



## HL7 Lab Results API Developer Guide – 2.5.1

Quickly and easily connect your Laboratory Information System (LIS) with Practice Fusion's Electronic Health Record (EHR) System

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## Practice Fusion 2.5.1 Result Overview

This document describes how to integrate with Practice Fusion’s Electronic Health Record (EHR) system by submitting version 2.5.1 Observation Result – Unsolicited messages that contain laboratory results data to the Practice Fusion API.

This section presents a high-level overview of the Practice Fusion 2.5.1 result implementation and how this integration project might differ from other integration projects.

The Practice Fusion Lab Results API strictly adheres to the HL7 version 2.5.1 Implementation Guide: S&I Framework Lab Results Interface, Release 1- US Realm. You can retrieve a copy of this guide here:

[http://www.hl7.org/implement/standards/product\\_brief.cfm?product\\_id=279](http://www.hl7.org/implement/standards/product_brief.cfm?product_id=279)

### Result Workflow

Security validation is first performed against the API credentials used to send the result to the Practice Fusion API. After successful validation, the result is routed to the correct EHR account based on the MSH-6 value. Once the result has been routed to an account, it is assigned to a provider based on the provider information in the ORC-12 and OBR-16 fields and assigned to a patient’s chart based on information in the PID segment.

The results are then available to be viewed in the “Tasks” section or within the patient’s chart.

Solicited and unsolicited results are handled in the same manner within the Practice Fusion EHR. Results and orders are housed separately within both the “Tasks” section and the patient “Charts” section. This allows for test results from multiple orders to be grouped together in one result report or tests from a single order to be sent in individual result reports.

### Order Numbers

HL7 messages are grouped in the EHR based on the order and accession values (OBR-2 and OBR-3, respectively).

If separate HL7 messages are sent with identical OBR-2 values but unique OBR-3 accession values, the results will appear as separate result reports in the EHR.

If a single HL7 message contains multiple order groups, each with a different OBR-2 and OBR-3 value, only the order and accession number in the first OBR segment will be displayed at the top of the report and all results will be displayed in the same report.

If separate HL7 messages are sent with identical OBR-2 and OBR-3 values, the results will be grouped together in the same result report in the EHR.

Please note that version 2.5.1 requires ORC-2 and OBR-2 to be identical and ORC-3 and OBR-3 to be identical.

### LOINC

The Practice Fusion Results API works with test codes based upon the LOINC Common Lab Orders Value Set 2.27 standard or higher. All incoming results are expected to be primarily coded using LOINC, and optionally coded with custom identifiers. More information about LOINC can be found at [www.loinc.org](http://www.loinc.org)

Including LOINC codes provides tremendous value to providers as it allows lab values to be trended in patient flowsheets and ultimately enables better patient care through quality data. Furthermore LOINC codes are necessary for providers to meet certain government incentive program criteria.

LOINC codes should be populated in OBX-3 in the following format: <Observation ID> ^ <Observation Name> ^ <Coding System>

*Example: 3016-3^Thyrotropin:ACnc:Pt:Ser/Plas:Qn^LN*

## Embedded Attachments

Embedded PDFs can be included in HL7 result message. The base64 encoded PDF string must be included in an OBX segment in the following format:

```
OBX|1|ED|PDF^PDFName||^AP^^Base64^[base64 encoded PDF strain]|||||F|||20120816122332|||||||Performing  
Lab|1234 Any Street^Any Town^CA^94102
```

Please note that the PDF must be sent in the last order group of the message.

The attachment will be available for the provider to save or print. The value populated in OBX-3.2 will be displayed in the EHR as the attachment name.

## URLs

A URL can be included in the result if there is a link the provider should be directed to open. The URL must be sent in the NTE-3 field of an NTE segment. The hyperlink will display in the Notes section of the test or observation depending on whether the NTE is placed after the OBR or OBX segment.

## Provider Matching

Practice Fusion strongly recommends including the NPI in ORC-12.1 and OBR-16.1. Provider matching is performed against the OBR-16 field. If the NPI is included in OBR-16.1 and matches the NPI configured in the provider's user profile, then the result will automatically be matched even if there is a discrepancy with the provider's name (i.e. Dan instead of Daniel). Version 2.5.1 requires that ORC-12 and OBR-16 match exactly, so the NPI should also be included ORC-12.1.

Although it is strongly recommended that the NPI is included, if it is not then provider matching is performed on the provider's name in OBR-16.2 and OBR-16.3.

In the event that an exact provider match is not located, the result will be "unassigned" and can be manually assigned by the appropriate provider.

## Patient Matching

Patient matching is performed against the PID-5 (Name), PID-7 (Date of Birth), and PID-8 (Gender) fields. In the event that multiple patients have the same name and date of birth, the provider will be required to manually assign the result to the correct patient chart.

## OBX-5 Observation Value Character Limit

A maximum of 8,000 characters can be sent in the OBX-5 field. This is primarily applicable if textual report information will be sent in an OBX segment.

## Notes

Note (NTE) segments can be associated with the following segments:

- The Patient Identification (PID) segment, where the note applies to the entire lab result
- The OBR segment, where the note applies to all observations related to that panel or test
- The OBX segment, where the note applies to only that one observation

## Sample Messages

This section contains a sample messages that conforms to the Practice Fusion ORU\_R01 message specification.

### Sample result file

```
MSH|^~\&||VendorCode||accountID|20160205022300||ORU^R01^ORU_R01|msgcontro  
lID|P|2.5.1||AL|AL||||LRI_NG_RN_Profile^^2.16.840.1.113883.9.20^ISO  
PID|1||PATID1234^^^MR||Patient^Carol^Middle||F|  
ORC|CA|Placer1234|Filler56789||||||12345678923^Provider^Stephanie  
OBR|1|Placer1234|Filler56789|57021-8^CBC W Auto Differential panel in  
Blood^LN^^^^^CBC W Auto Differential panel in Blood  
|||ObservationDate/Time||||||12345678923^Provider^Stephanie  
||||ResultReportedDate/Time|||ResultStatus(From HL7 table 0123)  
OBX|1|NM|718-7^Hemoglobin [Mass/volume] in Blood^LN^^^^^Hemoglobin  
[Mass/volume] in Blood||5.5|mEq/L|2.5-  
5.3|H|||Status|||20120816122332||||||Performing Lab|1234 Any  
Street^Any Town^CA^94102  
OBX|2|ED|PDF^PDF|^AP^^Base64^[base64 encoded PDF  
strain]|||||F|||20120816122332||||||Performing Lab|1234 Any  
Street^Any Town^CA^94102
```

# ORU\_R01 Detailed Segment Definitions

This section of the document provides detailed information about the segments in the ORU\_R01 message. Each item in the following bulleted list links to the section that describes the identified segment:

- Message Header (MSH) ..... 9
- Patient Identification (PID) ..... 13
- Order Common (ORC) ..... 15
- Observation Request (OBR) ..... 17
- Observation Result (OBX)..... 22
- Note (NTE) ..... 27
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Each subsection provides a brief description of the segment and an example of the data it might contain in a valid message. The fields of each segment are detailed in a table with eight columns. When a field should contain values from a table identified by HL7 and the number of values is manageable, those values are included for convenience.

The segment definitions are truncated after all fields used by Practice Fusion have been defined. For more information about data types or code sets, please see the HL7 version 2.5.1 Implementation Guide: S&I Framework Lab Results Interface, Release 1- US Realm:  
[http://www.hl7.org/implement/standards/product\\_brief.cfm?product\\_id=279](http://www.hl7.org/implement/standards/product_brief.cfm?product_id=279)

**Table 1: Field Information**

Column Name	Contents
Seq	Contains the sequence number of the field within the message.
Name	Contains the name of the field.
Value	Contains the value that <i>must</i> appear in the field (such as ORU^R01 for the “Message Type” field) or that <i>might</i> appear in the field (such as an example value for a date field that will not always contain the same value), as well as rules that must be applied to the data.  Hard-coded or example values are formatted in Courier font to make them easy to identify from surrounding text.
Type	Identifies the data type of the field. For detailed information about each data type, see Data Types in the appendix.
Req’d	Identifies whether the field is required, optional, or required in certain conditions. For detailed information about each possible value, see Requiredness in the appendix. The value in this column is linked to its definition in the appendix.

Column Name	Contents
Card	Identifies the cardinality of the field. For detailed information about each possible cardinality state, see Cardinality in the appendix.
Used?	Indicates whether or not the field is used at all in the business logic of Practice Fusion.
Disp?	Indicates whether or not the field is displayed in the Practice Fusion application; some fields might be used in the logic layer, but never displayed in the presentation layer.



## Message Header (MSH)

The MSH segment is the first segment in every HL7 message, and defines the message’s source, purpose, destination, and certain syntax specifics such as the delimiters and character sets used in the message.

The MSH segment is required and may only appear once. Required fields are highlighted in gray.

```
MSH|^~\&||VendorCode||accountID|20160205022300||ORU^R01^ORU_R01|msgcontrolID|P|
2.5.1||AL|AL||||LRI_NG_RN_Profile^^2.16.840.1.113883.9.20^ISO
```

Practice Fusion-specific requirements:

1. The MSH-4 sending facility must be hardcoded with the Practice Fusion vendor code associated with your lab. Your implementation specialist will provide you with this code.
2. The MSH-6 field must be populated with the account ID associated with the practice/provider for which the results is intended.
3. The Message Profile Identifier field (MSH-21) should be populated with “LRI\_NG\_RN\_Profile^^2.16.840.1.113883.9.20^ISO”.

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
MSH-0	Segment identifier	MSH	ST	R	1..1	Y	N
MSH-1	Field separator	(the “pipe” character)	ST	R	1..1	Y	N
MSH-2	Encoding characters	^~\&	ST	R	1..1	Y	N
MSH-3	Sending application	Identifies your application Example: LaboratoryInformationSystemName	Varies	O	0..1	N	N
MSH-4	Sending facility	Practice Fusion specific code unique to each partner  Hardcode the value provided by your Practice Fusion implementation specialist in this field	HD	R	1..1	N	N
MSH-5	Receiving application	Identifies Practice Fusion as the destination  Example: Practice Fusion	HD	O	0..1	N	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
MSH-6	Receiving facility	Identifies the healthcare organization for which the message is intended  Practice Fusion uses this field to route the result to the correct EHR account. NPI or a Practice ID is often used.  Example: 1234567893	HD	R	1..1	Y	Y
MSH-7	Message date and time	Identifies the date and time the message was created  Example: 20130205022300	TS_1	R	1..1	Y	Y
MSH-8	Security	Used in some implementations for security features	ST	O	0..1	N	N
MSH-9	Message type	Identifies message type ORU^R01^ORU_R01	MSG	R	1..1	Y	N
MSH-10	Message control ID	Contains the value the system uses to associate the message with the response to the message  Can be any alphanumeric string Example: UNX3ZMH5YAPHBL63SB3	ST	R	1..1	Y	N
MSH-11	Processing ID	P for "in production" D for "in debugging" T for "in training"	PT	R	1..1	Y	N
MSH-12	HL7 version	2.5.1	VID	R	1..1	Y	N
MSH-13	Sequence number	A non-null value in this field indicates that the sequence number protocol is in use	NM	O	0..1	N	N
MSH-14	Continuation pointer	Contains the value used by a system to associate a continuation message with the message that preceded it when the data of an unsolicited observation request must be split into multiple messages	ST	O	0..1	N	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
MSH-15	Accept acknowledgment type	AL to always require accept acknowledgement messages to be returned  NE to never require accept acknowledgements  SU to only require accept acknowledgements for successfully transmitted messages  ER to only require accept acknowledgements in the event of an error	ID	R	1..1	N	N
MSH-16	Application acknowledgment type	AL to always require application acknowledgements to be returned  NE to never require application acknowledgements to be returned  SU to require application acknowledgements to be returned only in response to successfully transmitted messages  ER to only require application acknowledgements in the event of an error	ID	R	1..1	N	N
MSH-17	Country code	HL7 recommends values from ISO table 3166  Example: US for “United States”	ID	O	0..1	N	N
MSH-18	Character set	Valid character set codes are defined in HL7 table 0211  Example: ASCII for the ASCII character set	ID	O	0..1	N	N
MSH-19	Principle language of message	HL7 recommends values from ISO table 639  Example: en for “English”	CE	O	0..1	N	N
MSH-20	Alternate Character Set Handling Scheme	This field can be left blank	ID	O	0..1	N	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
MSH-21	Message Profile Identifier	Identifies the results interface message profile  Populate with the following message profile:  LRI_NG_RN_Profile^2.16.840.1.113883.9.20^ISO	EI	R	1..1	Y	N

## Patient Identification (PID)

The PID segment is used by all applications as the primary means of communicating patient identification information. This segment contains identifying and demographic information about the patient that is not likely to change frequently.

The PID segment is required and may only appear once. Practice Fusion does not use any information after the PID-13 field, so the PID segment definition has been truncated after this field. Required fields are highlighted in gray.

```
PID|1||PATID1234^^^^MR||Patient^Carol^Middle|||F|
```

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
PID-0	Segment type ID	PID	SI	R	1..1	N	N
PID-1	Set ID	Sequence number. Constrained to "1"	SI	R	1..1	N	N
PID-2	Patient ID	Excluded for this implementation guide					
PID-3	Patient identifier list	Uniquely identifies the patient using values such as a medical record number, billing number, birth registry, and so forth  This does not necessarily have to match the Practice Fusion MRN.  Example: PATID1234^^^^MR	CX	R	1..*	N	N
PID-4	Alternate patient ID	Excluded for this implementation guide					
PID-5	Patient name	Patient's first, last, and middle name  Example: Patient^Carol^Middle	XPN	R	1..1	Y	Y
PID-6	Mother's maiden name	Maiden name of mother	XPN	O	0..1	N	N
PID-7	Patient date of birth	Used in patient matching  Example: 19520215	TS_2	O	0..1	Y	Y
PID-8	Patient gender	Valid gender codes are defined in HL7 table 0001  Example: M for "male"	IS	R	1..1	Y	Y

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
PID-9	Patient alias	Excluded for this implementation guide					
PID-10	Patient race	Valid race codes are defined in HL7 table 0005 Example: WH	CE	O	0..1	N	N
PID-11	Patient address	Example: 123 Any Grove^APT A1^Anytown^MD^12345^	XAD	O	0..1	Y	N
PID-12	Country code	Excluded for this implementation guide					
PID-13	Patient home phone number	Patient phone number Example: (555)555-5555	XTN	O	0..1	N	N

## Order Common (ORC)

The optional ORC segment identifies basic information about the order for testing of the specimen. This segment includes identifiers of the order, who placed the order, when it was placed, what action to take regarding the order, and so forth.

The ORC segment is not required, but if it is present, the minimum information needed for the segment to be valid are the ORC-0, ORC-1, and ORC-6 fields. The ORC segment definition is truncated after the ORC-6 field. Required fields are highlighted in gray.

```
ORC|CA|Placer1234|Filler56789|||||||12345678923^Provider^Stephanie
```

### Notes:

1. There must be a corresponding OBR segment for each ORC segment
2. ORC-2 (Placer Order Number) must be identical to OBR-2 (Placer Order Number)
3. ORC-3 (Filler Order Number) must be identical to OBR-3 (Filler Order Number)
4. ORC-12 (Ordering Provider) must be identical to OBR-16 (Ordering Provider)

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
ORC-0	Segment type	ORC	SI	R	1..1	N	N
ORC-1	Order control	Specifies the code in HL7 table 0119 that identifies the action to be taken for the order  Examples: NW for "new order or service request" CA for "cancel order or service request"	ID	R	1..1	N	N
ORC-2	Placer order number	Identifies the application requesting the order. If OBR-2 is populated, then this field is required to contain an identical value.  Example: 01220	EI	R	0..1	Y	Y
ORC-3	Filler order number	The order number of the application filling the order.  This value must be identical to OBR-3. Example: 27798445140	EI	R	1..1	Y	Y
ORC-4	Placer group number	Used by the application placing the order to group sets of orders together and identify them	ED	RE	0..1	N	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
ORC-5	Order status	Specifies the code in HL7 table 0038 that identifies the status of the order.	ID	O	0..1	N	N
ORC-6	Response flag	Specifies the code in HL7 table 0121 that allows the placer application to determine the amount of information to be returned from the filler.	ID	O	0..1	N	N
ORC-7	Quantity/Timing	Excluded for this implementation guide.					
ORC-8	Parent	Parent order	EI	O	0..1	N	N
ORC-9	Date/Time of Transaction	Transaction timestamp	TS	O	0..1	N	N
ORC-10	Entered By	Identifies who entered the order	XPN	O	0..1	N	N
ORC-11	Verified By	Identifies who verified the order	XPN	O	0..1	N	N
ORC-12	Ordering Provider	<p>Identifies the individual that requested the order or prescription. This must be identical to the value in OBR-16.</p> <p>It is recommended that the NPI is included.</p> <p>Example: 12345678923^Provider^Stephanie</p>	XCN	R	1..1	Y	Y



## Observation Request (OBR)

The OBR segment is used to transmit information specific to an order for a diagnostic study or observation, physical exam, or assessment. It defines the attributes of a particular request for diagnostic services (for example laboratory or EKG) or clinical observations, (for example, vital signs or physical exam).

The OBR segment is required and may repeat. Practice Fusion does not use any information after OBR-25, so the OBR segment definition has been truncated after this field. Required fields are highlighted in gray.

```
OBR|1|Placer1234|Filler56789|TestID^TestName^IDSystem|||ObservationDate/Time|||||
||||OrderingProviderID^OrderingProviderLastName^OrderingProviderFirstName|||||Re
sultReportedDate/Time|||ResultStatus(From HL7 table 0123)
```

### Notes:

1. There must be a corresponding ORC segment for each OBR segment
2. ORC-2 (Placer Order Number) must be identical to OBR-2 (Placer Order Number)
3. ORC-3 (Filler Order Number) must be identical to OBR-3 (Filler Order Number)
4. ORC-12 (Ordering Provider) must be identical to OBR-16 (Ordering Provider)

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
OBR-0	Segment type	OBR	ST	R	1..1	N	N
OBR-1	Set ID	These values should be a numeric sequence, increasing with each OBR segment present in the message. Example: OBR 1	SI	R	1..1	N	N
OBR-2	Placer order number	Identifies the application requesting the order. If ORC-2 is populated, then this field is required to contain an identical value  Practice Fusion recommends populating this field as providers' can search through results based on the OBR-2 order number  This appears as the order number in the EHR Example: 01220	EI	R	0..1	Y	Y
OBR-3	Filler order number	The order number of the application filling the order  This value must be identical to OBR-3.  This appears as the accession number in the EHR.	EI	R	1..1	Y	Y

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
		Example: 27798445140					
OBR-4	Universal service ID	Specifies the code for the requested observation or test battery in the following format:  TestID ^ Test Name ^ ID System  Example: 57021-8^CBC W Auto Differential panel in Blood^LN	CWE	R	1..1	N	Y
OBR-5	Priority	Excluded for this implementation guide					
OBR-6	Requested date and time	Excluded from this implementation guide.					
OBR-7	Observation date and time	This reflects the specimen collection date/time when the test involves a specimen.  Since a test may also involve drawing specimens at different times, e.g., tolerance tests, this date/time only covers the draw of the first specimen. All other specimen collection date/times, including the first one, are communicated in the SPM segment  For unknown collection date/time use "0000".  NOTE: Even when a specimen is not involved, the Observation Date/Time is always relevant.  Example: 20130205022300	TS_4	R	1..1	Y	N
OBR-8	Observation end date and time	Identifies the end date and time of a study or timed specimen collection. If an observation takes place over a substantial period of time, it will indicate when the observation period ended. For observations made at a point in time, it will be null. This is a results field except when the placer or a party other than the filler has already drawn the specimen  Example: 20130205022300-0500	TS_5	O	0..1	N	N
OBR-9	Collection volume	Specifies the collection volume of a specimen. Valid values are identified in "Figure 7-13. Common ISO derived units and *ISO extensions" in Chapter 7 of the HL7 specification	CQ	O	0..1	N	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
		Example: ML					
OBR-10	Collector identifier	Identifies the individual, department, or facility that collected the specimen	XCN	O	0..*	N	N
OBR-11	Specimen action code	Specifies the code in HL7 table 0065 that identifies the action to be taken with respect to the specimens that accompany or precede the order	ID	O	0..1	N	N
OBR-12	Danger code	Contains the code, or text, or both that indicate any known or suspected patient or specimen hazards, such as a patient with active tuberculosis or blood from a patient with hepatitis.	CE	O	0..1	N	N
OBR-13	Relevant clinical information	Contains additional clinical information about the patient or specimen, such as the suspected diagnosis and clinical findings on requests for interpreted diagnostic studies.	CWE	O	0..1	N	N
OBR-14	Specimen received date and time	Excluded from this implementation guide					
OBR-15	Specimen source	Excluded from this implementation guide					
OBR-16	Ordering provider	Identifies the individual that requested the order or prescription. This must be identical to the value in ORC-12.  It is recommended that the NPI is included.  Example: 12345678923^Provider^Stephanie	XCN	R	1..1	Y	Y
OBR-17	Order callback phone number	Identifies the telephone number to call for clarification of a request or other information regarding the order; identical to the value populated in ORC-14 Callback Phone Number  Example: (555)555-5555	XTN	O	0..1	N	N
OBR-18	Placer field 1	Contains free-form text entered by the placer	ST	O	0..1	N	N
OBR-19	Placer field 2	Contains free-form text entered by the placer	ST	O	0..1	N	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
OBR-20	Filler 1	Contains free-form text entered by the filler	ST	O	0..1	N	N
OBR-21	Filler 2	Contains free-form text entered by the filler	ST	O	0..1	N	N
OBR-22	Result reported date and time	Identifies the date and time when the results are entered in a report or when the status value in the ORC-5 - Order Status field was changed. When other applications (such as office or clinical database applications) query the laboratory application for results that have not yet been transmitted, the information in this field may be used to control processing in the exchange. Usually, the ordering service would want only those results for which the reporting date and time is greater than the date and time the inquiring application last received results  Example: 20130205022300	TS_6	R	1..1	Y	Y
OBR-23	Charge to practice	Contains the charge to the ordering entity for the studies performed, when applicable. The first subcomponent is a dollar amount identified by the filler; the second subcomponent is a charge code identified by the filler	CM	O	0..1	N	N
OBR-24	Diagnostic serv sect ID	Specifies the code in HL7 table 0074 that identifies where the observation was performed  Examples: AU for "Audiology" RAD for "Radiology"	ID	O	0..1	N	N
OBR-25	Test status	Specifies the code in HL7 table 0123 that identifies the status of results for the order  O for "Order received; specimen not yet received"  I for "No results available; specimen received; procedure incomplete"  S for "No results available; procedure scheduled but not performed yet"	ID	R	1..1	Y	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
		<p>A for "Some, but not all results are available"</p> <p>P for "Preliminary: a verified early result is available, but final results are not yet obtained"</p> <p>C for "Correction to results"</p> <p>R for "Results stored, but not yet verified"</p> <p>F for "Final results are stored and verified; can only be changed with a corrected result"</p> <p>X for "No results available; order cancelled"</p> <p>Y for "No order on record for this test"</p> <p>Z for "No record of the patient"</p>					

## Observation Result (OBX)

The OBX segment is used to transmit a single observation or observation fragment. It represents the smallest indivisible unit of a report and is designed to carry information about observations in report messages.

The OBX segment is required and may repeat. Required fields are highlighted in gray.

OBX example with a lab site:

```
OBX|1|ST|Identifier^ObservationName^NameOfCodingSystem||5.5|mEq/L|2.5-5.3|H||||Status|||20120816122332|||||||Performing Lab|1234 Any Street^Any Town^CA^94102
```

OBX example with a PDF Attachment:

```
OBX|1|ED|PDF^PDF||^AP^^Base64^[base64 encoded PDF strain]|||||F|||20120816122332|||||||Performing Lab|1234 Any Street^Any Town^CA^94102
```

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
OBX-0	Segment type	OBX	ST	R	1..1	N	N
OBX-1	Set ID	These values should be a numeric sequence, increasing with each OBX segment present in the message Example: OBX 1	SI	R	1..1	N	N
OBX-2	Value type	Contains the format of the observation value  If the value is CE then the result must be a coded entry  If the value is TX then the results are bulk text  If the value is NM then the value must be numeric only	ID	R	1..1	Y	N
OBX-3	Observation identifier	Contains a unique identifier for the observation, such as Local Observation Identifiers Names and Codes (LOINC) values  Use the following format: TestID ^ Test Name ^ ID System  Example: 4544-3^HCT^LN	CE	R	1..1	Y	N
OBX-4	Observation	Contains a unique identifier for each OBX segment with the same value in the	ST	O	0..1	N	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
	sub-id	OBX-3 Observation Identifier field in a single Observation Request					
OBX-5	Observation value	Contains the value observed by the producer  If the value in the OBX-2 Value Type field is ED, then this field should contain the value OBX5.5; otherwise, this field should contain the value OBX-5.1	<sup>1</sup> Varies	O	0..1	Y	Y
OBX-6	Result units of measurement	Specifies the ISO value of the units for the measurement	CE	O	0..1	Y	Y
OBX-7	Result unit reference range	Specifies lower limits, upper limits, or both for result values  Examples: > 10 < 15 3.5 – 4.5	ST	O	0..1	Y	Y
OBX-8	Abnormal flags	Specifies the code in HL7 table 0078 that identifies the normalcy status of the result  L for “below normal low” LL for “alert low” < for “panic low” H for “above normal high” HH for “alert high” > for “panic high” A for “abnormal” N for “normal” AA for “very abnormal” U for “significant change up” D for “significant change down” B for “better” W for “worse”	IS	O	0..*	Y	Y

<sup>1</sup>Although NM is a valid type, observations which are usually reported as numbers will sometimes have the string (ST) data type because non-numeric characters are often reported as part of the result, e.g., >300 to indicate the result was off-scale for the instrument. In the example, ">300", ">" is a symbol and the digits are considered a numeric value. However, this usage of the ST type should be discouraged since the SN (structured numeric) data type now accommodates such reporting and, in addition, permits the receiving system to interpret the magnitude. All HL7 data types are valid, and are included in Table 0125 except CM, CQ, SI, and ID.

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
		S for "susceptible" R for "resistant" I for "intermediate" MS for "moderately susceptible" VS for "very susceptible" NULL for "no range defined, or normal ranges don't apply"					
OBX-9	Probability	Contains a decimal value between 0 and 1 that identifies the probability of the result being true	NM	O	0..1	N	N
OBX-10	Nature of abnormal test	Specifies the codes in HL7 table 0080 that identify the nature of an abnormal test A for "An age-based population" N for "Non-generic normal range" R for "A race-based population" S for "A sex-based population"	ID	O	0..*	N	N
OBX-11	Observation result status	Specifies the codes in HL7 table 0085 that identifies the current completion status of the observation result C for "Record coming over is a correction and replaces a final result" D for "Delete the OBX record" F for "Final results; can only be changed with a corrected result" I for "Specimen in lab; results pending" P for "Preliminary results" R for "Results entered but not yet verified" S for "Partial results" X for "Results cannot be obtained for this observation" U for "Results status change to Final without re-transmitting results already sent as "preliminary" W for "Post original as wrong", such as when the results were sent for the wrong patient	ID	R	1..1	Y	Y
OBX-12	Effective date of last normal	Contains changes in the observation methods that would make values	DT	O	0..1	N	N



Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
	observation	obtained from an old method not comparable with those obtained from the new method					
OBX-13	User-defined access checks	Permits the producer to record results-dependent codes for classifying the observation at the receiving system	ST	O	0..1	N	N
OBX-14	Observation date and time	Identifies the physiologically-relevant date and time of the report  If this is not populated, then the OBR-14 value will be applied to the observation Date/Status  Example: 20130205022300	DT	O	0..1	Y	Y
OBX-15	Producer's Reference	Producer reference identifier	CE	O	0..1	Y	Y
OBX-16	Responsible observer	Contains the unique identifier of the individual responsible for performing or verifying the observation	XCN	O	0..1	N	N
OBX-17	Observation method	Identifies the method or procedure by which an observation was obtained when the sending system wishes to distinguish between measurements obtained by different methods	CE	O	0..*	N	N
OBX-18	Equipment Instance Identifier	Identification of equipment	Varies	O	0..1	N	N
OBX-19	Date/Time of Analysis	Analysis Timestamp	TS_5	O	0..1	N	N
OBX-20	Reserved for Harmonization	Excluded from this implementation guide					
OBX-21	Reserved for Harmonization	Excluded from this implementation guide					
OBX-22	Reserved for Harmonization	Excluded from this implementation guide					
OBX-23	Performing Organization Name	The name of the organization which performed the test	XON	R	1..1	Y	Y
OBX-24	Performing Organization Address	The address of the organization which performed the test in the following format:	XAD	R	1..1	Y	Y

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
		Street Address^City^State^Zip					
OBX-25	Performing Organization Medical Director	The Director of the performing medical organization	XCN	O	0..1	Y	Y

## Note (NTE)

The NTE segment contains notes and comments, and can be attached to the PID, OBR, and OBX segments.

The NTE segment is optional and may repeat. Please note that NTE segments cannot contain empty NTE-3 fields. Required fields are highlighted in gray.

```
NTE|1|TX|Sample comment here
```

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
NTE-0	Segment type	NTE	ST	R	1..1	N	N
NTE-1	Set ID	These values should be a numeric sequence, increasing with each NTE segment present Example: NTE 1	SI	R	1..1	N	N
NTE-2	Comment source	Identifies the source of the comment Examples: P for "practice" O for "other system"	ID	O	0..1	N	N
NTE-3	Comment	Contains the comments entered by the source Example: EPITHELIAL CELL ABNORMALITY: SQUAMOUS CELLS	FT	R	1..1	N	Y

## Specimen (SPM)

The Specimen Information Segment (SPM) describes the characteristics of a single sample. The SPM segment carries information regarding the type of specimen, where and how it was collected, who collected it and some basic characteristics of the specimen.

This segment is not required and may repeat. Practice Fusion does not use any information after SPM-18, so the segment definition is truncated after this field. Required fields are highlighted in gray.

```
SPM|1|||SER^Serum^HL70487|||||||201606070456|201606081234|
```

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
SPM-0	Segment type	SPM	ST	R	1..1	N	N
SPM-1	Set ID	Sequence identifier	SI	R	1..1	N	N
SPM-2	Specimen ID	Specimen identifier	ID	O	0..10..1	N	N
SPM-3	Specimen Parent IDs	Specimen parent identifiers	ID	R	0..1	N	N
SPM-4	Specimen Type	Specimen types from HL7 table 0487 must be used in the following format: Value ^ Description ^ CodeSet Example: SER^Serum^HL70487	CWE	R	1..1	Y	Y
SPM-5	Specimen Type Modifier	Specimen Type Modifier	Varies	O	0..1	N	N
SPM-6	Specimen Additives	Specimen Additives	Varies	O	0..1	N	N
SPM-7	Specimen Collection Method	Specimen Collection Method	Varies	O	0..1	N	N
SPM-8	Specimen Source Site	Specimen Source Site	Varies	O	0..1	N	N
SPM-9	Specimen Source Site Modifier	Specimen Source Site Modifier	Varies	O	0..1	N	N

Seq	Name	Value	Type	Req'd	Card	Used?	Disp?
SPM-10	Specimen Collection Site	Collection site of specimen	Varies	O	0..10..1	N	N
SPM-11	Specimen Role	Specimen role	Varies	O	0..10..1	N	N
SPM-12	Specimen Collection Amount	Specimen collection amount	Varies	O	0..1	N	N
SPM-13	Grouped Specimen Count	Grouped specimen count	Varies	O	0..1	N	N
SPM-14	Specimen Description	Specimen description	Varies	O	0..1	N	N
SPM-15	Specimen Handling Code	Specimen handling code	Varies	O	0..10..1	N	N
SPM-16	Specimen Risk Code	Specimen risk code	Varies	O	0..1	N	N
SPM-17	Specimen Collection Date/Time	The date and time at which the specimen was collected	TS_4	O	0..10..1	N	Y
SPM-18	Specimen Received Date/Time	The date and time at which the specimen was received	TS	O	0..1	N	Y

# Authentication

All API service requests (REST and SOAP) must have an Authorization header containing user credentials (username and password). An Authorization header is created as follows:

1. Concatenate username and password into a string separated by ':' ('username:password')
2. Convert string into a base64 encoded string
3. Prepend base64 encoded string with "Basic"

For example, if the username is 'username' and the password is 'password!', the Authorization header would be:

**Authorization: Basic** dXN1cm5hbWUxOnBhc3N3b3JkIQ==

If an API request does not have an Authorization header with valid credentials, an HTTP 401 Unauthorized response will be returned, and a WWW-Authenticate header value of "Basic realm="api.practicefusion.com" will be given.

# Practice Fusion RESTful Services

Practice Fusion exposes a Representational State Transfer (REST) service that can process HL7 data.

## Request URLs

Results can be submitted to Practice Fusion's Production environment or to its Partner Testing Environment (PATE).

### Production

POST <https://api.practicefusion.com/ordering/lab/v1/SubmitResults>

### Test

POST <https://testapi.practicefusion.com/ordering/lab/v1/SubmitResults>

## Request Headers

Content-Type: application/x-www-form-urlencoded

Authorization: Basic [base 64 string]

## Request Body (the HL7 message)

```
MSH|^~\&|App|PracticeFusionCode||PracticeAccount#|20131008113050||ORU^R01^ORU_R01
|testmessagecontrolid1|P|2.5.1|1||AL|NE||||LRI_NG_RN_Profile^^2.16.840.1.113883.
9.20^ISO
...
```

Please note that carriage returns are required as end of segment terminators.

# Practice Fusion SOAP-Based Services

Practice Fusion also exposes the same functionality via a SOAP service that can process HL7 data.

## Service URLs

Results can be submitted to Practice Fusion's Production environment or to its Partner Testing Environment (PATE).

### Production WSDL

<https://api.practicefusion.com/ordering/lab/v1/PartnerResultsService.svc?singleWsd1>

### Test WSDL

<https://testapi.practicefusion.com/ordering/lab/v1/PartnerResultsService.svc?singleWsd1>

## Request Headers

```
Content-Type: text/xml; charset=utf-8
Authorization: Basic [base 64 string]
```

## Sample Request

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/">
  <s:Body>
    <SubmitResults xmlns="http://practicefusion.com/PartnerOrderingApi/2013/07">
      <request xmlns:i="http://www.w3.org/2001/XMLSchema-instance">
        <H17ResultMessage>

          MSH|...

        </H17ResultMessage>
      </request>
    </SubmitResults>
  </s:Body>
</s:Envelope>
```

Please note that carriage returns are required as end of segment terminators.

## Sample Response

```
<s:Envelope xmlns:s="http://schemas.xmlsoap.org/soap/envelope/">
  <s:Body>
    <SubmitResultsResponse
      xmlns="http://practicefusion.com/PartnerOrderingApi/2013/07">
      <SubmitResultsResult xmlns:i="http://www.w3.org/2001/XMLSchema-instance">
        <H17AcknowledgementMessage>

          MSH|...

        </H17AcknowledgementMessage>
      </SubmitResultsResult>
    </SubmitResultsResponse>
  </s:Body>
</s:Envelope>
```



```
    </SubmitResultsResponse>
  </s:Body>
</s:Envelope>
```

## C# Sample Code:

**NOTE:** This sample assumes you've added a service reference to the Practice Fusion results web service. This code demonstrates one approach of authenticating and calling the service with an HL7 message and getting back an acknowledgement.

```
private string SubmitPracticeFusionResultMessage(string hl7Message)
{
    var address = new EndpointAddress(
        "https://testapi.practicefusion.com/ordering/lab/v1/PartnerResultsService.svc");
    var binding = new BasicHttpBinding
    {
        Security =
        {
            Mode = BasicHttpSecurityMode.Transport,
            Transport = { ClientCredentialType = HttpClientCredentialType.Basic }
        }
    };
    using (var client = new PracticeFusionPartnerResultsClient(binding, address))
    {
        client.ClientCredentials.UserName.UserName = "myLabAccount";
        client.ClientCredentials.UserName.Password = "myPassword";

        var result = client.SubmitResults(new SubmitResultsRequest
        {
            Hl7ResultMessage = hl7Message
        });

        var acknowledgement = result.Hl7AcknowledgementMessage;
        // TODO: process ACK message
        return acknowledgement;
    }
}
```

\

# Appendix

This section details the values that appear in the “Req’d”, “Card”, and “Type” columns in the detailed segment definition tables.

## Requiredness

This section defines the values that appear in the “Req’d” of the detailed segment definitions, which specify whether the segment is required, optional, or required based on certain conditions.

R

The segment is required.

O

The segment is optional, and may be omitted.

C

The segment might be required depending on conditions related to the trigger event or the value of other fields.

## Cardinality

This section defines the cardinality values displayed in the “Card” column of the detailed segment definitions, which specify the logic behind how a segment may repeat or not.

0..1

The segment may be omitted and can occur only once.

1..1

The segment must occur only once.

0..\*

The segment may be omitted or may repeat an unlimited number of times.

1..\*

The segment must appear at least once, and may repeat an unlimited number of times.

0..N

The segment may be omitted or may repeat a specific number of times.

## Version History

Version	Date	Comment
v. 1	November 15, 2013	New Document
v. 1.1	January 14, 2014	Updated Lab Result information to cover SOAP interface.
v. 1.2	June 22, 2016	Updated and added additional necessary information regarding 2.5.1 Lab Result API