



ASCEND CV Inbound HL7 Specification

ASCEND CV Version 8.0

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Introduction

Purpose of this Document

This document describes ASCEND HIT's Cardiovascular Reporting (ASCEND CV®) technical interface specifications for unidirectional inbound HL7 messages in ORM (General Order Message) or ADT (Admission Discharge Transfer) message formats. ORM messages transmit information about orders as well as patient information between the Hospital Information Systems (HIS) and other hospital platforms/systems. ADT messages transmit information about patient demographics and/or healthcare encounters (visits) between Hospital Systems.

This specification describes inbound HL7 Events, Messages and Segments that are supported in the interface(s) between ASCEND CV and the HIS. It will also document interface design, as well as any processes or procedures that may require special attention when implementing these interfaces.

This document assumes the reader has a basic understanding of interface concepts and the Health Level 7 (HL7) standard. This document also assumes the reader has access to the HL7 Standards reference materials (<http://www.hl7.org/>).

About ASCEND CV

ASCEND CV, part of the ASCEND HIT Suite of products, provides a rich browser-based application supporting cardiovascular clinical workflows for the creation and confirmation/signing of structured reports. ASCEND CV provides a user-friendly, intelligent interface for clinicians to record measurements, findings, and conclusions related to a patient case. Because the reports are built off of structured content, rich analytics, downstream registry support, and prior study imports are supported.

Integration with the Hospital Information System is a feature of ASCEND CV. ASCEND CV's integration engine accepts select ORM and ADT messages from the hospital system, and processes the pertinent patient demographic and clinical order information.

The ORM and ADT interface was developed using the HL7 2.3.1 Standard. The ASCEND CV interface supports standard TCP/IP (MLLP) communication protocols.

Definitions and Acronyms

The table below contains terms and acronyms with definitions that are commonly used throughout the implementation and integration of ASCEND CV.

Term	Definition
ADT	Admission, Discharge, and Transfer types of HL7 messages.
Case	An episode of care consisting of one or multiple studies.
EMR	Electronic Medical Record.
Encounter	Unique ID for the patient's visit. Also, visit number, patient account number.
Enumerated Field	An enumerated field is a field in the HL7 message that requires a set of mapped values.
HIS	Hospital Information System.
HL7	Health Level 7, the healthcare interface standard.
MRN	Medical Record Number, a unique identifier for each patient.
NPI	National Provider Identifier, a unique 10-digit identification number for health care providers required by HIPAA in the United States
ORM	General order type of HL7 message.
ORU	Unsolicited result HL7 message.
Participant	Individual involved in any aspect of the ordering, performance and/or procedural reporting of a study.
Role	Clinical function or part played by the participant in the case.

HL7 Messaging

The HL7 interface will follow the standard message acknowledgement protocol. An acknowledgement message (ACK/NAK) will be sent back to the Hospital Information System (HIS) to acknowledge the receipt of the ORM or ADT message.

The HL7 message is enclosed by special characters that form a standard LLP/MLLP message block around the HL7 message data. The expected characters are as follows:

Delimiter	Character	Hex Code	Decimal Code
Start of block character	Vertical Tab	0B	11
End of block character	File Separator	1C	28
End of data character	Carriage Return	0D	13

Specification

Message Types

The table below describes the message types processed by ASCEND CV along with processing notes.

Message Type	Description	Notes
ORM O01	General Order Message	<ul style="list-style-type: none">ASCEND CV creates patients, cases and studies from ORM <i>New Order</i> messagesOrder control codes in ORC-1 (eg. SC, CA) can also trigger ASCEND CV behavior
ADT A08	Update Patient Information	<ul style="list-style-type: none">ASCEND CV updates demographic information.Signed reports will not be updated.
ADT A31	Update Person Information	<ul style="list-style-type: none">ASCEND CV updates patient demographic information as in the A08 message above, however this action can be taken on patients with no open studies (i.e., without a current episode)Sometimes used for back-loading MPI informationSigned reports will not be updated.

Message Type	Description	Notes
ADT A34	Merge Patient Information – Patient ID Only	<ul style="list-style-type: none"> • ASCEND CV will move the studies from the old MRN (MRG-3.1) to the new MRN (PID-3.1). • All MRNs listed in PID-3 will remain active in ASCEND CV. • MRN merges will not affect reports that are in progress. These reports will need to be updated manually. • Signed reports will not be updated.
ADT A35	Merge Patient Information – Account Number Only	<ul style="list-style-type: none"> • ASCEND CV will move studies from the prior patient account number in MRG-3 to the new account number in PID-18. • The old account number becomes inactive. • Account number merges will not affect reports that are in progress. These reports will need to be updated manually. • Signed reports will not be updated.
ADT A44	Move Account Information – Patient Account Number	<ul style="list-style-type: none"> • ASCEND CV will move studies from the prior patient account number in MRG-3 to the correct account number in PID-18. • The old patient account number remains active. • ASCEND CV does not update any demographic information with this message type. • PDF signed reports will not be updated.

Filtering

Only cardiology orders should be sent to ASCEND CV. The best way to filter the appropriate orders is to send just those USIDs, or order codes, that pertain to cardiology. These codes are transmitted in OBR-4.1 and also configured in the ASCEND CV Administrator User Interface.

If possible, only ADT messages processed by ASCEND CV (e.g., for cardiovascular patients) should be sent to reduce unnecessary HL7 traffic.

Merging

ASCEND CV uses only one value in MRG- 1 as the “old”, or source, identifier to be merged away. If multiple values are sent in MRG-1, ASCEND CV will use the first value. ASCEND CV will then loop through all the identifiers in PID-3 to find the matching patient to merge into. ASCEND CV is looking for a match on:

- Patient identifier (required in PID-3.1)
- Identifier type (required in PID-3.5)
- Assigning Authority (*if it is included* in PID-3.4)

Therefore, cross-facility merges are not supported. ASCEND CV will also require a match on patient last name, first initial, and date of birth before merging. If no matching patient is found, ASCEND CV will do nothing. If more than one patient is found, ASCEND CV will log an error message in its Administrative UI.

Supported Segments

The HL7 ORM and ADT segments contain logical groups of information such as patient, patient provider, and order information. The following table lists the segments for each message type that are processed by ASCEND CV. Additional segments or custom segments need not be removed by the client, but will be ignored.

Key	BOLD = Required	[] = Optional	{ } = Repeating
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ORM	MSH	Message Header
	PID	Patient Identification
	PV1	Patient Visit
	ORC	Common Order
	OBR	Order Detail
	[AL1]	Patient Allergy Information
	[DG1]	Diagnosis

A08	MSH	Message Header
	EVN	Event Type
	PID	Patient Identification
	PV1	Patient Visit
A31	MSH	Message Header
	EVN	Event Type
	PID	Patient Identification
A34	MSH	Message Header
	EVN	Event Type
	PID	Patient Identification
	MRG	Merge Patient Information
A35	MSH	Message Header
	EVN	Event Type
	PID	Patient Identification
	MRG	Merge Patient Information
A44	MSH	Message Header
	EVN	Event Type
	PID	Patient Identification
	MRG	Merge Patient Information

Data Types

Code	Value
CE	Coded Element
CX	Extended Composite ID
EI	Entity Identifier
HD	Hierarchic Designator
ID	Coded Value for HL7 Tables
IS	Coded Value
FC	Financial Class
MSG	Message Type
NDL	Name with Location and Date
PL	Person Location
PT	Processing Type
SI	Sequence ID
ST	String
TS	Time Stamp
TQ	Timing/Quantity
VID	Version Identifier
XAD	Extended Address
XCN	Extended Composite ID – ID and Person Name
XON	Extended Composite Organization ID – ID and Name
XPN	Extended Person Name
XTN	Extended Telecommunication Number

Field Detail by Segment

Each segment is divided into data fields that are delimited and in a fixed, specific order. The HL7 standard does not require that every field must be present; therefore maintaining field order with the correct number of separators is imperative. Fields required by ASCEND CV are indicated.

MSH – Message Header

MSH	Field Name	Data Type	Length	Req/ Opt	Comments
1	Field Separator	ST	1	R	" "
2	Encoding Characters	ST	4	R	"^" – Component Separator "~" – Repetition Separator "\ " – Escape Character "&" – Sub-Component Separator
3	Sending Application	HD	20	R	Client Specific
4	Sending Facility	HD	20	R	Client Specific
5	Receiving Application	HD	20	R	"ASCEND CV"
6	Receiving Facility	HD	20	R	Client Specific
7	Date/Time of Message	TS	26	R	YYYYMMDDHHMMSS
9	Message and Event Type	MSG		R	"ORM^R01"
10	Message Control ID	ST	20	R	Unique Message ID
11	Processing ID	PT	1	R	"T" for Test System "P" for Production System
12	Version ID	VID	5	R	Ex. 2.3.1

EVN – Event Type

EVN	Field Name	Data Type	Length	Req/ Opt	Comments
1	Event Type Code	ID	3	R	A08, A31, A34, etc...
2	Recorded Date/Time	TS	26	O	YYYYMMDDHHMMSS
3	Date/Time of Planned Event	TS	26	O	YYYYMMDDHHMMSS
4	Event Reason Code	IS	3	O	01 - Patient request 02 - Physician/health practitioner order 03 - Census management O - Other U - Unknown
5	Operator ID	XCN	250	O	
6	Event Occurred	TS	26	O	

PID – Patient Identifier

PID	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	O	"1"
2	Patient ID	CX	250	O	Patient Identifier^^^Assigning Facility^ID Type In ORM/order messages: This field may be utilized to store an encounter MRN if PID-3(1).1 is not used. If this field is utilized, it must have a facility code in PID-2.4 and type of "MRN" in PID-2.5
3	Patient ID List	CX	250	R	Patient Identifier^^^Assigning Facility^ID Type For Order/ORM messages this may be a repeating field:

PID	Field Name	Data Type	Length	Req/ Opt	Comments
					<p>If additional patient IDs follow the encounter MRN in PID-3.1, ASCEND CV will associate all the IDs in this list to the patient. Each instance must have a facility code in PID-3.4 and type of "MRN" in PID-3.5.</p> <p>For ADT A08 and A31 messages, only one identifier may be sent in PID-3. It also must have a facility code in PID-3.4 and type of "MRN" in PID-3.5.</p> <p>Note: Please indicate the values that will be sent in PID-3.4 in the section called "Facilities" below.</p>
5	Patient Name	XPN	250	R	Family Name^Given Name^Middle Initial^Suffix^Prefix^Degree
7	Date of Birth	TS	26	R	YYYYMMDD
8	Patient Sex	ID	1	O	<p>This is an enumerated field. Mappings are supported for:</p> <p><i>Ambiguous</i> <i>Female</i> <i>Male</i> <i>Not Applicable</i> <i>Other</i> <i>Unknown</i></p>
10	Race	ID	250	O	<p>This is an enumerated field. Mappings are supported for:</p> <p><i>Asian</i> <i>Black</i> <i>Native American</i> <i>Other Race</i> <i>Pacific Islander</i> <i>White</i></p>
11	Patient Address	XAD	250	O	Address 1^Address 2^City^State^Zip^Country
13	Home Phone/Email	XTN	250	O	Telephone^^^E-mail address
14	Work Phone	XTN	250	O	

PID	Field Name	Data Type	Length	Req/ Opt	Comments
15	Primary Language	CE	250	O	Code^Description
16	Marital Status	ID	250	O	This is an enumerated field. Mappings are supported for: <i>Annulled</i> <i>Common law</i> <i>Divorced</i> <i>Domestic partner</i> <i>Interlocutory</i> <i>Legally separated</i> <i>Living together</i> <i>Married</i> <i>Other</i> <i>Registered domestic partner</i> <i>Separated</i> <i>Single</i> <i>Unknown</i> <i>Unmarried</i> <i>Unreported</i> <i>Widowed</i>
18	Patient Account Number	CX	250	O	Unique number assigned to the patient visit
19	Social Security Number	ST	11	O	ASCEND can accept the SSN in either of these two formats: <ul style="list-style-type: none"> • 9 digits with no dashes: ex. 123456789 • 11 characters, 9 digits with two dashes: ex. 123-45-6789

PID	Field Name	Data Type	Length	Req/ Opt	Comments
22	Ethnic Group	ID	250	O	This is an enumerated field. Mappings are supported for: <i>Hispanic or Latino</i> <i>Mediterranean</i> <i>Middle Eastern</i> <i>Not Hispanic or Latino</i> <i>Unknown</i>
29	Death Date/Time	TS	26	O	YYYYMMDDHHMMSS
30	Death Indicator	ID	1	O	This is an enumerated field. Mappings are supported for: <i>Deceased</i> <i>Alive</i>

PV1 – Patient Visit

PV1	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	O	"1"
2	Patient Class	ID	1	R	This is an enumerated field. Mappings are supported for: <i>Emergency</i> <i>Inpatient</i> <i>Outpatient</i> <i>Preadmit</i> <i>Recurring patient</i> <i>Obstetrics</i> <i>Commercial account</i> <i>Not applicable</i> <i>Unknown</i>

PV1	Field Name	Data Type	Length	Req/ Opt	Comments
					<i>Observation</i>
3	Patient Location	PL	80	R	Nursing Station^Room^Bed^Facility ACEND CV Requires the facility in PV1-3.4 at a minimum.
7	Attending Physician	XCN	250	O	ID^Last Name^First Name^Middle^FamilySuffix^^Professional Suffix^^NPI ASCEND CV expects the National Provider ID in 7.1, therefore this sub field is limited to 10 characters. "NPI" must be in 7.9 or 7.13 Note: Professional Suffix (ex. MD, RN, etc) must be in subfield 7.
8	Referring Physician	XCN	250	O	ID^Last Name^First Name^Middle^FamilySuffix^^Professional Suffix^^NPI ASCEND CV expects the National Provider ID in 8.1, therefore this sub field is limited to 10 characters. "NPI" must be in 8.9 or 8.13 Note: Professional Suffix (ex. MD, RN, etc) must be in subfield 7.
9	Consulting Physician	XCN	250	O	ID^Last Name^First Name^Middle^FamilySuffix^^Professional Suffix^^NPI ASCEND CV expects the National Provider ID in 9.1, therefore this sub field is limited to 10 characters. "NPI" must be in 9.9 or 9.13 Note: Professional Suffix (ex. MD, RN, etc) must be in subfield 7.
17	Admitting Physician	XCN	250	O	ID^Last Name^First Name^Middle^FamilySuffix^^Professional Suffix^^NPI ASCEND CV expects the National Provider ID in 17.1, therefore this sub field is limited to 10 characters. "NPI" must be in 17.9 or 17.13

PV1	Field Name	Data Type	Length	Req/Opt	Comments
					Note: Professional Suffix (ex. MD, RN, etc) must be in subfield 7.
19	Visit Number	CX	250	O	Unique number assigned to the patient visit
20	Financial Class	FC	50	O	Financial Class Code
44	Admit Date/Time	TS	26	O	YYYYMMDDMMSS
45	Discharge Date/Time	TS	26	O	YYYYMMDDMMSS

MRG – Merge Information

MRG	Field Name	Data Type	Length	Req/Opt	Comments
1	Prior Patient Identifier - Internal	CX	250	R	MRN^^^Assigning Facility^ID Type ASCEND CV only allows one identifier to be merged at a time.
2	Prior Alternate Patient ID	CX	250	O	
3	Prior Patient Account Number	CX	250	C	ASCEND CV requires this field for ADT^A44 messages only. MRG-3.1 is the prior account number. MRG-3.5 must be "FIN NBR"
4	Prior Patient ID - External	CX	250	O	
5	Prior Visit Number	CX	250	O	
6	Prior Alternate Visit ID	CX	250	O	
7	Prior Patient Name	XPN	250	O	Family Name^Given Name^Middle Initial^Suffix^Prefix^Degree

ORC – Common Order

ORC	Field Name	Data Type	Length	Req/ Opt	Comments
1	Order Control	ID	2	R	NW – New Order CA – Cancel Order OC – Order Canceled DC – Discontinue Order OD – Order Discontinued SC – Status Change
5	Order Status	ID	2	O	This is an enumerated field that is utilized to update the order for Status Change messages (when ORC-1 is not equal to NW). Mappings are supported for: <i>Canceled</i> <i>Completed</i> <i>Discontinued</i> <i>In Process Scheduled</i> <i>In Process Unspecified</i> <i>Not Found</i> <i>On Hold</i> <i>Replaced</i> <i>Some Results Available</i> ASCEND CV will update the study start date and time when it receives an In Process message. ASCEND CV will record the stop date and time when it receives a Completed message.
9	Date/Time of Transaction	TS	26	O	Date and time this order action occurred YYYYMMDDMMSS

ORC	Field Name	Data Type	Length	Req/ Opt	Comments
12	Ordering Provider	XCN	250	C	<p>ID^Last Name^First Name^Middle^FamilySuffix^^Professional Suffix^^NPI</p> <p>If ORC-12 is blank, ASCEND CV will use ORC-16.</p> <p>ASCEND CV expects the National Provider ID in 12.1, therefore this sub field is limited to 10 characters. "NPI" must be in 12.9 or 12.13 Note: Professional Suffix (ex. MD, RN, etc) must be in subfield 7.</p>

OBR – Observation/Request

OBR	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	4	O	"1"
2	Placer Order Number	EI	22	O	Identical to ORC-2
4	Universal Service ID	CE	250	R	Code^Description
16	Ordering Provider	XCN	250	C	<p>ID^Last Name^First Name^Middle^FamilySuffix^^Professional Suffix^^NPI</p> <p>If ORC-12 is blank, ASCEND CV will use ORC-16.</p> <p>ASCEND CV expects the National Provider ID in 16.1, therefore this sub field is limited to 10 characters. "NPI" must be in 16.9 or 16.13 Note: Professional Suffix (ex. MD, RN, etc) must be in subfield 7.</p>
20	Filler field 1	ST	60	R	<p>Accession Number^</p> <p>Note: This accession number should match that of DICOM</p>

OBR	Field Name	Data Type	Length	Req/ Opt	Comments
					study/exam data in the image store (e.g. PACS, VNA) when applicable. Example: 00000CV180000298
27.4	Quantity/Timing	TS	26	C	^^^Start Date/Time^Priority YYYYMMDDMMSS
27.6	Priority	ID	26	O	^^^Start Date/Time^Priority This is an enumerated field. Mappings are supported for: <i>As needed</i> <i>ASAP</i> <i>Call Back</i> <i>Preop</i> <i>Routine</i> <i>Stat</i> <i>Timing critical</i>
31.2	Reason for Study	CE	300	O	Identifier^Text

AL1 – Patient Allergy Information

AL1	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	4	R	
3.1	Allergen Description Identifier	ST	20	O	
3.2	Allergen Description Text	ST	199	O	

DG1 – Diagnosis

DG1	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	4	R	
3.1	Diagnosis Code Identifier	ST	20	O	
3.2	Diagnosis Code Text	ST	199	O	

Enumerations/Mappings

Instructions

Please complete the Alias column with the code that will be sent to ASCEND CV in the HL7 message. Please complete the Description column with the description from the sending system (will not necessarily be sent in the message but used for ASCEND information.) Each alias must be a unique value, you may not use the same value twice in the Alias column. You may add more than one alias separated by a comma. If the value is not used in the sending system, please indicate that the value is NOT USED.

Admission Status/Patient Class (PV1-2)

ASCEND CV Value	Alias	Description
Commercial Account		
Emergency		
Inpatient		
Not Applicable		
Observation		
Obstetrics		
Outpatient		
Preadmit		
Recurring Patient		
Unknown		

Death Indicator (PID-30)

ASCEND CV Value	Alias	Description
Alive		
Deceased		

Ethnicity (PID-22)

ASCEND CV Value	Alias	Description
Hispanic or Latino		
Mediterranean		
Middle Eastern		
Not Hispanic or Latino		
Unknown		

Patient Gender (PID-8)

ASCEND CV Value	Alias	Description
Ambiguous		
Female		
Male		
Not Applicable		
Other		
Unknown		

Marital Status (PID-16)

ASCEND CV Value	Alias	Description
Annulled		
Common Law		
Divorced		
Domestic Partner		
Interlocutory		
Legally Separated		
Living Together		
Married		
Other		
Registered Domestic Partner		

ASCEND CV Value	Alias	Description
Separated		
Single		
Unknown		
Unmarried		
Unreported		
Widowed		

Order Status (ORC-5)

This value is used by ASCEND CV when ORC-1 is equal to "SC" (status change).

ASCEND CV Value	Alias	Description
Completed		
In Process Scheduled		
On Hold		
Replaced		

Race (PID-10)

ASCEND CV Value	Alias	Description
Asian		
Black		
Native American		
Other Race		
Pacific Islander		
White		

Urgency/Priority (OBR 27.6)

ASCEND CV Value	Alias	Description
As Needed		
ASAP		

ASCEND CV Value	Alias	Description
Call Back		
PreOp		
Routine		
STAT		
Timing Critical		

Facilities

Please indicate the facilities and the associated information.

Facility Name	Street address, City, State, Zip	Value from PID-3.4 (MRN Authority)	Value from PV1-3.4 (Facility Identifier)

Qualification

Prerequisite activities

- Obtain sample messages of each type
- Ensure enumerations are mapped
- Ensure required segments are present
- Ensure required fields are present
- Ensure field length limits are observed
- Ensure filtering is in place

Order Testing

1. Create an order for each USID. Ensure each flows to ACV.
2. Set an order to In Process. Ensure the study start time is updated in ACV.
3. Set an order to Completed. Ensure the study start and stop time are correct in ACV.
4. Cancel an order. Ensure the order appears canceled in ACV.
5. Discontinue an order. Ensure the order appears discontinued in ACV.
6. Replace an order. Ensure that the new order information appears in ACV.

ADT Testing

1. Using one of the patients from the Order Testing, update demographic information to produce an A08. Ensure the demographic updates appear in ACV.

Note: Demographic fields that will be updated by the interface are:

- Patient name
 - DOB
 - Gender
 - Race
 - Patient address
 - Home phone
 - Work phone
 - Language
 - Marital status
 - SSN
 - Ethnic group
 - Death indicator and date
2. Using a patient that has no active visit but has had a previous order, update demographic information to produce an A31. Ensure the demographic updates appear in ACV.
 3. Choose two patients that were successfully stored in ACV. Combine the two patients to produce an A34. Ensure the patients are combined and the active MRN matches in both the sending system and ACV.
 4. Choose a patient that was successfully stored in ACV that has two medical record numbers. Move an encounter from one MRN to the other to produce an A35. Ensure the encounter exists on the correct MRN in ACV, and the old encounter number is inactive.
 5. Choose a patient that was successfully stored in ACV that has two medical record numbers. Move an encounter from one MRN to the other to produce an A44. Ensure the encounter exists on the correct MRN in ACV, and the old encounter number is active.



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