HIL index and interference

Joining pre-analytical index with post-analytical comments to the clinicians

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Different sources affects the quality of a blood sample

How is the sample acquired: Home, ambulance, hospital, general practitioner ….

The condition of the patient

The handling: Pneumatic tube system, transport by hand, or directly into the measurement instrument?

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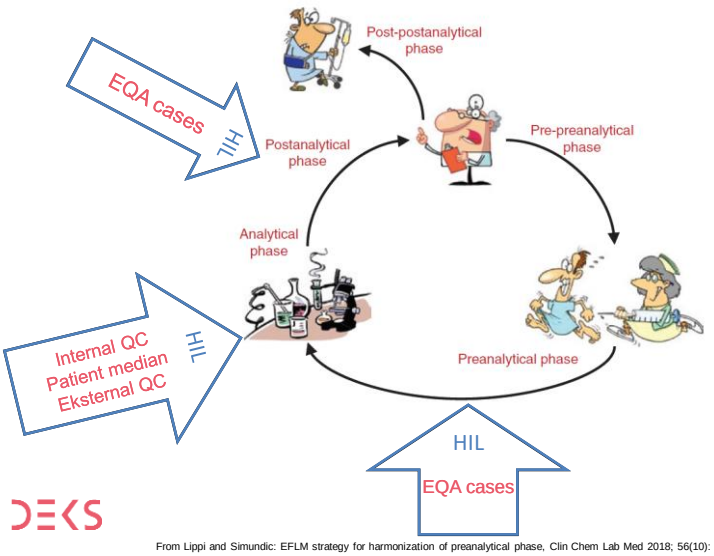
How do EQA ensure the quality of the analytical phases?



From Lippi and Simundic: EFLM strategy for harmonization of preanalytical phase, Clin Chem Lab Med 2018; 56(10): 1660-1666

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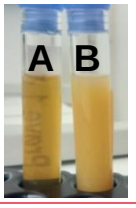
Quality assurance programme for 3 analytical phases

Normal sample



Interference-sample

HIL-index and interference

3 rounds pr. year

2 samples each round, similar pools of serum:

- 1 normal sample A
- 1 modified sample B with added interference (haemolysis, icterus or lipemia)

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HIL-indeks and interference.
Assurance of quality in several phases

Pre-analytical (Most errors)

- Do all find the same haemolytic, icterical and lipemic index?

Analytical quality assurance (Fewest errors)

- Cholesterol, Creatinine, Ferritin, Potassium, LDH, Phosphate

Post-analytical (Second most errors)

- Is the result accompanied with a comment?
- Are the comments the same?

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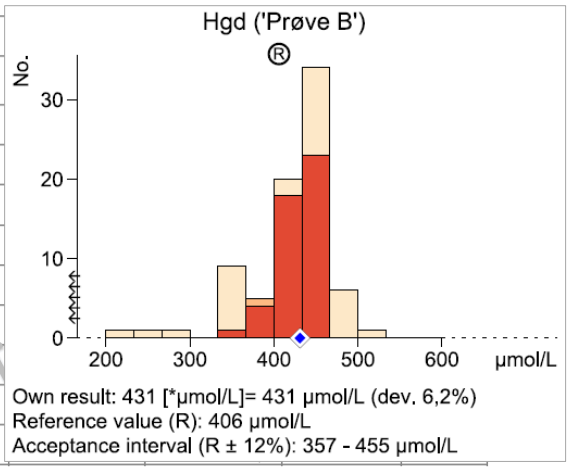
Pre-analytical
Measurements of the icteric index

Exampel from HIL round 2, 2020, Sample B

Method group
Reference target
Advia Chemistry
Alinity
Architect
Atellica
AU Series
Cobas c-modul
Cobas c-modul
Dimension Vista
Vitros



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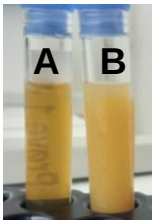
Analytical part
The setup

Quality assurance programme with many aspects

Both normal EQA ……. and interference-effects

Normal unmodified sample



As sample A, but with added interference in different concentrations

Difference = interference

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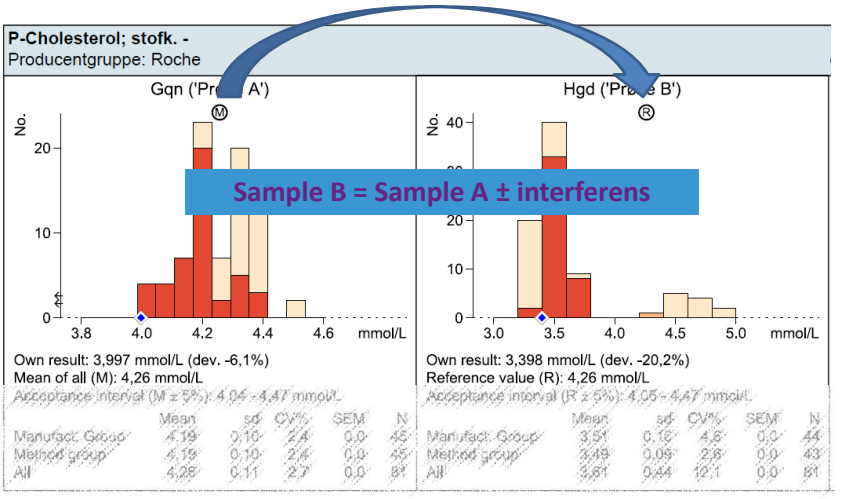
Analytical part
Normal EQA and interference effect



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Analytical part I
Results for cholesterol

Table 2. Components with interference
Difference in % is the difference between sample A and B. The number n is for results reported for sample B.
Red figures mark where the used acceptance limits have been exceeded: Cholesterol 5%

Component	Method group	Sample A	Sample B	Difference, %	number, n
Cholesterol [mmol/L]	Alle	4,26	3,61	-15,3	81
	Advia Chemistry	4,36	4,59	5,3	2
	Alinity	4,35	3,32	-23,7	11
	Architect	4,34	3,34	-23,0	11
	Atellica	4,31	4,67	8,4	8
	AU series	4,36	3,46	-20,6	3
	Cobas c-modul	4,19	3,49	-16,7	43
	Cobas e-modul		4,38		1
	Dimension Vista	4,2	3,6	-14,3	1
	Vitros	4,3	4,4	2,3	1

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Analytical part II
Results for ferritin

Acceptance limit for Ferritin: ±15%

Component	Method group	Sample A	Sample B	Difference %	number, n
Ferritin [µg/L]	Alle	139,2	138,9	-0,2	73
	Advia Centauer	122	119	-2,5	1
	Alinity	117,2	116,8	-0,3	11
	Architect	112	112,2	0,2	9
	Atellica	119,5	120,3	0,7	7
	Beckman Coulter Dxl	92,9	92,1	-0,9	1
	Cobas c-modul	157,2	157,5	0,2	11
	Cobas e-modul	154,9	154,3	-0,4	32
	Vitros	128	121	-5,5	1

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Postanalytical quality assurance
The setup

Assessment of the postanalytical process:

- Comments that might have accompanied the result to the clinician, had it been a patient sample
- Do we see a comment once interference is present
- Does everyone add the same comment, when having measured the same interference?
- Do we see comments when no interference is present?

Consequences of wrong post-analytical handling

- Results might wrongly be retained → need for new sample → longer time before a result is released
- Results are wrongly released or results are released without a comment despite interference → risk of wrong diagnosis

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Post-analytical comments I
Cholesterol

Interference and as expected:

The following comments have accompanied the result of an analysis request.

Component	Result for the clinician regarding sample B
	Sample B: Cannot be performed – sample icteric
	Sample B handed in as: Icteric
	Sample B Patients result: Icteric
	Sample B cannot be released due to icterus.
	Answer released as icteric
Cholesterol	Sample B: with precaution due to icterus
	Sample B – answer cannot be released due to icterus
	The B-result is released with a comment.
	The patient has elevated bilirubin. The analysis result is false low
	The analysis result is false low, up till 20 % to low due to high bilirubin concentration in the sample
	Sample B: the result is false low up till 20 % due to a high concentration of bilirubin
	Answer is released with following comment: Uncertain answer due to interference of high bilirubin
	Sample B: The result will not be reported. Instead. Cannot be analyzed because the sample is icteric.

Lots of interesting comments.
Almost the same message,
but different wordings

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Pre-analytical comments II
Ferritin

No specific interference but:

Ferritin	Sample B: cannot be performed, The sample icteric
	Icteric
	Sample B: It is not possible to detect ferritin due to interference of bilirubin
	Answer released with following comment: Uncertain answer due to interference with high bilirubin

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Conclusion

It is possible to combine quality assurance of the pre-analytical, analytical and post-analytical phases

When measured, the important H, I and L indexes varies among instruments

Analytical measurement on different instruments are affected differently by interferences

Post-analytical a great variance among comments and release/withhold of results is seen, which directly influences the clinician's possibility to diagnose patients

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International scheme running for 6 years with participants from many Countries

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Questions

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