supported in PID:3. At least one repetition is required to be a Medical Record Number with a type code of "MR". If more than one Medical Record Number is sent, only the first occurrence will be used.

NTE Segment

The HL7 NTE (Notes and Comments) segment is used for sending notes and comments related to the patient.

HL7 Field	Description	Required	Notes
NTE:3.1	Comment		

Patient Visit Group

The Patient Visit Group contains the PV1 and PV2 segments.

PV1 Segment (Required)

The PV1 segment is primarily used to identify the location of the patient.

This segment is required because the workflow engine cannot determine the appropriate flow without patient class and location information.

HL7 Field	Description	Required	Repeating	Notes
PV1:2.1	Patient Class	✓		E, I, or O are processed. All others are rejected.
PV1:3.1	Location – Point of Care	✓ (I/E)		Unit or Department
PV1:3.2	Location – Room	✓ (I/E)		
PV1:3.3	Location – Bed	✓ (I/E)		
PV1:3.4	Location – Facility	✓		
PV1:7.1	Attending Physician ID		✓	
PV1:7.2	Attending Physician Last Name			
PV1:7.3	Attending Physician First Name			
PV1:7.9	Assigning Authority for Attending Physician ID ¹			
PV1:8.1	Referring Physician ID		✓	
PV1:8.2	Referring Physician Last Name			
PV1:8.3	Referring Physician First Name			
PV1:8.9	Assigning Authority for Referring Physician ID ¹			
PV1:9.1	Consulting Physician ID		✓	
PV1:9.2	Consulting Physician Last Name			
PV1:9.3	Consulting Physician First Name			
PV1:9.9	Assigning Authority for Consulting Physician ID ¹			

HL7 Field	Description	Required	Repeating	Notes
PV1:10.2	Hospital Service Text			
PV1:11.1	Temporary Location – Point of Care			Location other than the assigned location required for a temporary period of time (e.g., OR, operating theatre, etc.).
PV1:11.2	Temporary Location – Room			
PV1:11.3	Temporary Location – Bed			
PV1:11.4	Temporary Location – Facility			
PV1:17.1	Admitting Physician ID		✓	
PV1:17.2	Admitting Physician Last Name			
PV1:17.3	Admitting Physician First Name			
PV1:17.9	Assigning Authority for Admitting Physician ID ¹			
PV1:18.1	Patient Type			
PV1:19.1	Visit Number			
PV1:19.4	Visit Number Assigning Authority			This field is required if a Visit Number is provided in PV1:19.1
PV1:36.2	Discharge Disposition Text			PV1:36 is supported as a CWE datatype (pre-adopted from HL7 2.7)
PV1:44.1	Admit Date/Time			
PV1:45.1	Discharge Date/Time ¹			
PV1:53	Service Episode Description			A brief user-defined description of a Service Episode in or for which the visit occurs.

1. Assigning authorities for user IDs need to match one of Spok Go's supported External Systems in order to resolve the ID to a Spok Go user.

2. If multiple date/time values are present, the first occurrence is used.

PV2 Segment

The PV2 segment is a continuation of visit-specific information contained in the PV1 segment. This segment is currently not required but is included here for future consideration.

HL7 Field	Description	Required	Repeating	Notes
PV2:3.2	Patient Admit Reason			
PV2:4.2	Transfer Reason Text			This field contains the short description of the reason for a patient location change.
PV2:12	Visit Description			This field contains a brief user-defined description of the visit.
PV2:25.2	Visit Priority Code Text			Examples of some of the visit priorities that may be sent in this field include: <ul style="list-style-type: none"> - Emergency - Urgent - Elective (based on HL7 table 0217)
PV2:41.2	Precaution Code Text		✓	Examples of some of the possible precautions that may be sent in this field include: <ul style="list-style-type: none"> - Aggressive - Blind - Confused - Deaf - On IV - Paraplegic (based on HL7 table 0433)
PV2:45.2	Advance Directive Code Text			Examples of some of the possible text that may be sent in this field include: <ul style="list-style-type: none"> - Do not resuscitate - No directive (based on HL7 table 0435) Note: PD1:15 and PV2:45 are redundant to each other. If both fields are valued, only the visit-level value from PV2:45 will be used. PV2:45 is supported as a CWE datatype (pre-adopted from HL7 2.7)

AL1 Segment

The AL1 (Allergy Information) segment is used to communicate the patient's allergy info as it is known at the time of an order.

HL7 Field	Description	Required	Notes
AL1:2.2	Allergen Type Code Text	✓	Examples of some of the possible allergen type code descriptions that may be sent in this field include: <ul style="list-style-type: none">- Drug Allergy- Food Allergy- Miscellaneous Allergy- Miscellaneous contraindication- Environmental Allergy- Animal Allergy- Plant Allergy- Pollen Allergy (based on HL7 table 0127)
AL1:3.2	Allergen Code Text	✓	
AL1:4.2	Allergy Severity Code Text		Examples of some of the possible allergen type code descriptions that may be sent in this field include: <ul style="list-style-type: none">- Severe- Moderate- Mild- Unknown (based on HL7 table 0128)

Order Group

The ORM Order Group contains a required ORC Segment and an optional Order Detail Group. Although the ORM specification states the Order Group can be repeated, we accept one and only one order group be present in an ORM message.

ORC Segment

Order messages must contain a common order (ORC) segment.

HL7 Field	Description	Required	Notes
ORC:1.1	Order Control	✓	
ORC:2.1	Placer Order Number	✓ ¹	This is the same as OBR:2.1 Placer Order Number
ORC:3.1	Filler Order Number (aka: Accession Number)	✓ ²	This is the same as OBR:3.1 Filler Order Number
ORC:5.1	Order Status		
ORC:7.6	Order Priority	✓ ³	The supported single-letter priority values in order, from high to low, are: S=Stat, A=ASAP, R=Routine, P=Preop, T=Timed
ORC:11.1	Authorizing Provider ID		
ORC:11.2	Authorizing Provider Last Name		
ORC:11.3	Authorizing Provider First Name		
ORC:11.9	Assigning Authority for Authorizing Provider ID ⁴		
ORC:12.1	Ordering Provider ID	✓ ⁵	This is expected to be the same as the Ordering Provider in OBR:16 - if different, the ordering provider in ORC:16 will supersede OBR:12's ordering provider. If more than one Ordering Provider is received in this field, only the first repetition will be used.
ORC:12.2	Ordering Provider Last Name		
ORC:12.3	Ordering Provider First Name		
ORC:12.9	Assigning Authority for Ordering Provider ID ⁴	✓	
ORC:14.1	Callback Phone Number	Expected ⁶	
ORC:16.2	Order Control Code Reason		

- At least one of the following identifiers must be provided: Placer Order Number (ORC:2.1) or Placer Order Number (OBR:2.1). If both identifiers are present, OBR:2.1 will supersede ORC:2.1.
- At least one of the following identifiers must be provided: Filler Order Number (ORC:3.1) or Filler Order Number (OBR:3.1). If both identifiers are present, OBR 3.1 will supersede ORC:3.1.
- A value is required in either ORC:7.6 or OBR:27.6. The highest value from one of these elements will be used to determine the message's priority. When unsupported values are provided, single-letter or otherwise (ex: "STAT" instead of "S"), the priority value from the first ORC or OBR instance is used.
- Assigning authorities for user IDs need to match one of Spok Go's supported External Systems in order to resolve the ID to a Spok Go user.
- At least one of the following identifiers is required: Ordering Provider ID (ORC:12.1) or Ordering Provider ID (OBR:16.1).
- If both ORC:14.1 and OBR:17.1 are present, OBR:17.1 will supersede ORC:14.1. If multiple phone numbers are present, the first occurrence is used.

Order Detail Group

The ORM Order Detail group must contain one OBR Segment and can contain an optional DG1 Segment and an optional list of Observation Groups.

OBR Observation Request

HL7 Field	Description	Required	Notes
OBR:2.1	Placer Order Number	✓ ¹	This is the same as ORC:2.1 Placer Order Number
OBR:3.1	Filler Order Number (aka: Accession Number)	✓ ²	This is the same as ORC:3.1 Filler Order Number
OBR:4.1	Universal Service Code	✓	
OBR:4.2	Universal Service Text	✓	Spok Go's alerts do not support clickable links/URLS at this time.
OBR:7.1	Observation Date Time	✓	
OBR:13	Relevant Clinical Information		
OBR:16.1	Ordering Provider	✓ ³	This is expected to be the same as the Ordering Provider in ORC.12 - if different, the ordering provider in ORC:16 will supersede OBR:12's ordering provider. If more than one Ordering Provider is received in this field, only the first repetition will be used.
OBR:16.2	Ordering Provider Last Name		
OBR:16.3	Ordering Provider First Name		
OBR:16.9	Assigning Authority for Ordering Provider ID ⁴	✓	
OBR:17.1	Order Callback Phone Number	Expected ⁵	
OBR:22.1	Results Rpt / Status Change Date / Time		
OBR:27.6	Priority	✓ ⁶	The supported single-letter priority values in order, from high to low, are: S=Stat, A=ASAP, R=Routine, P=Preop, T=Timed
OBR:32.1 ⁷	Results Interpreter ID		
OBR:32.1.2 ⁷	Results Interpreter Last Name		
OBR:32.1.3 ⁷	Results Interpreter First Name		
OBR 32.1.9 ⁷	Results Interpreter Assigning Authority ⁴		

HL7 Field	Description	Required	Notes
OBR:34.1 ⁷	Technician ID		OBR:34's Technician info will be used as the Result Interpreter when OBR:32 is absent
OBR:34.1.2 ⁷	Technician Last Name		
OBR:34.1.3 ⁷	Technician First Name		
OBR 34.1.9 ⁷	Technician Assigning Authority ⁴		

1. At least one of the following identifiers must be provided: Placer Order Number (ORC:2.1) or Placer Order Number (OBR:2.1). If both identifiers are present, OBR:2.1 will supersede ORC:2.1.
2. At least one of the following identifiers must be provided: Filler Order Number (ORC:3.1) or Filler Order Number (OBR:3.1). If both identifiers are present, OBR 3.1 will supersede ORC:3.1.
3. At least one of the following identifiers are required: Ordering Provider ID (ORC:12.1) or Ordering Provider ID (OBR:16.1).
4. Assigning authorities for user IDs need to match one of Spok Go's supported External Systems in order to resolve the ID to a Spok Go user.
5. If both ORC:14.1 and OBR:17.1 are present, OBR:17.1 will supersede ORC:14.1. If multiple phone numbers are present, the first occurrence is used.
6. A value is required in either ORC:7.6 or OBR:27.6. The highest value from one of these elements will be used to determine the message's priority. When unsupported values are provided, single-letter or otherwise (ex: "STAT" instead of "S"), the priority value from the first ORC or OBR instance is used.
7. Note that most of the Interpreter and Technician info in OBR:32 and OBR:34 is communicated as HL7 subcomponents (ex: |12345&Last&First&&&&AsgnAuth|) within that field's first "Name (CNN)" component.

NTE Segment

The HL7 NTE (Notes and Comments) segment is used for sending notes and comments related to the order.

HL7 Field	Description	Required	Notes
NTE:3.1	Comment		

DG1 Segment

The DG1 segment contains patient diagnosis information of various types, for example: admitting, primary, etc. The DG1 segment is used to send multiple diagnoses (for example, medical records encoding).

The DG1 segment itself is optional, but when the segment is used, all fields must be included.

HL7 Field	Description	Required	Notes
DG1:1	Set Identifier	✓	
DG1:2	Diagnosis Coding Method	✓	
DG1:3	Diagnosis Code	✓	
DG1:4	Diagnosis Description	✓	
DG1:6	Diagnosis Type	✓	

Observation Group

The Observation Group must contain an OBX Segment and an optional list of NTE Segments.

OBX Segment

Answers at Order Entry (AOE) can be sent in this segment or the NTE.

The OBX segment itself is optional, but when the segment is used, all fields must be included.

HL7 Field	Description	Required	Notes
OBX:2.1 ¹	Value Type	✓	
OBX:3.1	Identifier Code	✓	
OBX:3.2	Identifier Text	✓	
OBX:5.1 ²	Observation Value		
OBX:6.1	Units	✓ (NM)	
OBX:7.1	Reference Range	✓ (NM)	
OBX:16.1	Responsible Observer ID		
OBX:16.2	Responsible Observer Last Name		
OBX:16.3	Responsible Observer First Name		
OBX:16.9	Assigning Authority for Responsible Observer ID ³		

1. See the OBX Value Type Handling section of these specs for details regarding the supported value types.

2. Although HL7 allows for OBX:5 to support repeating fields, Spok Go only supports repeating OBX:5 instances when the value type in OBX:2 is "TX" or text.

3. Assigning authorities for user IDs need to match one of Spok Go's supported External Systems in order to resolve the ID to a Spok Go user.

NTE Segment

The HL7 NTE (Notes and Comments) segment is used for sending notes and comments related to the observations.

HL7 Field	Description	Required	Notes
NTE:3.1	Comment		

OBX Value Type Handling

Spok Go supports the following value types in OBX:2

OBX:2 Value Type	Processing Details
CE Coded Element	<ul style="list-style-type: none"> OBX:3.2 and OBX:5.1 will be forwarded for possible display.
CWE Coded Entry	<ul style="list-style-type: none"> OBX:3.2 and OBX:5.1 will be forwarded for possible display.
DT Date	<ul style="list-style-type: none"> OBX:3.2 and OBX:5.1 will be forwarded for possible display. ISO formatting will be applied to valid date strings.
FT Formatted Text	<ul style="list-style-type: none"> Consecutive OBX segments with the same contents in OBX:3.2 will have their OBX:5 contents combined into a single text block. HL7 line field encoding (ex: \.br\) supported Unique OBX:3.2 values and any combined OBX:5 contents will be forwarded for possible display.
ID Coded Value for HL7 Defined Tables	<ul style="list-style-type: none"> OBX:3.2 and OBX:5.1 will be forwarded for possible display.
IS Coded Value for User Defined Tables	<ul style="list-style-type: none"> OBX:3.2 and OBX:5.1 will be forwarded for possible display.
NM Numeric	<ul style="list-style-type: none"> OBX:3.2, OBX:5.1, OBX:6.1 and OBX:7.1 will be forwarded for possible display.
RP Reference Pointer	<ul style="list-style-type: none"> OBX:3.2 and OBX:5.1 will be forwarded for possible display.
SN Structured Number	<ul style="list-style-type: none"> OBX:3.2, OBX:5, OBX:6.1 and OBX:7.1 will be forwarded for possible display. Up to 4 subcomponents are supported in OBX:5 where the separators will be replaced by spaces in order to create the structured number value (ex: >^1^/ ^2 = "> 1 / 2").
ST String Data	<ul style="list-style-type: none"> Consecutive OBX segments with the same contents in OBX:3.2 will have their OBX:5 contents combined into a single text block. HL7 field repetition characters (ex: ~) supported for line feeds Unique OBX:3.2 values and any combined OBX:5 contents will be forwarded for possible display.
TS Time Stamp	<ul style="list-style-type: none"> OBX:3.2 and OBX:5.1 will be forwarded for possible display. ISO formatting will be applied to valid date strings.
TX Text Data	<ul style="list-style-type: none"> Consecutive OBX segments with the same contents in OBX:3.2 will have their OBX:5 contents combined into a single text block. HL7 field repetition characters (ex: ~) supported for line feeds Unique OBX:3.2 values and any combined OBX:5 contents will be forwarded for possible display.

Spok Go does not support the following value type in OBX:2

OBX:2 Value Type	Processing Details
ED Encapsulated Data	<ul style="list-style-type: none"> Spok Go cannot accept/display the level of formatting that an encapsulated data string is trying to communicate. OBX segments with an ED value type will be ignored in ORM messages that contain a mix of other value types. ORM messages that only contain OBX segments with ED data type(s) will be NAK'ed

Any other OBX:2 value type that is received will be handled as individual observations where OBX:3.2 and OBX:5.1 will be forwarded for possible display.

Support External Systems

The table below contains the values supported as Practitioner Assigning Authorities (usually in the 9th component of a practitioner/physician field), which in conjunction with an associated practitioner/physician ID field, is used to uniquely identify each practitioner in incoming HL7 messages.

Values	
Active Directory	PeopleSoft
Agfa	Philips
Allscripts	Quanum
Athena	SailPoint
Cactus	Sectra
Carestream	ServiceNow
Cerner	Siemens
Centricity	Thermofisher
Cirdan	Vista
Epic	Workday
Fujifilm	
GE	
IBM	
Kestral	
Kronos	
Lawson	
Lexmark	
Meditech	
NPPES	