

ASCEND CV Outbound HL7 Specification

ASCEND CV Version 8.0

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Table of Contents

Introduction	3
Purpose of this Document	3
Definitions and Acronyms	3
About ASCEND CV	4
HL7 Messaging	5
Implementation	5
Data Types	6
Outbound ORU Specification	7
Supported Segments	7
Example Message	7
Field Detail by Segment	7
MSH – Message Header	8
PID – Patient Identifier	9
PV1 – Patient Visit	9
OBR – Observation/Request	10
OBX – Observation/Result [Optional] Embedded Document	11
Outbound Status Change ORM Specification	12
Supported Segments	12
Example Message	12
Field Detail by Segment	12
MSH – Message Header	13
PID – Patient Identifier	14
PV1 – Patient Visit	14
ORC – Common order segment	15
OBR – Observation/Request	15
OBX – Observation/Result - Case Status	16
OBX – Observation/Result [Optional] - Study Status	17
Split Cath Case Statuses	18
Split Echo Stress Case Statuses	20
Split Nuclear Stress Case Statuses	23

Introduction

Purpose of this Document

This document describes ASCEND HIT's Cardiovascular Reporting (ASCEND CV®) technical interface specifications regarding the transmission of unidirectional outbound HL7 messages in the Unsolicited Result ORU message format. ORU messages transmit the finalized result from the ASCEND system as well as patient information to the Hospital Information System (HIS). 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/).

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

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.
HIS	Hospital Information System.
HL7	Health Level 7, the healthcare interface standard.

Term	Definition
MRN	Medical Record Number, a unique identifier for each patient. A patient can have multiple medical record numbers, each allocated by a different signing authority, as well as a community medical record number.
NPI	National Provider Identifier, a unique 10-digit identification number for health care providers required by HIPAA
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.

About ASCEND CV

ASCEND CV, part of the ASCEND HIT application suite, is a mechanism for creating and completing structured reports for the cardiovascular department. ASCEND CV provides a user-friendly, efficient, and intelligent interface for clinicians to record measurements, findings, and conclusions related to a patient case.

Integration with the hospital information system is a feature of ASCEND CV. ASCEND CV's integration engine accepts ORM and select ADT messages from the hospital system, as well as other data from various cardiovascular imagining and physiological devices, and processes the pertinent patient demographic and clinical order information. ASCEND CV can also produce outbound ORU and status change ORM messages to deliver cardiovascular reports and results to the hospital system.

HL7 Messaging

The HL7 interface will follow the standard message acknowledgement protocol. An acknowledgement message ACK/NAK should be sent back from the Hospital Information System to acknowledge the receipt of the ORU message.

The HL7 message is enclosed by special characters that form a standard LLP/MLLP message block around the HL7 message data. HL7 message data is positioned after the **Start of block character**. **End of block character** and **End of data character** are positioned after the HL7 message data. The expected framing characters are as follows:

Description	Hex Code	Decimal Code
Start of block character	ОВ	11
HL7 message data		
End of block character	1C	28
End of data character	0D	13

Implementation

ASCEND CV will transmit ORU messages on various ASCEND CV study state transition events. This includes preliminary, preliminary revision, final, and amended, amendment revision, and addendum added status reports.

An ASCEND report can be included within an OBX segment. In this case, a signed report document PDF is encoded as a Base 64 ASCII string and passed in an encapsulated data field within the OBX

ASCEND CV can also be configured not to send any Observation Result OBX segment if the desire is to only transmit report status in the Order Detail OBR segment, without providing the report document via HL7.

Data Types

Code	Value		
CE	Coded Element		
CX	Extended Composite ID		
EI	Entity Identifier		
ED	Encapsulated Data		
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		

Outbound ORU Specification

Supported Segments

The HL7 ORU segments contain logical groups of information such as patient information, patient provider information, and order information. The following table lists the segments for each message type that are populated by ASCEND CV.

Key BOLD = Required	[] = Optional	{ } = Repeating	
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ORU	MSH	Message Header			
	PID	Patient Identification			
	PV1	Patient Visit			
	OBR	Order Detail			
	ОВХ	Observation/Result			

Example Message

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 Character	ST	4	R	"^" – Component Separator
	Character				"~" – Repetition Separator
					"\" – Escape Character
					"&" – Sub-Component Separator
3	Sending Application	HD	20	R	"ASCEND CV"
4	Sending Facility	HD	20	R	Client Specific
					Defaults to "Not Specified"
5	Receiving	HD	20	R	Client Specific
	Application				Defaults to "Not Specified"
6	Receiving Facility	HD	20	R	Client Specific
					Defaults to "Not Specified"
7	Date/Time of Message	TS	26	R	YYYYMMDDHHMMSS
9	Message Type/Event Type	MSG		R	"ORU^R01"
10	Message Control	ST	20	R	Unique Message ID
11	Processing ID	PT	1	R	"T" – Test System
					"P" – Production System
12	Version ID	VID	5	R	"2.3"
15	Accept Acknowledgment Type	ST	2	R	"AL"

PID – Patient Identifier

PID	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	0	"1"
3	Patient ID List	СХ	250	R	ID^^^Authority^Type~ ID^^^Authority^Type List of all patient identifers
5	Patient Name	XPN	250	R	Family Name^Given Name^Middle Name^Family Suffix
7	Date of Birth	TS	26	0	YYYYMMDD
8	Patient Gender	ID	1	0	Set as the value received by ASCEND in the initial ORM message
10	Race	ID	250	0	Set as the value received by ASCEND in the initial ORM message
18	Patient Account Number	CX	250	0	Unique number assigned to the patient visit
19	Social Security Number	ST	16	0	Patient social security number

PV1 – Patient Visit

PV1	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	0	"1"
2	Patient Class	ID	1	R	Value ASCEND received in PV1:2. Expected values include: "I" = Inpatient "O" = Outpatient
3	Patient Location	PL	80	R	Nursing Station^Room^Bed^Facility PV1-3-4 populated with facility identifier
7	Attending Physician	XCN	250	0	NPI^Last^First^Middle^Family suffix Participant may have been changed in ASCEND

PV1	Field Name	Data Type	Length	Req/ Opt	Comments
8	Referring Physician	XCN	250	0	NPI^Last^First^Middle^Family suffix Participant may have been changed in ASCEND
17	Admitting Physician	XCN	250	0	NPI^Last^First^Middle^Family suffix Participant may have been changed in ASCEND
18	Patient Type	СХ	250	0	"O" – Outpatient "I" – Inpatient "OBV" – Observation
44	Admit Date	TS	26	0	YYYYMMDDHHMMSS

OBR – Observation/Request

OBR	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	4	0	"1"
2	Placer Order Number	EI	22	0	Placer order number
3	Filler Order Number	EI	22	0	Set as the value received by ASCEND in the initial ORM message
4	Universal Service ID	CE	250	R	Code^Text Description Set as the value received by ASCEND in the initial ORM message
7	Observation Date/Time	TS	26	0	First signature timestamp (Can be a preliminary signature) YYYYMMDDHHMMSS
13	Relevant Clinical Info	ST	300	0	"Interventional" for interventional report "Diagnostic" for diagnostic report <empty> for single physician report</empty>
16	Ordering Provider	XCN	250	0	NPI^Last Name^First ^Middle Participant may have been changed in ASCEND

OBR	Field Name	Data Type	Length	Req/ Opt	Comments
20.1	Filler Field 1	ST	60	0	Accession/Order Number
22	Results Rpt / Status Change – Date/Time	TS	26	0	Most recent signature or amendment timestamp YYYYMMDDHHMMSS
25	Results Status	ST	1	R	"P" – Preliminary "P" – Preliminary revision "F" – Signed "C" – Amended "A" – Addendum added "A" – Amendment revision
32.1	Principal Result Interpreter	XCN	250	0	NPI&Last&First&Middle&Family suffix Participant may have been changed in ASCEND

OBX – Observation/Result [Optional] Embedded Document

ОВХ	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	R	Counter, begin at 1. Increment sequentially for repeating segments.
2	Value Type	ID	2	R	"ED" - Embedded Document
5	Observation Value	ST	250	R	^APPLICATION^PDF^BASE64^ <base64 document="" encoded="" pdf=""></base64>
11	Results Status	ST	1	R	"P" – Preliminary "P" – Preliminary revision "F" – Signed "C" – Amended "A" – Addendum added "A" – Amendment revision

Outbound Status Change ORM Specification

Supported Segments

The HL7 ORU segments contain logical groups of information such as patient information, patient provider information, and order information. The following table lists the segments for each message type that are populated by ASCEND CV.

ORU	MSH	Message Header	
	PID	Patient Identification	
	PV1	Patient Visit	
	ORC	Common order	
	OBR	Observation request	
	ОВХ	Observation/Result	
	ORC OBR	Common order Observation request	

Example Message

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 Character	ST	4	R	"^" – Component Separator
	onaracte.				"~" – Repetition Separator
					"\" – Escape Character
					"&" – Sub-Component Separator
3	Sending Application	HD	20	R	"ASCEND CV"
4	Sending Facility	HD	20	R	Client Specific
					Defaults to "Not Specified"
5	Receiving	HD	20	R	Client Specific
	Application				Defaults to "Not Specified"
6	Receiving Facility	HD	20	R	Client Specific
					Defaults to "Not Specified"
7	Date/Time of Message	TS	26	R	YYYYMMDDHHMMSS
9	Message Type/Event Type	MSG		R	"ORM^O01"
10	Message Control	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	"2.3"
15	Accept Acknowledgment Type	ST	2	R	"AL"

PID – Patient Identifier

PID	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	0	"1"
3	Patient ID List	СХ	250	R	ID^^^Authority^Type~ ID^^^Authority^Type List of all patient identifers
5	Patient Name	XPN	250	R	Family Name^Given Name^Middle Name^Family Suffix
7	Date of Birth	TS	26	0	YYYYMMDD
8	Patient Gender	ID	1	0	Set as the value received by ASCEND in the initial ORM message
10	Race	ID	250	0	Set as the value received by ASCEND in the initial ORM message
18	Patient Account Number	CX	250	0	Unique number assigned to the patient visit
19	Social Security Number	ST	16	0	Patient social security number

PV1 – Patient Visit

PV1	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	0	"1"
2	Patient Class	ID	1	R	Value ASCEND received from order in PV1:2. Expected values include: "I" = Inpatient "O" = Outpatient
3	Patient Location	PL	80	R	Nursing Station^Room^Bed^Facility PV1-3-4 populated with facility identifier
7	Attending Physician	XCN	250	0	NPI^Last^First^Middle^Family suffix Participant may have been changed in ASCEND

PV1	Field Name	Data Type	Length	Req/ Opt	Comments
8	Referring Physician	XCN	250	0	NPI^Last^First^Middle^Family suffix Participant may have been changed in ASCEND
17	Admitting Physician	XCN	250	0	NPI^Last^First^Middle^Family suffix Participant may have been changed in ASCEND
18	Patient Type	СХ	250	0	"O" – Outpatient "I" – Inpatient "OBV" – Observation
44	Admit Date	TS	26	0	YYYYMMDDHHMMSS

ORC – Common order segment

ORC	Field Name	Data Type	Length	Req/ Opt	Comments
1	Order Control	ID	2	R	"SC"
5	Order Status	ID	2	0	Set as the value received by ASCEND in the initial ORM message
9	Date/Time of Transaction	TS	26	0	YYYYMMDDMMSS

OBR – Observation/Request

OBR	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	4	0	"1"
2	Placer Order Number	EI	22	0	Placer order numer
3	Filler Order Number	EI	22	0	Set as the value received by ASCEND in the initial ORM message

OBR	Field Name	Data Type	Length	Req/ Opt	Comments
4	Universal Service ID	CE	250	R	Code^Text Description Set as the value received by ASCEND in the initial ORM message
7	Observation Date/Time	TS	26	0	Date and time this outbound event was created. YYYYMMDDMMSS
13	Relevant Clinical Info	ST	300	0	"Interventional" for interventional report "Diagnostic" for diagnostic report <empty> for single physician report</empty>
16	Ordering Provider	XCN	250	0	NPI^Last Name^First ^Middle Participant may have been changed in ASCEND
20.1	Filler Field 1	ST	60	0	Accession/Order Number
22	Results Rpt / Status Change – Date/Time	TS	26	0	Date and time this outbound event was created. YYYYMMDDMMSS
25	Results Status	ST	1	R	"P" – Preliminary "P" – Preliminary revision "F" – Signed "C" – Amended "A" – Addendum added "A" – Amendment revision
32.1	Principal Result Interpreter	XCN	250	0	NPI&Last&First&Middle&Family suffix

OBX – Observation/Result - Case Status

ОВХ	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	R	Counter, begin at 1 for first OBX segment. Increment sequentially for repeating segments.
2	Value Type	ID	2	R	"ST" - Embedded Document

ОВХ	Field Name	Data Type	Length	Req/ Opt	Comments
3	Observation Identifier	ST	20	0	"Case Status" Identifies OBX segment as a Case Status observation
5	Observation Value	ST	250	R	Case Status The following values are possible outputs In progress" To be read" For overread" Preliminary" Signed" In revision" Amended"
14	Date/Time of the Observation	TS	26	0	Date and time this state transition occurred.

OBX - Observation/Result [Optional] - Study Status

For cases with multiple studies, a study status OBX will be included for each case study.

ОВХ	Field Name	Data Type	Length	Req/ Opt	Comments
1	Set ID	SI	1	R	Counter, begin at 1 for first OBX segment. Increment sequentially for repeating segments.
2	Value Type	ID	2	R	"ST" - Embedded Document
3	Observation Identifier	ST	20	0	Study status type identifier The following values are possible outputs • Diagnostic Study Status • Interventional Study Status • Stress ECG Study Status • Stress Imaging Study Status
5	Observation Value	ST	250	R	Study Status The following values are possible outputs • "In progress"

ОВХ	Field Name	Data Type	Length	Req/ Opt	Comments
					 "To be read" "For overread" "Preliminary" "Signed" "In revision" "Amended"

Split Cath Case Statuses

When a status change occurs on a case with multiple studies, the case status OBX value will be dependant on the status of all studies in the case. The tables that follow specify how case statuses are derived based on case study statuses.

Diagnostic Study Status	Interventional Study Status	Case Study Status
New	New	None (No message sent)
New	In progress	In progress
New	To be read	To be read
New	For overread	For overread
New	Preliminary	Preliminary
New	Signed	In progress
New	In revision	In revision
New	Amended	Amended
In progress	New	In progress
In progress	In progress	In progress
In progress	To be read	To be read
In progress	For overread	For overread
In progress	Preliminary	Preliminary
In progress	Signed	In progress
In progress	In revision	In revision
In progress	Amended	Amended
To be read	New	To be read

Diagnostic Study Status	Interventional Study Status	Case Study Status
To be read	In progress	To be read
To be read	To be read	To be read
To be read	For overread	For overread
To be read	Preliminary	Preliminary
To be read	Signed	To be read
To be read	In revision	In revision
To be read	Amended	Amended
For overread	New	For overread
For overread	In progress	For overread
For overread	To be read	For overread
For overread	For overread	For overread
For overread	Preliminary	Preliminary
For overread	Signed	For overread
For overread	In revision	In revision
For overread	Amended	Amended
Preliminary	New	Preliminary
Preliminary	In progress	Preliminary
Preliminary	To be read	Preliminary
Preliminary	For overread	Preliminary
Preliminary	Preliminary	Preliminary
Preliminary	Signed	Preliminary
Preliminary	In revision	In revision
Preliminary	Amended	Amended
Signed	New	In progress
Signed	In progress	In progress
Signed	To be read	To be read
Signed	For overread	For overread
Signed	Preliminary	Preliminary

Diagnostic Study Status	Interventional Study Status	Case Study Status
Signed	Signed	Signed
Signed	In revision	In revision
Signed	Amended	Amended
In revision	New	In revision
In revision	In progress	In revision
In revision	To be read	In revision
In revision	For overread	In revision
In revision	Preliminary	In revision
In revision	Signed	In revision
In revision	In revision	In revision
In revision	Amended	In revision
Amended	New	Amended
Amended	In progress	Amended
Amended	To be read	Amended
Amended	For overread	Amended
Amended	Preliminary	Amended
Amended	Signed	Amended
Amended	In revision	In revision
Amended	Amended	Amended

Split Echo Stress Case Statuses

When a status change occurs on a case with multiple studies, the case status OBX value will be dependent on the status of all studies in the case. The tables that follow specify how case statuses are derived based on case study statuses.

ECG Study Status	Imaging Study Status	Case Study Status
New	New	None (No message sent)
New	In progress	In progress
New	To be read	To be read

ECG Study Status	Imaging Study Status	Case Study Status
New	For overread	For overread
New	Preliminary	Preliminary
New	Signed	None (No message sent)
New	In revision	None (No message sent)
New	Amended	None (No message sent)
In progress	New	In progress
In progress	In progress	In progress
In progress	To be read	To be read
In progress	For overread	For overread
In progress	Preliminary	Preliminary
In progress	Signed	None (No message sent)
In progress	In revision	None (No message sent)
In progress	Amended	None (No message sent)
To be read	New	In progress
To be read	In progress	In progress
To be read	To be read	To be read
To be read	For overread	For overread
To be read	Preliminary	Preliminary
To be read	Signed	None (No message sent)
To be read	In revision	None (No message sent)
To be read	Amended	None (No message sent)
For overread	New	In progress
For overread	In progress	In progress
For overread	To be read	To be read
For overread	For overread	For overread
For overread	Preliminary	Preliminary
For overread	Signed	None (No message sent)
For overread	In revision	None (No message sent)

ECG Study Status	Imaging Study Status	Case Study Status
For overread	Amended	None (No message sent)
Preliminary	New	In progress
Preliminary	In progress	In progress
Preliminary	To be read	To be read
Preliminary	For overread	For overread
Preliminary	Preliminary	Preliminary
Preliminary	Signed	None (No message sent)
Preliminary	In revision	None (No message sent)
Preliminary	Amended	None (No message sent)
Signed	New	In progress
Signed	In progress	In progress
Signed	To be read	To be read
Signed	For overread	For overread
Signed	Preliminary	Preliminary
Signed	Signed	Signed
Signed	In revision	In revision
Signed	Amended	Amended
In revision	New	In progress
In revision	In progress	In progress
In revision	To be read	To be read
In revision	For overread	For overread
In revision	Preliminary	Preliminary
In revision	Signed	Signed
In revision	In revision	In revision
In revision	Amended	Amended
Amended	New	In progress
Amended	In progress	In progress
Amended	To be read	To be read

ECG Study Status	Imaging Study Status	Case Study Status
Amended	For overread	For overread
Amended	Preliminary	Preliminary
Amended	Signed	Signed
Amended	In revision	In revision
Amended	Amended	Amended

Split Nuclear Stress Case Statuses

When a status change occurs on a case with multiple studies, the case status OBX value will be dependent on the status of all studies in the case. The tables that follow specify how case statuses are derived based on case study statuses.

ECG Study Status	Imaging Study Status	Case Study Status
New	New	None (No message sent)
New	In progress	In progress
New	To be read	To be read
New	For overread	For overread
New	Preliminary	Preliminary
New	Signed	None (No message sent)
New	In revision	None (No message sent)
New	Amended	None (No message sent)
In progress	New	In progress
In progress	In progress	In progress
In progress	To be read	To be read
In progress	For overread	For overread
In progress	Preliminary	Preliminary
In progress	Signed	None (No message sent)
In progress	In revision	None (No message sent)
In progress	Amended	None (No message sent)
To be read	New	In progress

ECG Study Status	Imaging Study Status	Case Study Status
To be read	In progress	In progress
To be read	To be read	To be read
To be read	For overread	For overread
To be read	Preliminary	Preliminary
To be read	Signed	None (No message sent)
To be read	In revision	None (No message sent)
To be read	Amended	None (No message sent)
For overread	New	In progress
For overread	In progress	In progress
For overread	To be read	To be read
For overread	For overread	For overread
For overread	Preliminary	Preliminary
For overread	Signed	None (No message sent)
For overread	In revision	None (No message sent)
For overread	Amended	None (No message sent)
Preliminary	New	In progress
Preliminary	In progress	In progress
Preliminary	To be read	To be read
Preliminary	For overread	For overread
Preliminary	Preliminary	Preliminary
Preliminary	Signed	None (No message sent)
Preliminary	In revision	None (No message sent)
Preliminary	Amended	None (No message sent)
Signed	New	In progress
Signed	In progress	In progress
Signed	To be read	To be read
Signed	For overread	For overread
Signed	Preliminary	Preliminary

ECG Study Status	Imaging Study Status	Case Study Status
Signed	Signed	Signed
Signed	In revision	In revision
Signed	Amended	Amended
In revision	New	In progress
In revision	In progress	In progress
In revision	To be read	To be read
In revision	For overread	For overread
In revision	Preliminary	Preliminary
In revision	Signed	Signed
In revision	In revision	In revision
In revision	Amended	Amended
Amended	New	In progress
Amended	In progress	In progress
Amended	To be read	To be read
Amended	For overread	For overread
Amended	Preliminary	Preliminary
Amended	Signed	Signed
Amended	In revision	In revision
Amended	Amended	Amended



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