

Laboratory-Clinical Communications LCC Profile

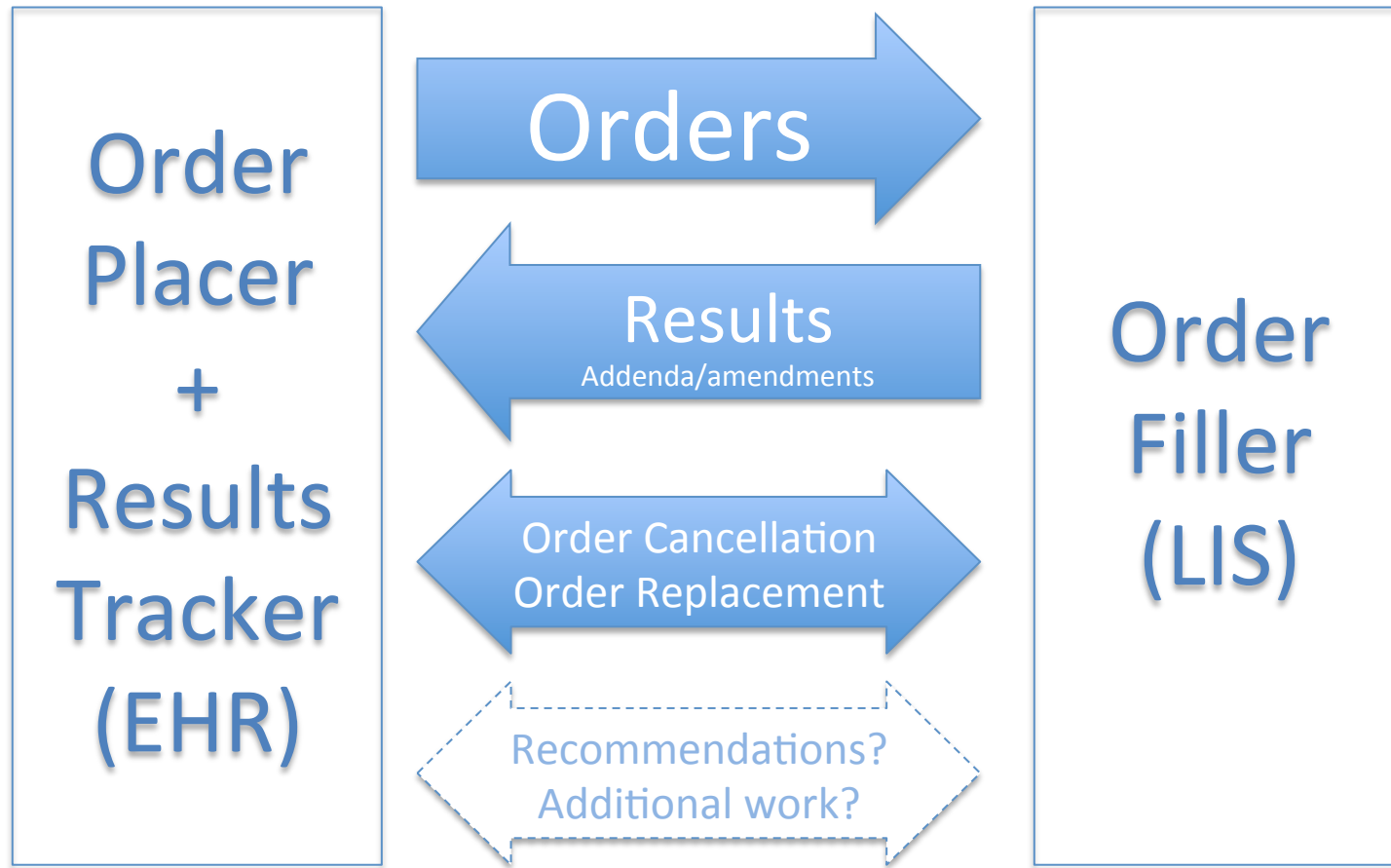
IHE Laboratory Domain

College of American Pathologists

(DIHIT Committee)

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HL7/LTW Order Communications



The Problem

- The traditional order-result paradigm does not include clinically-important workflow related to ordering and resulting
 - Recommending and accepting order replacement
 - Requests and responses for result verification, clarification, interpretation, annotation (fulfillment)
- Occur on an ad hoc basis outside of systems, limiting documentation, decision support, process standardization, quality improvement
- Clinical lab context, but general applicability

Two New Transactions

- Order replacement (LAB-6)
 - Information about the patient or specimen is available at the Order Filler that indicates orders should be changed for optimal care
 - Order Filler recommends changes to Order Placer
 - Placer returns order change request
- Result verification/interpretation/annotation (LAB-7)
 - Result does not fully satisfy the clinical need, or conflicting information is available to the Placer
 - Placer requests follow-up or annotation from Filler
 - Filler responds with result that may include an addendum or amendment to previous report

Detailed Description

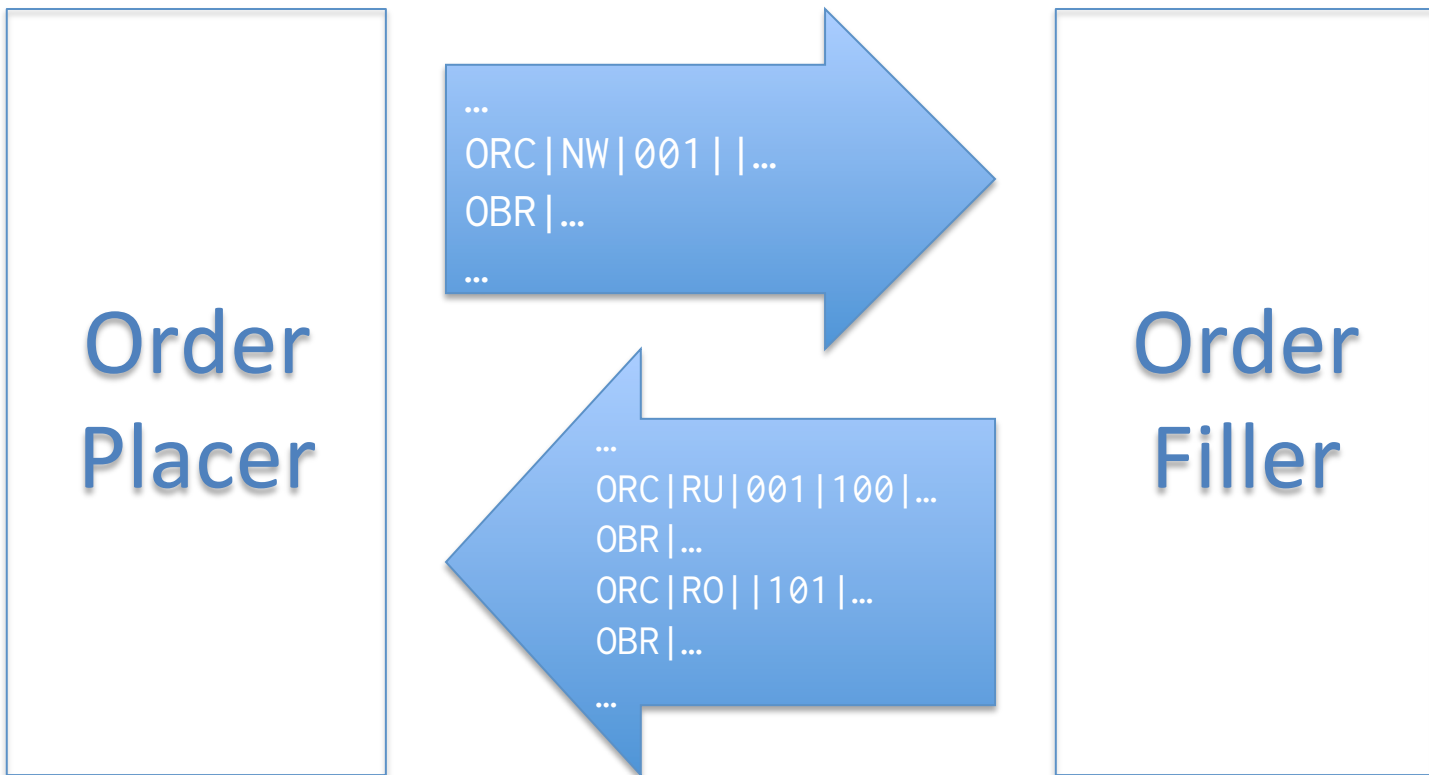
- IHE Wiki (Laboratory Technical Committee)
 - LCC Long Proposal working document
 - [http://wiki.ihe.net/index.php?title=LCC Long Proposal - wiki](http://wiki.ihe.net/index.php?title=LCC%20Long%20Proposal%20-%20wiki)
- Order replacement: 9 use cases
- Order fulfillment: 6 use cases
- Transaction descriptions
- Message structure proposals
- Current status of HL7 & IHE change proposals

LAB-6 Order Replacement Use Cases

- Test prioritization when specimen is limited
- Optimizing testing for best diagnostic yield
- Optimizing reference laboratory ordering
- Proactive followup of inconclusive testing
- Timeout of future orders
- Proactive correction of incorrect test orders
- Promotion of clinical guideline adherence
- Promotion of test utilization goals
- Extended/complex testing algorithms
- Missing or erroneous information from Placer

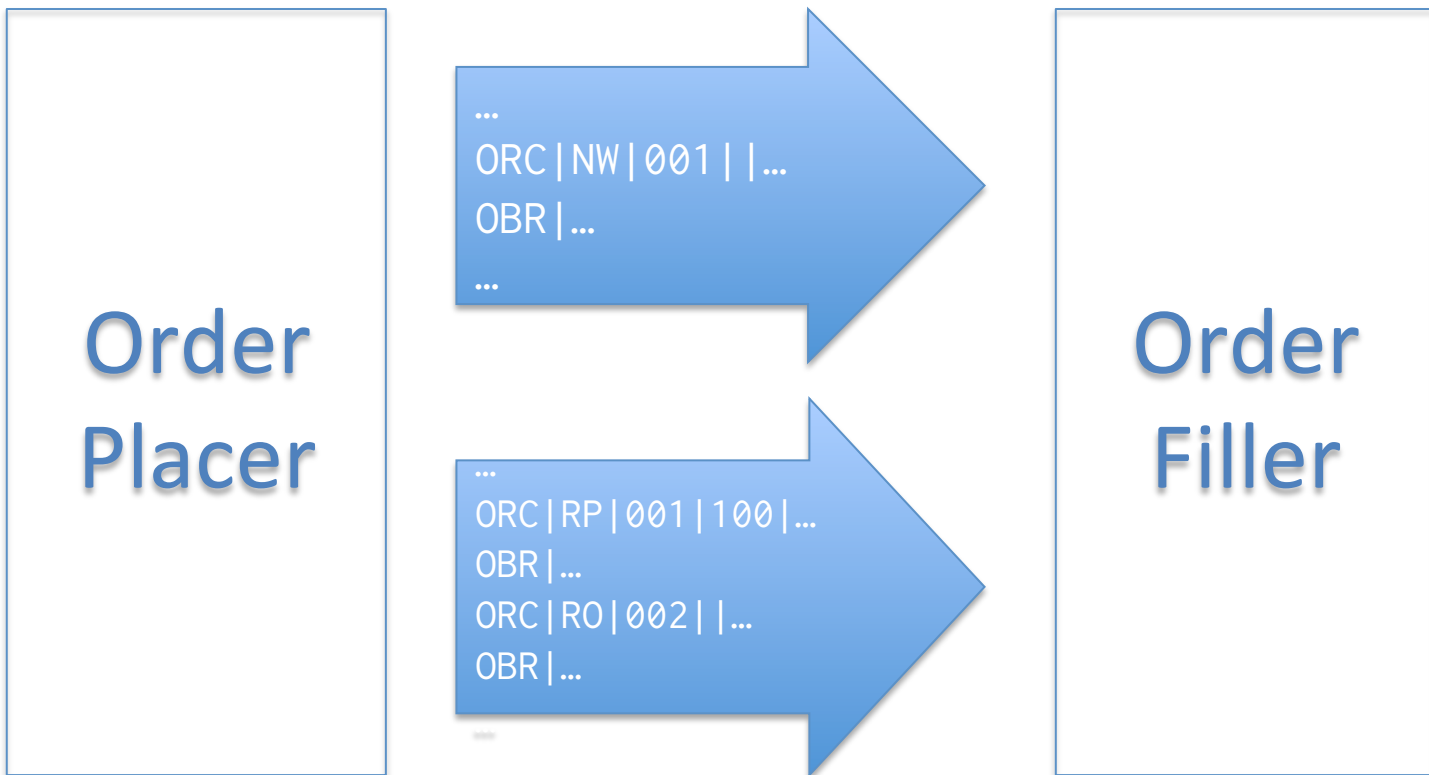
Current Order Replacement

Unsolicited



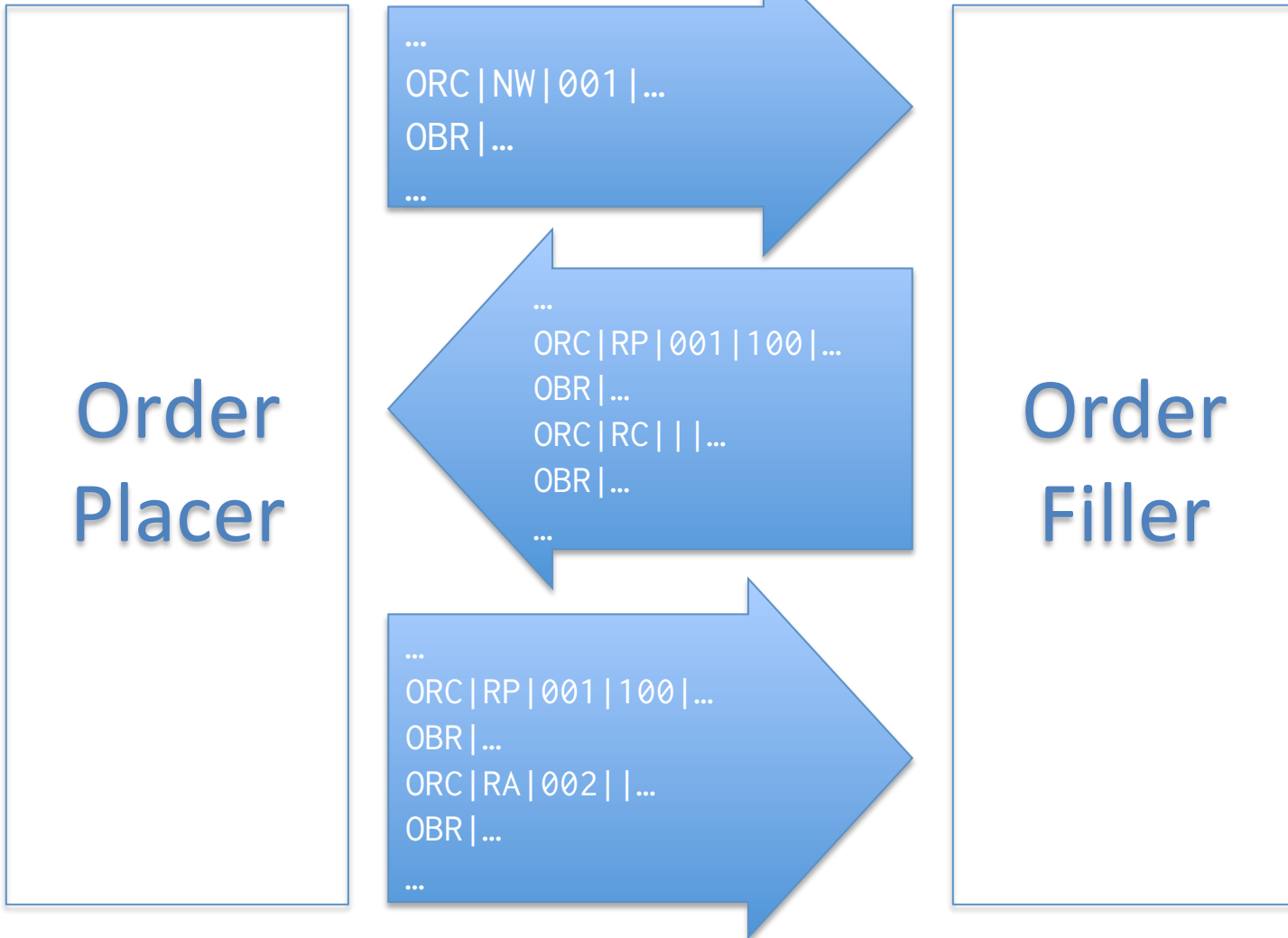
Current Order Replacement

Solicited



Order Replacement

Recommended (LCC)



Order Replacement Transaction Strategy

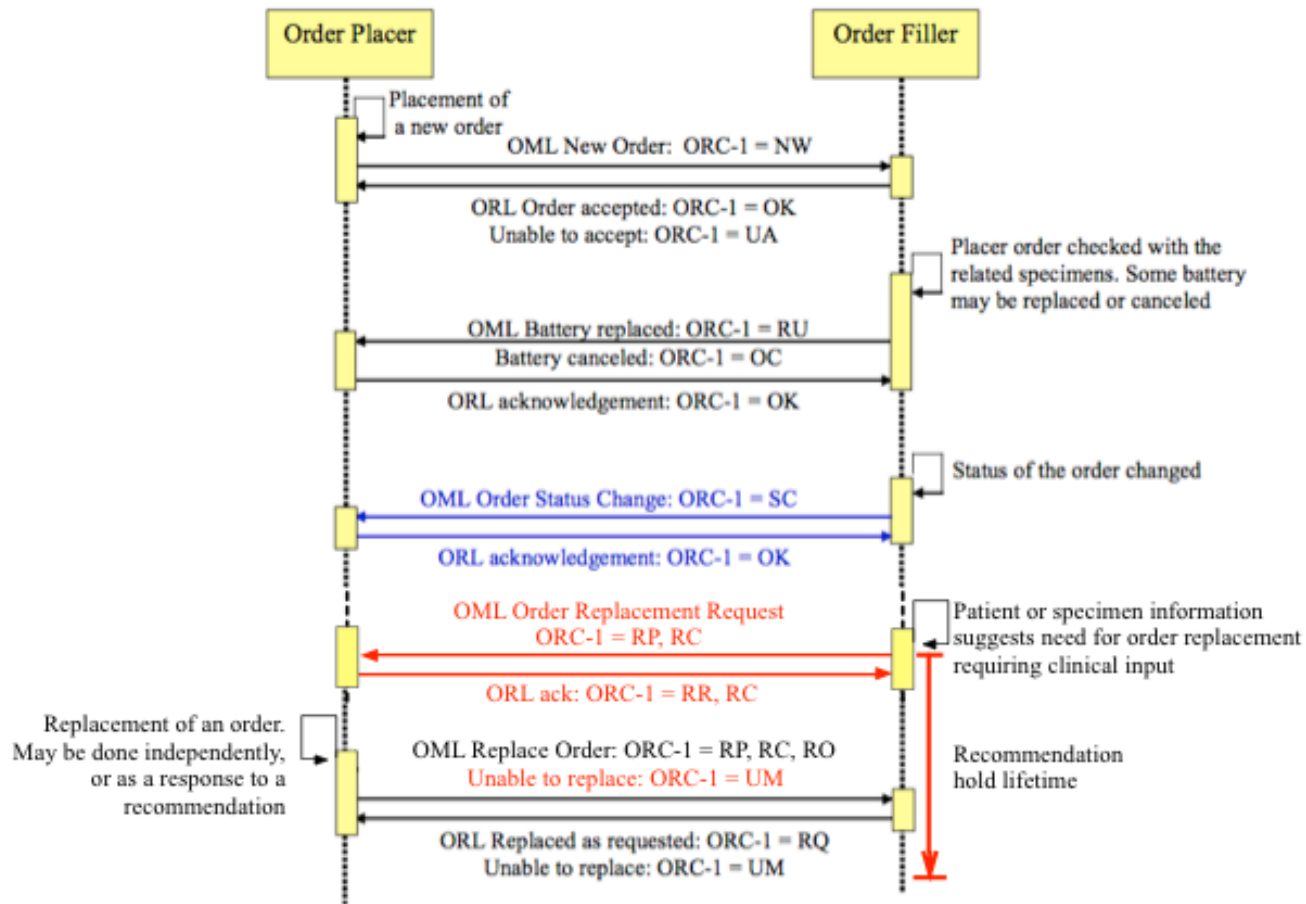
(LAB-6)

- Based on unsolicited order replacement message OML^O21 (Filler to Placer)
- Filler sends “recommended order replacement” message to Placer
 - Original orders to be replaced have control code RP and status HR, new control code reasons (ORC-16)
 - Recommended change orders follow with control code RC, status HR
 - Recommendation time window, with default processing of original orders if response isn’t received within that time span
- Placer responds with an order replacement message similar to order replacement (OML^O21 Placer to Filler)
 - Control code RP for orders to be replaced, same status and reason
 - Control codes RA and RD for accepted and declined recommendations
 - If replacement is declined or time window is exceeded without response, processing continues as now (loose coupling of recommendation and response)

Order Modification Transaction Details

- Filler sends “recommended order replacement” message to Placer, structure similar to existing Filler -> Placer unsolicited order replacement
 - Original orders to be changed
 - ORC-1 Control Code RP
 - Placer and filler order numbers (ORC-2 and -3)
 - Status HR (ORC-5)
 - New ORC-34 Order Status Date Range with start and stop times for the review period
 - Reason for change (ORC-16, new codes) and NTE following ORC/OBR
 - Must include OBR segments
 - Recommended replacement orders
 - Control Code RC for recommended change
 - Replacements do not carry order numbers
- Placer response is similar to solicited order replacement
 - Orders to replace retain RP control code
 - Orders that should not be replaced carry control code UM
 - Accepted recommended orders carry RA control code and Placer order number
 - Declined recommended orders carry RD control code
 - Added orders carry RO control codes

Order Replacement Overview



Placer order (LAB-1) sequence diagram.

Blue transactions are required only if order placer and order results tracker are separate.

LAB-6 additions are shown in red.

Single Order Replacement

```
...  
ORC|NW|1234||...           New order with Placer order number  
OBR|...  
...  
  
## Begin LCC -- Filler recommends a change in this order (Filler to Placer OML^021):  
...  
ORC|RP|1234|5678||HR|||||||PY|...|<start>^<stop>| Recommend replace (RP), on hold for  
revision (HR) with reason (PY) and  
HR duration from start->stop  
  
OBR|...  
ORC|RC|||||...           Recommended replacement order (RC)  
OBR|...  
NTE|...           Additional information about the reason for replacement  
...  
  
## Placer immediately acknowledges the recommendation (Placer to Filler ACK)
```

Single Order Replacement (2)

```
## Placer accepts recommendation within the time window (Placer to Filler OML^021):
...
ORC|RP|1234|5678||HR|||||||PY|... RP control code
OBR|...
ORC|RA|1504|||... RA control code (replacement accepted), Placer
order number added
OBR|...
...

## Filler confirms replacement (Filler to Placer ORL^022):
...
ORC|RQ|1234|5678||RP|||||||PY|... RQ replaced as requested, RP status
OBR|...
ORC|RA|1504|5679||IP|... Filler order number added, in progress status
OBR|...
...

## OR, status change if Placer response is not sent within the time window ##
...
ORC|SC|1234|5678||IP|||||||... Filler updates status to IP, processing proceeds
OBR|...
...
```

Multiple Order Replacement

Filler recommends replacing the three orders with two orders (Filler to Placer OML^021):

...

ORC|RP|1234|5678||HR|||||||PY|...|<start>^<stop>| First order to replace

OBR|...

ORC|RP|1235|5679||HR|||||||PY|...|<start>^<stop>| Second order to replace

OBR|...

ORC|RP|1236|5680||HR|||||||PY|...|<start>^<stop>| Third order to replace

OBR|...

ORC|RC|||||... First replacement order

OBR|...

NTE|...

ORC|RC|||||... Second replacement order

OBR|...

NTE|...

...

Placer returns immediate ACK...

Multiple Order Replacement (2)

Placer accepts one recommendation, declines one, and adds an additional replacement order (Placer to Filler OML^021):

```
...
ORC|RP|1234|5678||HR|||||||||PY|... First order to replace (RP control)
OBR|...
ORC|RP|1235|5679||HR|||||||||PY|... Second order to replace (RP)
OBR|...
ORC|RP|1236|5680||HR|||||||||PY|... Third order to replace (RP)
OBR|...
ORC|RA|2236||||... Accepted recommendation (RA), Placer order number added
OBR|...
NTE|...
ORC|RD||||... Declined recommendation (RD)
OBR|...
NTE|...
ORC|RO|2238||||... New replacement order (RO) added by Placer
OBR|...
NTE|...
...
```

Filler confirms replacement (Filler to Placer ORL^022):

```
...
ORC|RQ|1234|5678||RP|||||||||PY|... First is replaced (RQ, status replaced RP)
OBR|...
ORC|RQ|1235|5679||RP|||||||||PY|... Second is replaced (RQ)
OBR|...
ORC|RQ|1236|5680||RP|||||||||PY|... Third is replaced (RQ)
OBR|...
ORC|RA|2236|5690||IP|... Accepted recommendation (RA) with Filler order number and IP status
OBR|...
ORC|RO|2238|6123||IP|... New replacement order (RO) with filler order number and IP status
```

Order Control Codes

Recommended Order Replacement

ORC-1, Order control code (*new)

RP	Order to be replaced	Recommendation, response, and confirmation messages (orders to replace)
RO	Replacement order	Response messages, for replacement orders specified by the order Placer (not in original Filler recommendation message)
UM	Unable to modify	Response messages, for orders that should not be modified
RC*	Recommended change	Recommendation, response, and confirmation messages for orders that are recommended changes
RA*	Recommendation accepted	Recommendation, response, and confirmation messages for accepted proposed orders
RD*	Recommendation declined	Recommendation, response, and confirmation messages for declined proposed orders

ORC-5, Order status (*new)

HR*	Hold for revision	Recommendation and response messages for orders proposed for replacement, indicating “on hold” status
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Reason for Recommendation Codes

Recommended Order Replacement

Reason for recommendation (ORC-16, possible codes)

SD	Specimen Damaged	Available specimen inadequate for tests ordered
SV	Specimen Volume	Specimen volume inadequate for requested testing
ST	Specimen Type	Incorrect specimen type for requested testing
UN	Unavailable	Requested test unavailable, alternative testing proposed
SR	Screening Required	Screening test required prior to confirmatory test
IT	Indicated testing	Indicated follow up testing based on initial results
CE	Cost Efficacy	Lower cost testing strategy proposed
FO	Future Order	Future order timed out without specimen
CI	Contraindicated	Requested testing contraindicated in this patient, alternative strategy proposed
PY	Poor Yield	Requested strategy has poor diagnostic yield for this patient, alternative strategy proposed
IY	Improved Yield	Recommended testing improves diagnostic yield

Specimen Management

- Order replacement after specimen receipt
 - If specimen(s) are available, include SPM segments referencing the appropriate specimen after each recommended order
 - If no SPM segment for an order, new specimen is required
- Order modification is inherently order-centric; specimen-centric messages (O33 and O35) are not supported

LAB-7 Results Fulfillment/Followup

- Use cases
 - Unexpected or inconsistent results
 - Complex/unusual/unclear results
 - Systematic inconsistency or process problems
 - Testing errors (incorrect test or other clear error)
 - Other annotation
- Goal: Annotate results to fulfill clinical need, optimize individual care, improve overall quality

Fulfillment Workflow

- From results review at results tracker...
- Directly trigger a follow up request on a particular result, indicate type, add comment
- Request sent to Filler as order with link to original result
- Filler creates report indicating actions and outcome as a result
- Filler may also create addendum/
amendment/annotation to the original result extending the information it provides

Service Identifiers for Fulfillment

Existing LOINC

- 59465-5 Pathologist review of results
- 50595-8 Pathologist interpretation of unspecified specimen tests
- 14869-2 Pathologist review of blood tests
- 21026-0 Pathologist interpretation of blood tests
- 32144-8 Pathologist review of serum or plasma results
- 21025-2 Pathologist interpretation of body fluid tests

Other possibilities

- | | |
|----------------------------|--|
| Verify observation values | Results inconsistent with clinical impression |
| Test error | Incorrect test carried out |
| Result error | Incorrect result |
| Process quality annotation | Other issues (sample handling, reporting, TAT) |

Result Fulfillment

REL Segment Linking to Previous Group/Order/Result

Clinician working from order review requests verification of a blood test result (OML^021):
...
ORC|NW|1567|... New fulfillment order
OBR||1567||14869-2^Pathologist review of blood tests^LN|... LOINC code for review
REL||FT|9999|1567|1234|... Fulfillment Target link to existing order or result (Placer 1234)
...

Implementation Issues

- The REL segment uses EI datatypes for the source and target of the link, which carry a single identifier.
 - REL-4 (source) will carry the Placer order number for the current order and REL-5 (target) will carry either the Placer order group number, Placer order number, or Observation Instance Identifier for the prior order group, order, or result.
 - The target of the action will be the group results, single order results, or single result, respectively.
- The OML message is modified to add one or more REL segments as the last segment of each Order section.
- If the fulfillment message is sent to the Filler that processed the prior order, the prior order does not need to be included in the message.
- If the message is sent to a third party Filler, the pertinent orders and results must be included in the message as prior results with Placer group, order, or result EIs matching the EI named as the target of the relationship.

Planned HL7 CPs, v. 2.9

Order replacement (LAB-6)

- HL7 CP Add Order Status Date Range (#34) to ORC, Ch. 4
- HL7 CP New & Modified Order Control Codes (ORC 1, Table 0119)
- Define new messaging pattern (Table 0119)
- HL7 CP New Order Status Code (ORC 5, Table 0038)

Result fulfillment (LAB-7)

- HL7 CP Add REL segments to OML and define usage, Ch. 4
- HL7 CP Define Relationship Type Code FT (fulfillment target)