Introduction to HL7 Standards: v 2.x

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February 25, 2008

Why use data interchange standards?

- Use of standards is becoming more universal. HL7 standards are likely to be in use already

- EHRVA and the vendor community support and use HL7 standards

- As new items are collected, the HL7 standard is easier to accommodate

- Maintenance is not a cost or a problem

- Less work required for new organizations to join project

- The work is already done

Choices for data interchange

- HL7 v2.n series
- HL7 v3 standard
  - Model-based
- HL7 Clinical Data Architecture
  - Continuity of Care Document
  - Common Document Types

Which choice?

- Version 2.x is my immediate recommendation
- Messages are straight forward and the OBX segment can carry any data content
- Version 2.x is easy and straight forward to implement
- An Implementation Manual with conformance agreement for common data elements and the use of a common terminology will provide controlled interoperability
- Version 2.6 is the latest release

version 2.x messaging standard

- Based on an implicit information model
- Focused initially on needs of HIS, later versions expanded horizontally into other areas including ambulatory care
- Most widely used HL7 standard (>90% provider organizations)
- Events not tightly coupled to profiles
- Makes no formal attempt to define process
- Available with delimiter syntax or with XML syntax
- Most currently implemented version is v2.3
- Messages initiated by trigger events

v2.x messaging standard (2)

- Uses segments whose contents are positionally defined; segments are made up of data fields which are made up of data elements

- Fields may be repeating

- Much data sent as name-value pairs

- Accommodates any HL7 registered terminology expressed as code, name, terminology ID triplet

v2.x messaging standard (3)

- Is easy to use and understand; quick implementation
- Works well within a single enterprise where both sender and receiver are tightly bound; does not work well when sender and receiver are not connected
- Has saved money on cost of interfaces
- Will continued to be supported by HL7 in the future and will continue to be implemented by users

v2.x Functional areas

- ADT, Registration, Orders, Results, patient financial, query language, immunization reporting, clinical trials, adverse drug reactions, scheduling, referrals, medical records, patient care, problem lists and goals, waveforms, personnel management, clinical lab automation transactions, master files
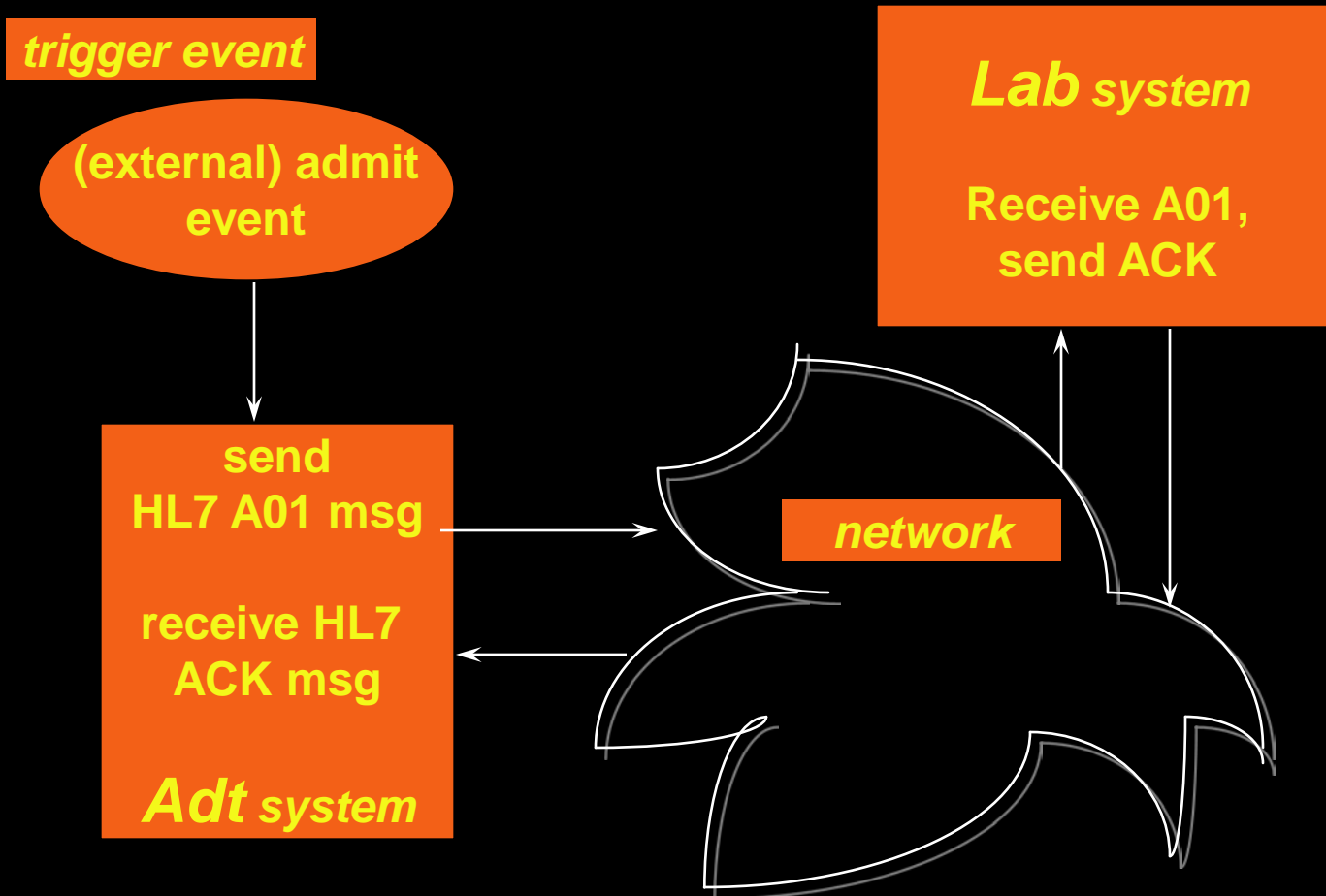
Version 2.6 chapters

1. Introduction
2. Control
3. Patient Administration
4. Order Entry
5. Queries
6. Financial Management
7. Observation Reporting
8. Master Files
9. Medical Records/ Information Management
10. Scheduling
11. Patient Referral

12. Patient Care
13. Clinical Laboratory Automation
14. Application Management
15. Personnel Management
16. Non-US Claims
17. Materials Management

Appendix:
A.   Data Definition Tables
B.   Lower Layer Protocol
C.   BNF Definitions
D.   Glossary
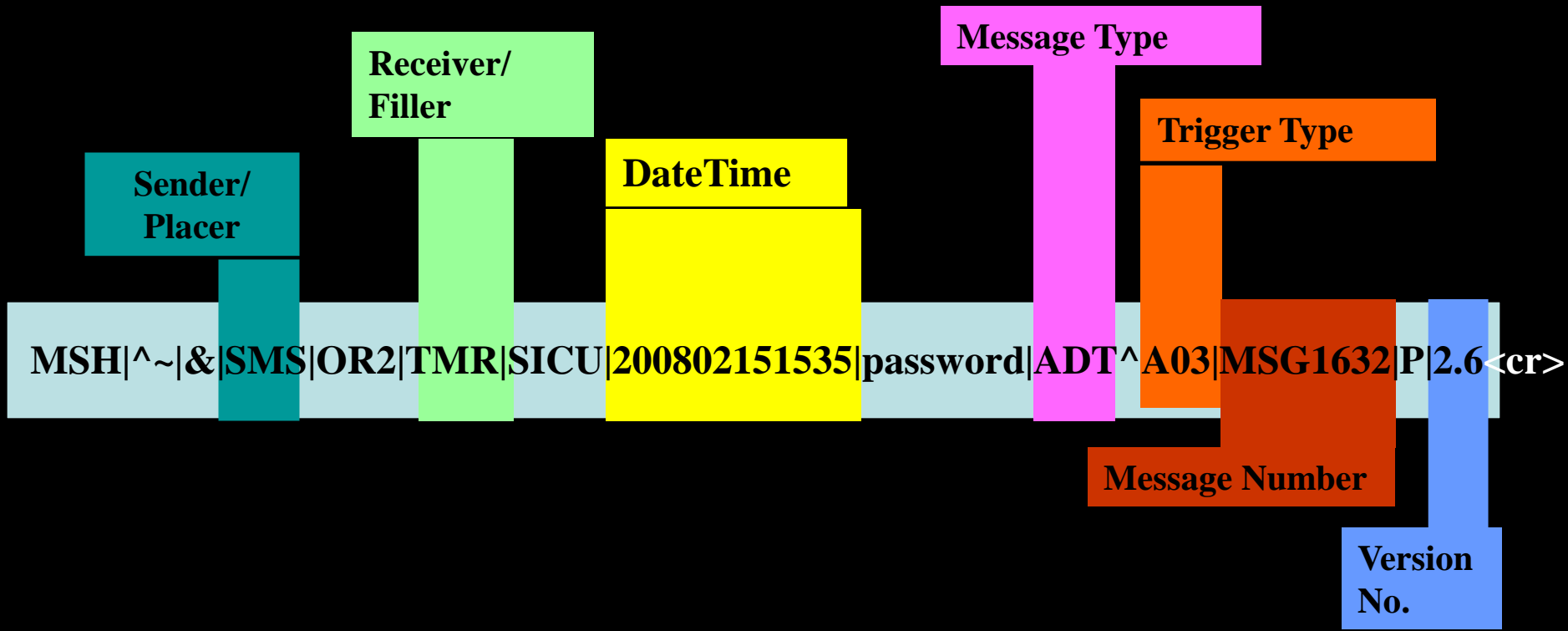
The HL7 basic "Transaction Model"

trigger event

(external) admit event

Lab *system*

Receive A01, send ACK

send HL7 A01 msg

receive HL7 ACK msg

Adt *system*

network

HL7 Message
Message Header - MSH

Addressing the envelope:

Sender/Placer

Receiver/Filler

DateTime

Message Type

Trigger Type

MSH|^~\&|SMS|OR2|TMR|SICU|200802151535|password|ADT^A03|MSG1632|P|2.6<cr>

Message Number

Version No.

HL7 Message - PID Segment

Identify the patient:

Date of Birth

Check digit

Mother's Maiden Name

Gender

Address

Patient Name

Patient ID

```
PID|||Z12345^5^M11||PATIENT^JOSEPH^M^IV|
MAIDEN|19610605|M||C|1492 OCEAN STREET^
DURHAM^NC^27705|DUR|(919)684-6421<cr>
```

City State

Zip

County

Telephone Number
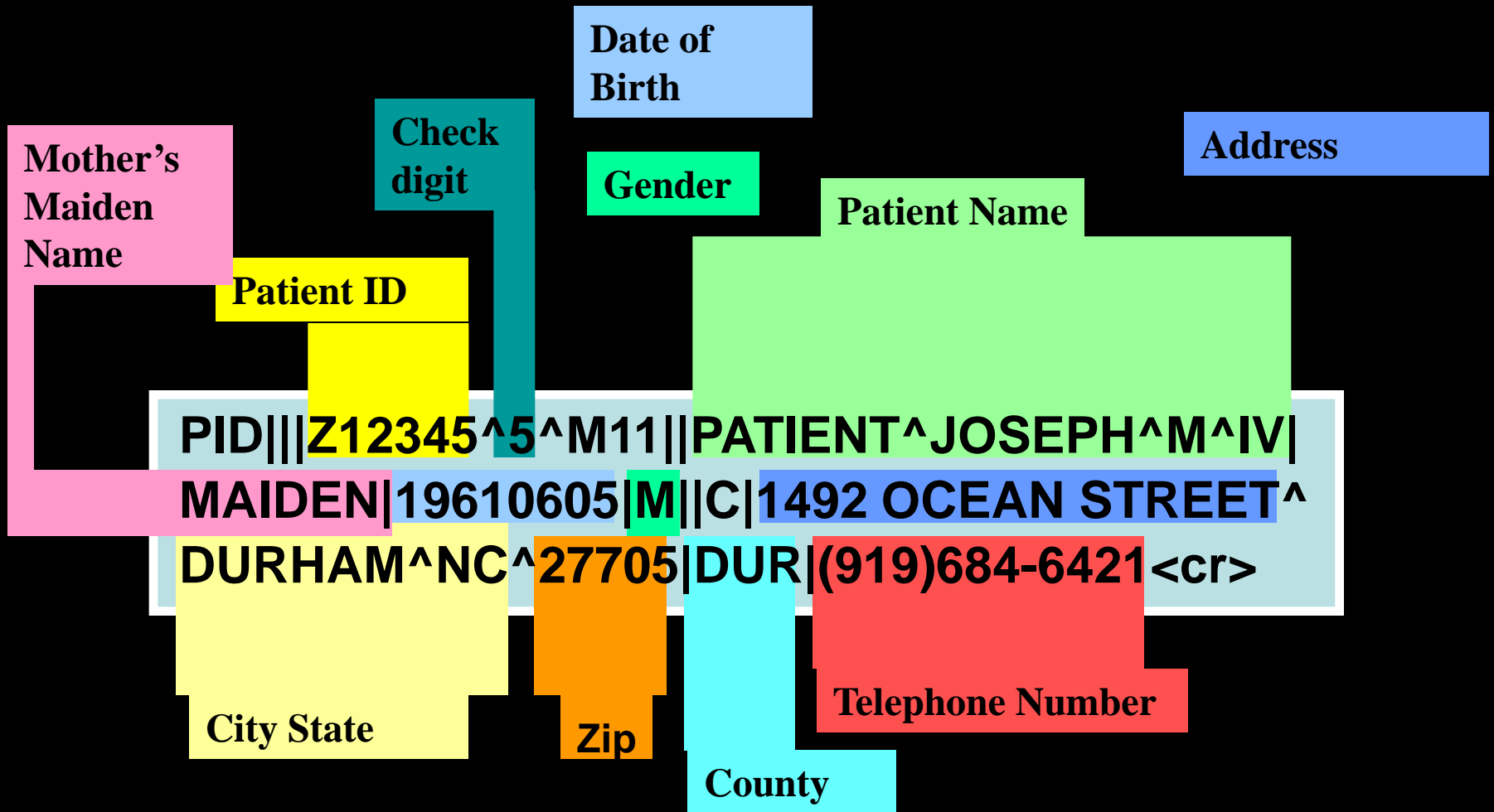
HL7 Message PV1 Segment

Define the visit or encounter

Patient Location

Attending

PV1|1|1|N2200^2200|||OR^02|0846^WELBY^MARCUS^G||SUR<cr>

Service

HL7 Message OBR Segment

Placer Order Number

Filler Order Number

Universal Service ID

Text

Local Set

OBR|1|330769.0001.001^DMCRES|0000514215^RADIS1|77061^U/S PEVLIC^L
||199607121145||||||||||||0491909||||U999|M||||||^FIBROIDS, R/O|207484^CARROLL
&BARBARA&A|||089657&BROWN&JOANNE<CR>

Requested DT service

Reason for study

Principal Result Interpreter
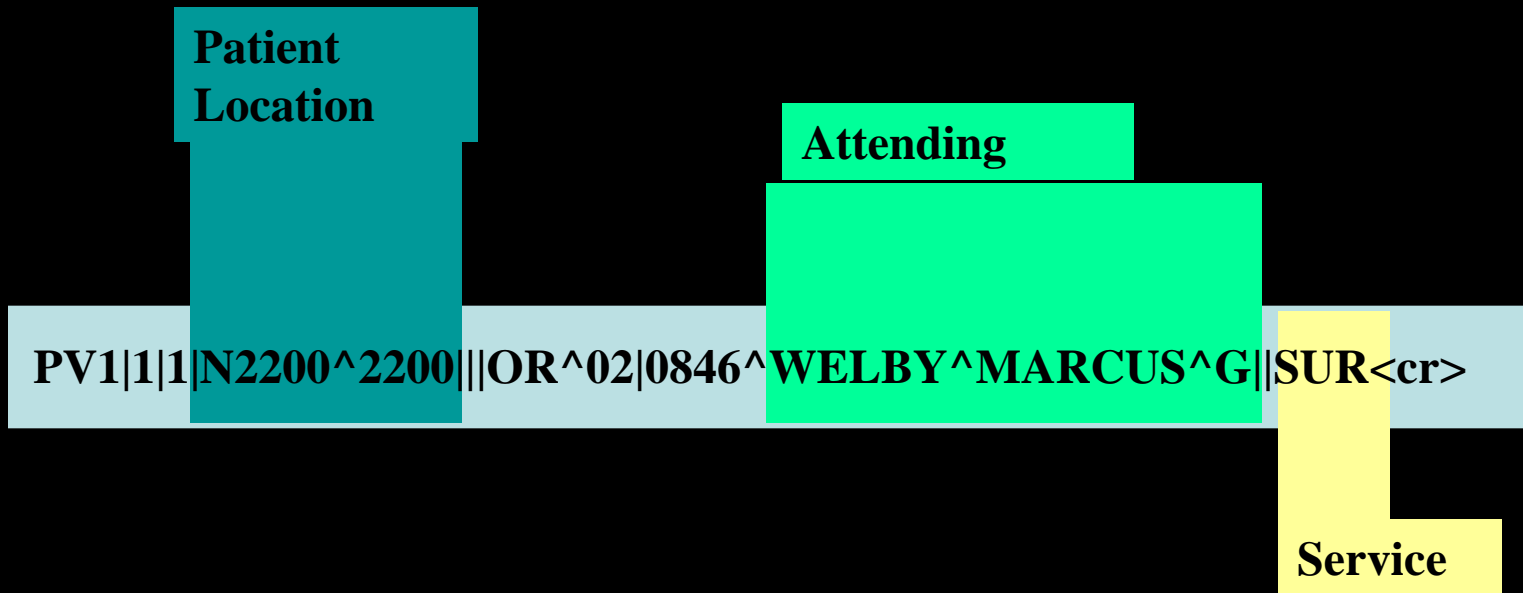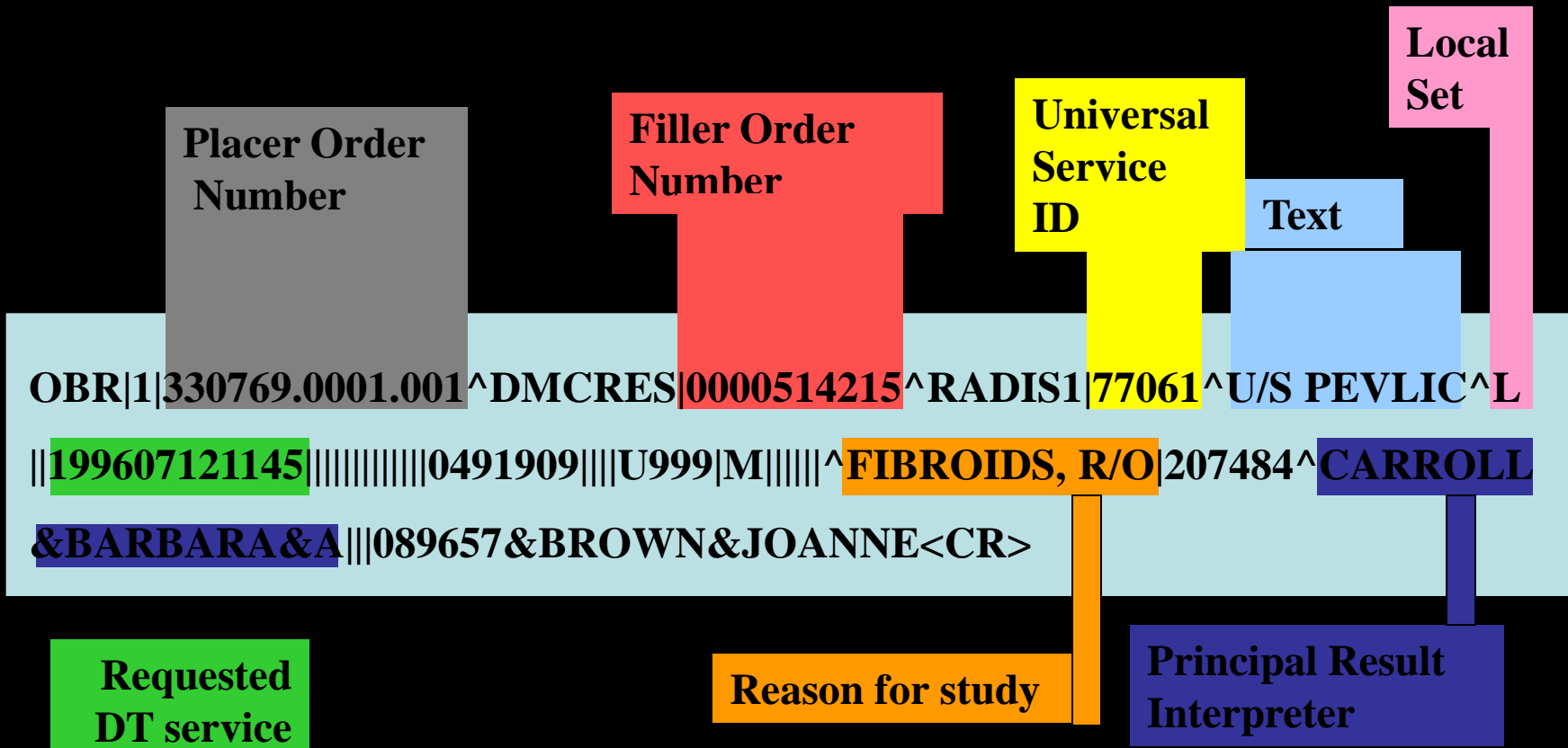
HL7 Result Message (ORU)

```
MSH|^~\&||||||19981105131523||ORU^R01<cr>
PID|||100928782^9^M11||Smith^John^J<cr>
OBR||||Z0063-0^^LN<cr>
OBX||XCN|Z0063-0^^LN||2093467^Smits^J^<cr>
OBX||Z0092-0^^LN||203BE0004Y^^X12PTX<cr>
```

Segment

Data Field

Component

OBX: the flexible segment

Other data fields include: date of observation, identity of provider giving observation, normal ranges, abnormal flags

A code that identifies the *datatype* of OBX-5

OBX-5: Data

Status

`OBX| |NM|11289-6^^LN| |38|C^^ISO+| | | | |F`

A code that identifies the data in OBX-5 (Temp Reading)

A code that identifies the units of numerical data in OBX-5

OBX: with a coded value

A code that identifies the *datatype as a* coded element

The code is from LOINC

The code is from SNOMED

OBX||CE|883-9^Blood Group^LN||F-D1250^Group O^SM|

**A code that identifies the data in OBX-5
(ABO Blood Group)**

**OBX-5: Data
A code for Group O**

v2.x Syntax

```
MSH|^~\&|REGADT|MCM|IFENG||199112311501||ADT^A04^ADT_A01|000001|P|2.4|||
EVN|A04|199901101500|199901101400|01||199901101410
PID|||191919^^GENHOS^MR~371-66-9256^^^USSSA^SS
|253763|MASSIE^JAMES^A||19560129|M|||171 ZOBERLEIN^^ISHPEMING^MI^49849^""^|
|(900)485-5344|(900)485-5344||S^^HL70002|C^^HL70006|10199925^^^GENHOS^AN
|371-66-9256||
NK1|1|MASSIE^ELLEN|SPOUSE^^HL70063|171 ZOBERLEIN^^ISHPEMING^MI^49849^""^
|(900)485-5344|(900)545-1234~(900)545-1200|EC1^FIRST EMERGENCY CONTACT^HL70131
NK1|2|MASSIE^MARYLOU|MOTHER^^HL70063|300 ZOBERLEIN^^ISHPEMING^MI^49849^""^
|(900)485-5344|(900)545-1234~(900)545-1200|EC2^SECOND EMERGENCY CONTACT^HL70131
NK1|3
NK1|4|||123 INDUSTRY WAY^^ISHPEMING^MI^49849^""^||(900)545-1200
|EM^EMPLOYER^HL70131|19940605||PROGRAMMER|||ACME SOFTWARE COMPANY
PV1||O|O/R||||0148^ADDISON,JAMES|0148^ADDISON,JAMES||AMB||||||
|0148^ADDISON,JAMES|S|1400|A||||||||||||||||||GENHOS|||||199501101410|
PV2|||||||||199901101400||||||||||||||||||||||||199901101400
ROL||AD|CP^^HL70443|0148^ADDISON,JAMES
OBX||NM|3141-9^BODY WEIGHT^LN||62|kg|||||F
OBX||NM|3137-7^HEIGHT^LN||190|cm|||||F
DG1|1|19||0815^BIOPSY^ACODE||00|
GT1|1||MASSIE^JAMES^""^""^""^""^||171 ZOBERLEIN^^ISHPEMING^MI^49849^""^
|(900)485-5344|(900)485-5344||||SE^SELF^HL70063|371-66-925||||MOOSES AUTO CLINIC
|171 ZOBERLEIN^^ISHPEMING^MI^49849^""|(900)485-5344|
IN1|0|0^HL70072|BC1|BLUE CROSS|171 ZOBERLEIN^^ISHPEMING^M149849^""^|
|(900)485-5344|90||||||50 OK|
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