IHE-Laboratory : Terminology

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Product Manager GLIMS

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MIPS
Diagnostics Intelligence

Terminology

- Procedural Coding systems
  - **LOINC**
  - SNOMED-CT vs SNOMED 3.5
  - HL7 vocabularies
  - ICD-10
  - Belgium : Albert, Medidoc, Health-1, Medar, Euclides, …
  - UCUM
  - …

Terminology

- Transactional dependencies.
  - Ordering   LAB-1   (OP -> **OF**)
  - Dispatching   LAB-4   (**OF** -> AM)
  - Analyzing   LAB-28   (AM -> Analyzer)
  - Reading   LAB-29   (Analyzer -> AM)
  - Confirming   LAB-5   (AM -> **OF**)
  - Reporting   LAB-3   (**OF** -> ORT)

  - Billing   (**OF** -> ???)

IHE-LTW + LDA/LAW + ILW … LCSD
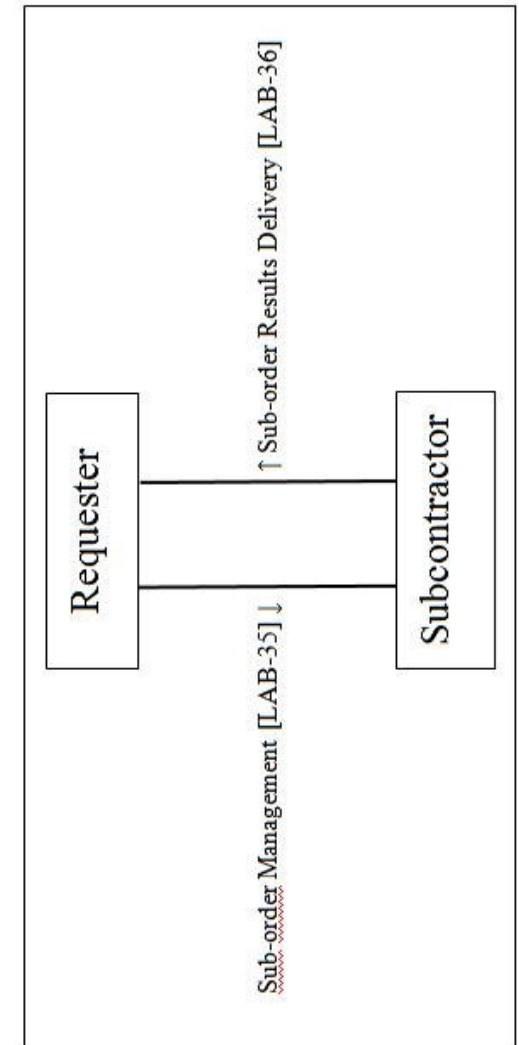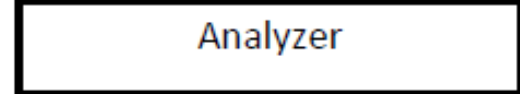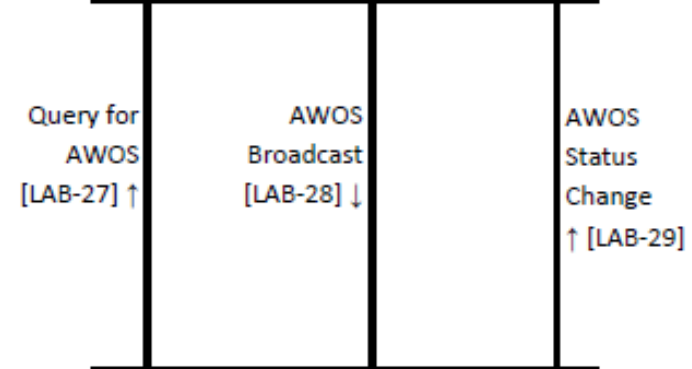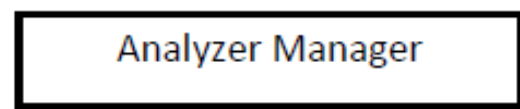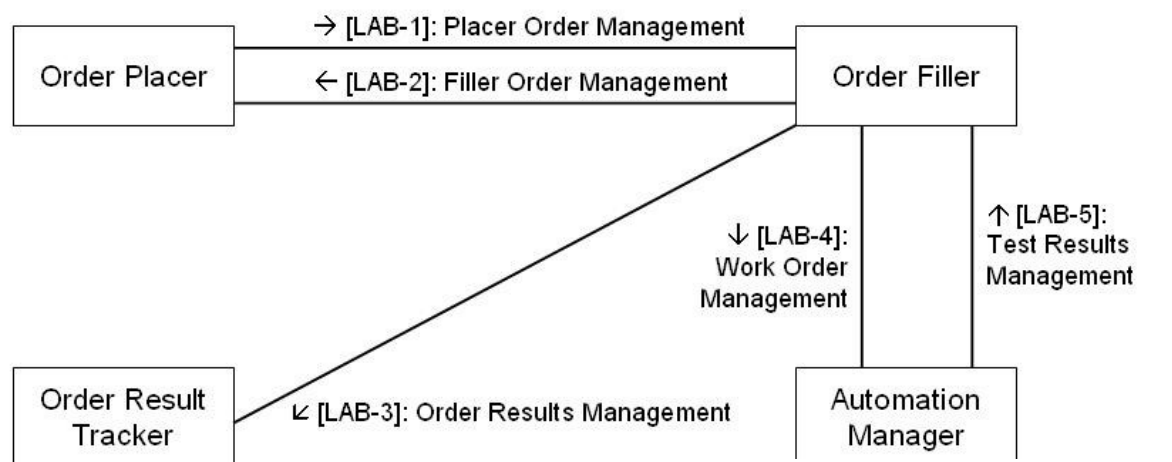
A case taken from IHE-Lab TF Rev. 4.0 Vol. 2a

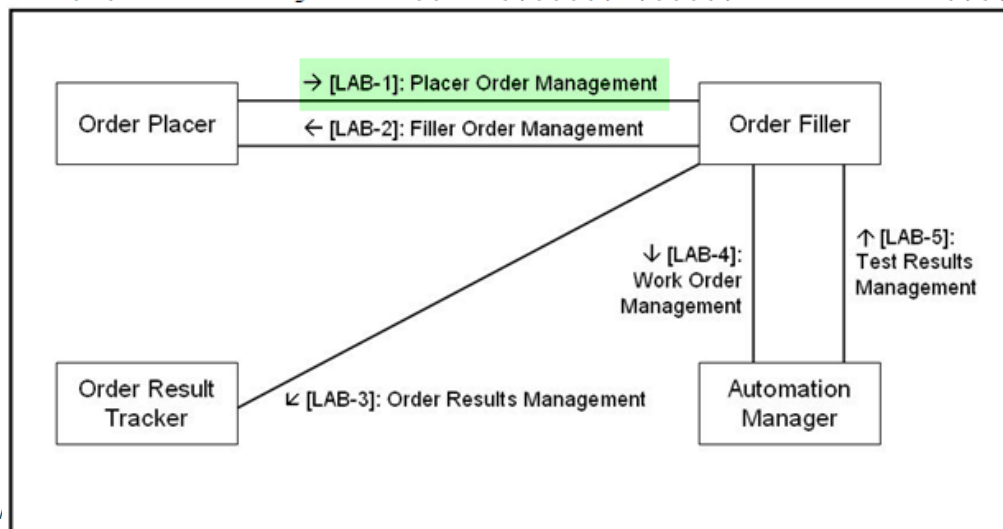Test on a Series of Specimens: Glucose Tolerance Study

CASE-1

Test on a Series of Specimens: Glucose Tolerance Study

4.3.3.1 LAB-1 (OP → OF): Message "New order" with the first 3 Specimens

A new placer order sent to the Order Filler: Priority "ASAP" for this placer order. One observation provided by the placer. Three first specimens collected. The other specimens are pending.

```
MSH|^~\&|OP|Entero-gastric|OF|Chemistry|200309060820||OML^O21^OML_O21|
msgOP123|T|2.5|123| |||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||12345
ORC|NW|12345678^gastric|||666^gastric|||||200309060710|222221^NURSE^NANCY|||||||||||Ent
ero-gastric^^^^^^FI^^^EG02
TQ1|||||||||A
OBR||12345678^gastric||82951^Glucose Tolerance Test^C4||||||1234^BLEEDER|
P|||||222222^PHYSICIAN^^^^DR|821
OBX|1|NM|GLUCOSE||75|g|||||F|||200309060735
SPM|1|123456781^gastric||SER|||||||P||||||200309060735|||||||||1
```
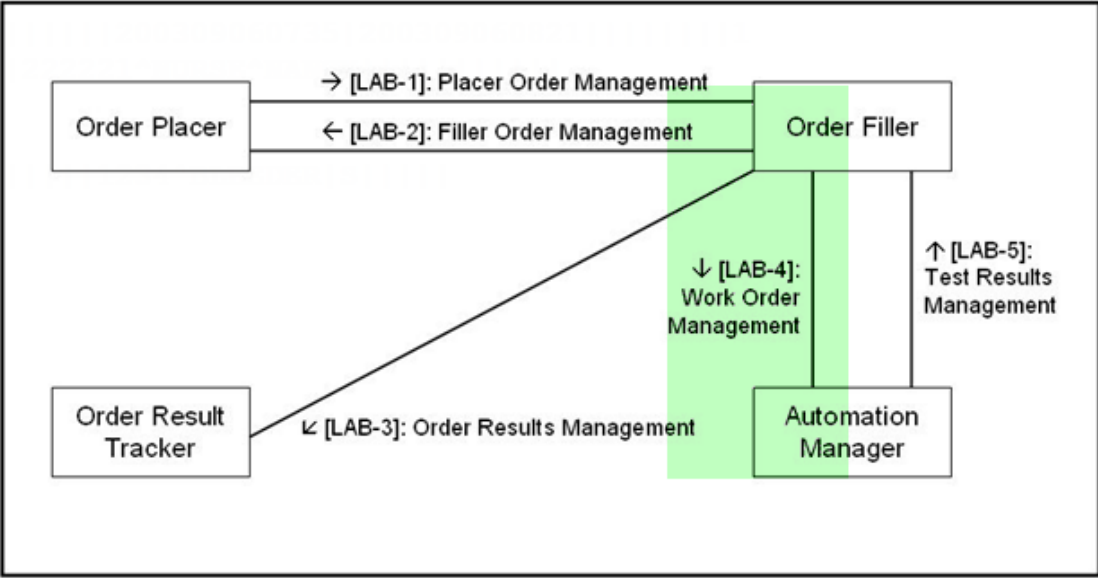
Test on a Series of Specimens: Glucose Tolerance Study

4.3.3.2 LAB-4 (OF → AM): Message "New order" with the first 2 Specimens

Two new work orders sent to the Automation Manager: Priority ASAP. One observation provided.

```
MSH|^~\&|OF|Chemistry|AM|Automation|200309060825||OML^O21^OML_O21|msgOF101|T|2.5|123||
||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward||||||||||||||||12345
ORC|NW|||666^gastric|||||200309060824|222221^NURSE^NANCY|||||||||||
Entero-gastric^^^^^^FI^^^EG02
TQ1||||||||||A
OBR||555_1^chemistry|||GLUC^GLUCOSE^L|||||||1234^BLEEDER|S|||||222222^PHYSICIAN^^^^DR|82
1
SPM|1|123456781^gastric ||SER|||||||F
ORC|NW|||666^gastric|||||200309060710
Entero-gastric^^^^^^FI^^^EG02
TQ1||||||||||A
OBR||555_2^chemistry|||GLUC^GLUCOSE^L|
222222^PHYSICIAN^^^^DR|821
```

82951
is now
GLUC

Order Placer
→ [LAB-1]: Placer Order Management
← [LAB-2]: Filler Order Management
Order Filler

↓ [LAB-4]: Work Order Management
↑ [LAB-5]: Test Results Management

Order Result Tracker
↙ [LAB-3]: Order Results Management
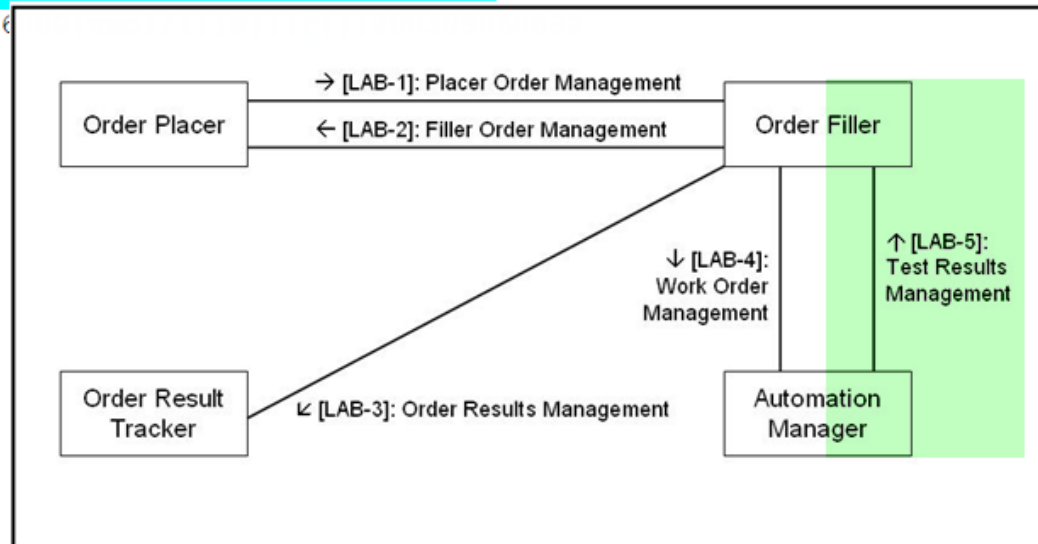
Automation Manager

Test on a Series of Specimens: Glucose Tolerance Study

4.3.3.5 LAB-5 (AM →OF): Message "New results" for the first 2 Work Orders

The Automation Manager sends the two final results for the 2 work orders, technically validated by Suzy TECHNICIAN at 8h33:

```
MSH|^~\&|AM|Automation|OF|Chemistry|200309060833||OUL^R22^OUL_R22|msgAM1|T|2.5|123||||
USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
SPM|1|123456781^gastric ||SER|||||||P||||||200309060735|200309060821|||||||||1
OBR||555_1^chemistry||GLUC^GLUCOSE^L|||||||1234^BLEEDER
|S|||||222222^PHYSICIAN^^^^DR|821||||||200309060832|||F|||||||
333333&TECHNICIAN&Suzy&&&&&MEMPHIS HOSPITAL^200309060833
OBX|1|NM|14749-6^GLUCOSE^LN||4200|umol/l||N|||F|||200309060830
SPM|2|123456782^gastric||SER|||||||P||||||200309060755|200309060821|||||||||1
OBR||555_2^chemistry||GLUC^GLUCOSE^L|||||||1234^BLEEDER
|S|||||222222^PHYSICIAN^^^^DR|821||||||200309060832|||F|||||||
333333&TECHNICIAN&Suzy&&&&&MEMPHIS HOSPITAL^200309060833
OBX|1|NM|14749-6^GLUCOSE^LN||6
```

82951 is now GLUC
Returning LOINC
14749-6

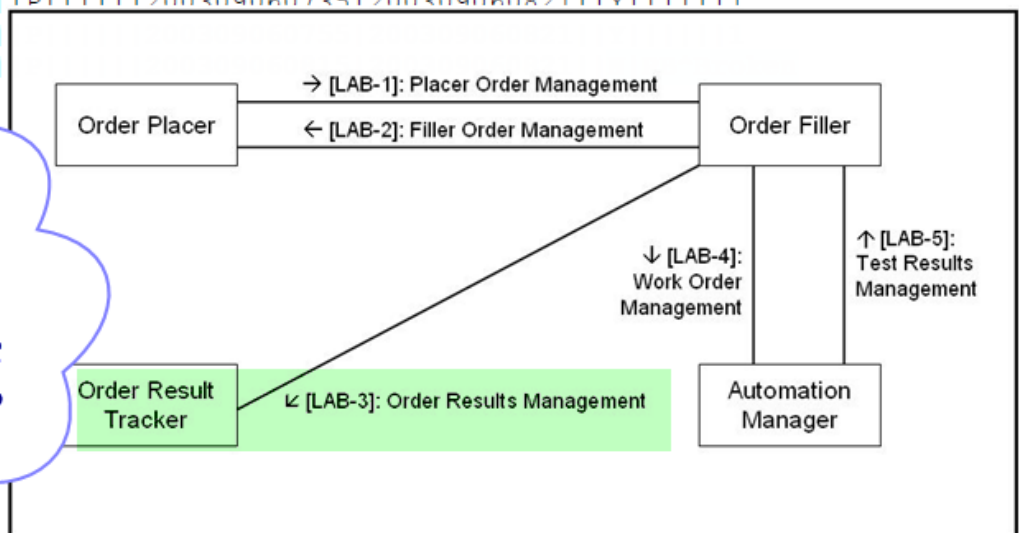
→ [LAB-1]: Placer Order Management
← [LAB-2]: Filler Order Management

Order Placer

Order Filler

↓ [LAB-4]: Work Order Management

↑ [LAB-5]: Test Results Management

Order Result Tracker

↙ [LAB-3]: Order Results Management

Automation Manager

Test on a Series of Specimens: Glucose Tolerance Study

4.3.3.7 LAB-3 (OF → ORT): Message "Status Changed"

The two first results are sent, not clinically validated (i.e., not verified):

```
MSH|^~\&|OF|Chemistry|ORT||200309060825||ORU^R01^ORU_R01|msgOF105|T|2.5|123||||USA||EN
PID|1||12345^5^M10^Memphis_Hosp^PI||EVERYMAN^ADAM^^JR^^^L|19800101|M
PV1|1|O|Ward|||||||||||||||12345
ORC|SC|12345678^gastric||666^gastric|A||||200309060834|222221^NURSE^NANCY|
|||||||||Entero-gastric^^^^^^FI^^^EG02
OBR||12345678^gastric|^chemistry|82951^Glucose Tolerance
Test^C4|||||||1234^BLEEDER|P|||||222222^PHYSICIAN^^^^DR|821|||||||R
TQ1|||||||||A
OBX|1|NM|GLUCOSE||75|g|||||F|||200309060735
OBX|2|NM|14996-3^GLUCOSE PRE 75 G GLUCOSE PO^LN||4200|umol/l|4000-6100|N|||
R|||200309060755
OBX|3|NM|30263-8^GLUCOSE 20M POST DOSE GLUCOSE^LN||6000|umol/l|<7800|N|||
R|||200309060755
OBX|4|NM|30264-6^GLUCOSE 40M POST DOSE GLUCOSE^LN|| | |||||X
SPM|1|123456781^gastric ||SER||||||P||||200309060735|200309060821||Y|||||||
SPM|2|123456782^gastric ||SER||||||
SPM|3|123456783^gastric ||SER||||||
container||
```

82951 is now GLUC
Returning LOINC 14749-6
!!!
The result however will be LOINC
14996-3 or 30263-8 or 30264-6

→ [LAB-1]: Placer Order Management
← [LAB-2]: Filler Order Management
Order Placer
Order Filler
↓ [LAB-4]: Work Order Management
↑ [LAB-5]: Test Results Management
Order Result Tracker
↙ [LAB-3]: Order Results Management
Automation Manager

A case taken from IHE-Lab TF Rev. 4.0 Vol. 2a

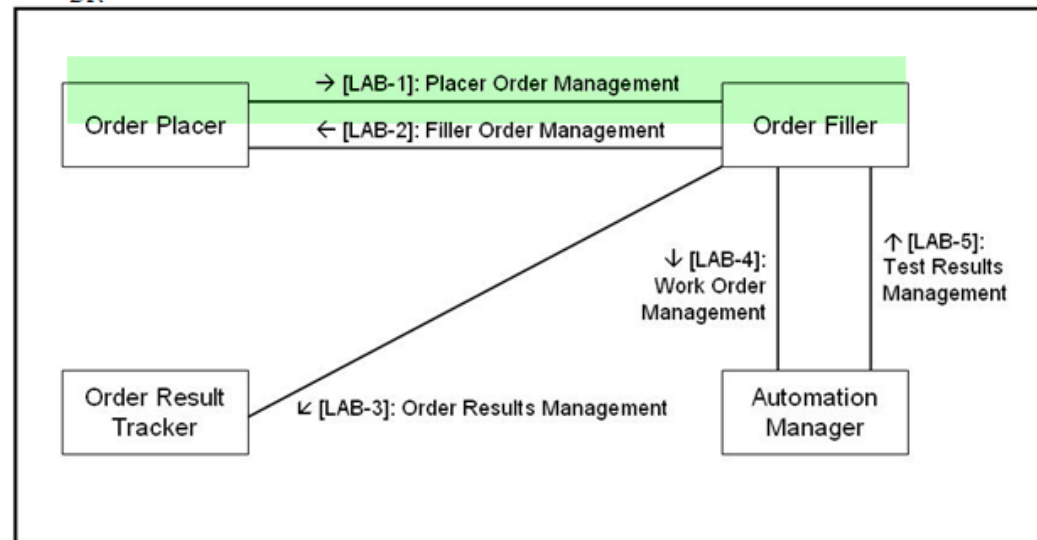Two Hematology Batteries on a Blood Specimen

CASE-2

Two Hematology Batteries on a Blood Specimen

4.2.3.1 LAB-1 (OP → OF): Message "New order" with one Specimen

A new placer order sent to the Order Filler:

```
MSH|^~\&|OP|Urology|OF|Cytology|200310060820||OML^O33^OML_O33|001|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||9998888
SPM|1|||BLD|||||||P||||||200310060735|||||||||1
ORC|NW|9876543^Urology|||555^Urology
|||||200310060710|^NURSE^JANET|||||||||||Urology^^^^^^FI^^^UR01
TQ1|1|||||||||R
OBR|1|9876543^Urology|||85027^Hemogram and platelet count, automated^C4|
||||||^COLLECT^JOHN|||||||^URO^^^^DR
ORC|NW|9876544^Urology|||555^Urology
|||||200310060710|^NURSE^JANET|||||||||||Urology^^^^^^FI^^^UR01
TQ1|1|||||||||R
OBR|1|9876544^Urology|||85009^Differential WBC Count, buffy coat^C4|
||||||^COLLECT^JOHN|||||||^URO^^^^DR
```

2 Batteries : 85027, 85009

→ [LAB-1]: Placer Order Management

Order Placer

← [LAB-2]: Filler Order Management

Order Filler

↓ [LAB-4]: Work Order Management

↑ [LAB-5]: Test Results Management

Order Result Tracker

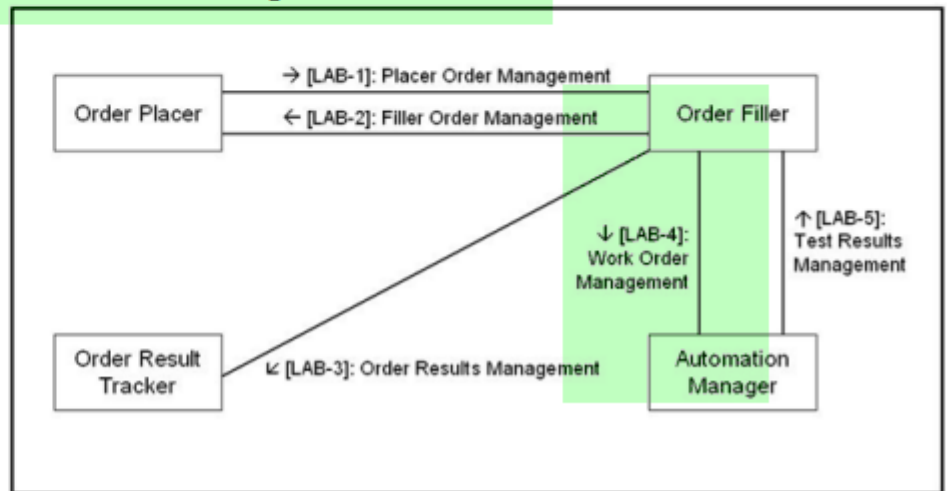↙ [LAB-3]: Order Results Management

Automation Manager

Two Hematology Batteries on a Blood Specimen

4.2.3.2 LAB-4 (OF → AM): Message "New order"

A new work order is sent to the Automation Manager:

```
MSH|^~\&|OF|Cytology|AM|Automation|200310060825||OML^O33^OML_O33|101|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||9998888
SPM|1|456_1^Cytology||BLD|||||||P||||||200310060735|200310060821|||||||||1
ORC|NW|||555^Urology|||||200310060710|^NURSE^JANET|||||||||||Urology^^^^^^FI^^^UR01
TQ1|1||||||||R
OBR|1|456^Cytology|||85027^Hemogram and platelet count, automated^C4|
|||||^COLLECT^JOHN|||||||^URO^^^^DR
ORC|NW|||555^Urology|||||200310060710|^NURSE^JANET|||||||||||Urology^^^^^^FI^^^UR01
TQ1|1||||||||R
OBR|1|457^Cytology|||85009^Differential WBC Count, buffy coat^C4|
|||||^COLLECT^JOHN|||||||^URO^^^^DR
```

2 Batteries : 85027, 85009
We are happy to see the AM
understands those batteries too.

→ [LAB-1]: Placer Order Management
← [LAB-2]: Filler Order Management
Order Placer

Order Filler

↓ [LAB-4]: Work Order Management

↑ [LAB-5]: Test Results Management

Order Result Tracker

⤎ [LAB-3]: Order Results Management
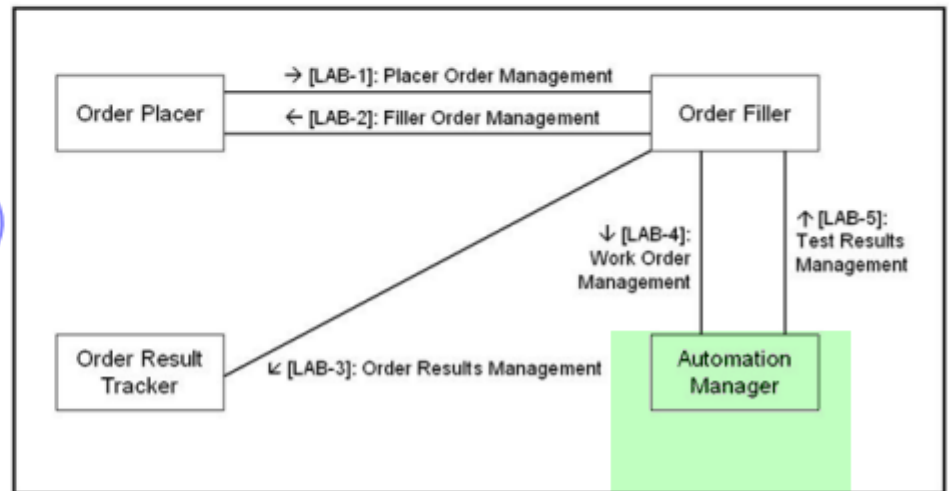
Automation Manager

Two Hematology Batteries on a Blood Specimen

4.2.3.5 LAB-21 (AM→ Analyzer): New AWOS

```
MSH|^~\&|AM|Cytology|LD|Cytology|200506121348||OML^O33^OML_O33|001|T|2.5|||||USA||EI
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||9998888
SPM|1|456_1||BLD|||||||P|||||200506121330|||||||||1
ORC|NW|9876543^Urology|||||||200506121315|66622^NURSE^JANET|||||||||||Urology
TQ1|||||||||R
OBR||9876543|||85027^Hemogram and platelet count, automated^C4||||||||||||||14788^URO
ORC|NW|9876544^Urology|||||||200506121315|66622^NURSE^JANET|||||||||||Urology
TQ1|||||||||R
OBR||9876544|||85009^Differential WBC count, buffy coat^C4|||||||||||||14788^URO
```

2 Batteries : 85027, 85009
We are more happy to see the
AM and Analyzer understands
those batteries.

Order Placer
→ [LAB-1]: Placer Order Management
← [LAB-2]: Filler Order Management
Order Filler

↓ [LAB-4]: Work Order Management
↑ [LAB-5]: Test Results Management

Order Result Tracker
↙ [LAB-3]: Order Results Management
Automation Manager

Two Hematology Batteries on a Blood Specimen

4.2.3.7 LAB-23 (Analyzer → AM): Tests Performed

```
MSH|^~\&|LD|Cytology|AM|Cytology|200506121410|||OUL^R22^OUL_R22|102|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||||9998888
SPM|1|456_1|||BLD
OBR||9876543||85027^Hemogram and platelet count, automated^C4||||||||||||||||||||||R
ORC|SC|9876543^Urology|||||||200506121410
OBX|1|NM|11156-7^LEUKOCYTES^LN||8.2|10*3/mm3|||||R|||2005
OBX|2|NM|11273-0^ERYTHROCYTES^LN||4.08|10*3/mm3||||
OBX|3|NM|20509-6^HEMOGLOBIN^LN||13.4|10*3/mm3||||
OBX|4|NM|20570-8^HEMATOCRIT^LN||39.7|10*3/mm3||||
OBX|5|NM|30428-7^MVC^LN||97|10*3/mm3|||||R|||2005
OBX|6|NM|28539-5^MCH^LN||33.0|10*3/mm3|||||R|||2
OBX|7|NM|28540-3^MCHC^LN||33.8|10*3/mm3|||||R|||
OBX|8|NM|11125-2^PLATELETS^LN||220|10*3/mm3|||||R|||
ORC|SC|9876544^Urology|||||||200506121410
OBR||9876544||85009^Differential WBC count, buffy coat^C4|||||||||R
OBX|1|NM|23761-0^NEUTROPHILS/100 LEUKOCYTES^LN||72|%|||||R|||200506121410
OBX|2|NM|26450-7^EOSINOPHILS/100 LEUKOCYTES ^LN||2|%|||||R|||200506121410
OBX|3|NM|26478-8^LYMPHOCYTES/100 LEUKOCYTES ^LN||20|%|||||R|||200506121410
OBX|4|NM|26485-3^MONOCYTES/100 LEUKOCYTES ^LN||6|%|||||R|||200506121410
OBX|5|NM|30180-4^BASOPHILS/100 LEUKOCYTES ^LN||0|%|||||R|||200506121410
```

2 Batteries : 85027, 85009
13 Results identified via LOINC
-> what about the BLD specimen ?
-> What about 10*3/mm3 units ?

Two Hematology Batteries on a Blood Specimen

4.2.3.8 LAB-5 (AM->OF): Message "New Results"

The Automation Manager sends the final results for the work order:

```
MSH|^~\&|AM|Automation|OF|Urology|200310060900||OUL^R22^OUL_R22|308|T|2.5|||||USA||EN
PID|1||6543210^^^Abbeville Hospital^PI||ILL^JOHN^^^^^L||19810101|M
PV1|1|I|||||||||||||||9998888
SPM|1|456 1^Cytology||BLD|||||||P|||||200310060735|200310060821||Y|||||1
OBR|1|456^Cytology||85027^Hemogram and platelet count, automated^C4|
|||||^COLLECT^JOHN|P|||||^URO^^^^DR|
|||||200310060832|||F|||||||&TECHOS&MARC^200310060833
ORC|SC||||CM||||200310060710|^NURSE^JANET||||||||||Urol
OBX|1|NM|11156-7^LEUKOCYTES^LN||8.2|10*3/mm3|4-10|
OBX|2|NM|11273-0^ERYTHROCYTES^LN||4.08|10*6/mm3|1
OBX|3|NM|20509-6^HEMOGLOBIN^LN||13.4|g/dL|11.5-14
OBX|4|NM|20570-8^HEMATOCRIT^LN||39.7|%|37-47|N||
OBX|5|NM|30428-7^MCV^LN||97|fL|80-95|N|||F|||200
OBX|6|NM|28539-5^MCH^LN||33.0|pg|27-32|N|||F|||20
OBX|7|NM|28540-3^MCHC^LN||33.8|%|30-36|N|||F|||20031
OBX|8|NM|11125-2^PLATELETS^LN||220|10*9/L|150-400|N||
OBR|2|457^Cytology||85009^Differential WBC Count, buffy coat
|||||^COLLECT^JOHN|P|||||^URO^^^^DR
|||||200310060832|||F|||||||&TECHOS&MARC^200310060833
ORC|SC||||CM||||200310060710|^NURSE^JANET||||||||||Urology^^^^^^FI^^^UR01
OBX|1|NM|23761-0^NEUTROPHILS/100 LEUKOCYTES^LN||72|%||N|||F|||200310060830
OBX|2|NM|26450-7^EOSINOPHILS/100 LEUKOCYTES^LN||2|%||N|||F|||200310060830
OBX|3|NM|26478-8^LYMPHOCYTES/100 LEUKOCYTES^LN||20|%||N|||F|||200310060830
OBX|4|NM|26485-3^MONOCYTES/100 LEUKOCYTES^LN||6|%||N|||F|||200310060830
OBX|5|NM|30180-4^BASOPHILS/100 LEUKOCYTES^LN||0|%||N|||F|||200310060830
```

2 Batteries : 85027, 85009
13 Results identified via LOINC
AM is not making changes.

Two Hematology Batteries on a Blood Specimen

4.2.3.10 LAB-3 (OF->ORT): Message "Status Changed"

The clinical expert has performed the clinical validation at 09h29. The order is completed. The results are final:

```
MSH|^~\&|OF|Cytology|ORT
PID|1||6543210^^^A
PV1|1|I||||||||||||
SPM|1|456_1^Cytolo
OBR|1|9876543^Urol
|||||^COLLECT^JOHN
||||||200310060929
ORC|SC|9876543^Uro
Urology^^^^^^FI^^^
TQ1|1|||||||||R
OBX|1|NM|11156-7^LEUKOCYTES^LN||8.2|10*3/mm3|4-10|N|||F|||200310060830
OBX|2|NM|11273-0^ERYTHROCYTES^LN||4.08|10*6/mm3|10-12|N|||F|||200310060830
OBX|3|NM|20509-6^HEMOGLOBIN^LN||13.4|g/dL|11.5-14.5|N|||F|||200310060830
OBX|4|NM|20570-8^HEMATOCRIT^LN||39.7|%|37-47|N|||F|||200310060830
OBX|5|NM|30428-7^MCV^LN||97|fL|80-95|N|||F|||200310060830
OBX|6|NM|28539-5^MCH^LN||33.0|pg|27-32|N|||F|||200310060830
OBX|7|NM|28540-3^MCHC^LN||33.8|%|30-36|N|||F|||200310060830
OBX|8|NM|11125-2^PLATELETS^LN||220|10*9/L|150-400|N|||F|||200310060830
OBR|2|9876544^Urology|457^Cytology|85009^Differential WBC Count, buffy coat^C4|
|||||^COLLECT^JOHN|P|||||^URO^^^DR|
||||||200310060929|||F|||||||&CYTO&JANE^200310060929|
ORC|SC|9876544^Urology||555^Urology|CM||||200310060710|^NURSE^JANET||||||||||||
Urology^^^^^^FI^^^UR01
TQ1|1|||||||||R
OBX|1|NM|23761-0^NEUTROPHILS/100 LEUKOCYTES^LN||72|%||N|||F|||200310060830
OBX|2|NM|26450-7^EOSINOPHILS/100 LEUKOCYTES^LN||2|%||N|||F|||200310060830
OBX|3|NM|26478-8^LYMPHOCYTES/100 LEUKOCYTES^LN||20|%||N|||F|||200310060830
OBX|4|NM|26485-3^MONOCYTES/100 LEUKOCYTES^LN||6|%||N|||F|||200310060830
OBX|5|NM|30180-4^BASOPHILS/100 LEUKOCYTES^LN||0|%||N|||F|||200310060830
```

Neutrophils : 72,00/100 * 8.2 10*3/mm3 => 5,904 10*3/mm3

2 Batteries : 85027, 85009
13 Results identified via LOINC
The OF could have completed this case with absolute values for the diff.
+ 5 extra LOINC ?
and what about the ordering battery ?

IHE Laboratory.
Do we have to plan something with
LOINC ? SNOMED ? ..