Report interpretation

Here you will find instructions on how to interpret reports for DEKS 'external quality assurance programs. This guide does not apply to the following external quality assurance programs:

- HIL-index (4131 DK)
- Non-invasive fetal RhD genotyping (4268 DK)

Interpretation of HIL-index (4131 DK) can be found here:
deks.dk/en/products/information-about-the-deks-programs/interpretation-of-reports/

Interpretation of Non-invasive fetal RhD genotyping (4268 DK) is described in the report.

Contents

Basic information

Report title

States which quality assessment program this report is about.

Program number – Program name
Round number. Lab indentification

Example:

3041 DK - Hæmatologi
Udsendelse 5 - 2019. Laboratorie nr. 500. resultat id. 500

Information about method

Your reported information about your method and information about which control groups your result/ your method is placed in.

Analysis name	**Equipment name or -group**
Possibly Method- or Manufacturer group	Group: *Instrument-, method- or principle group*

Examples of what is should look like:

F-Hæmoglobin(Fe); (Blod i fæces) stofk.	Instrument: OC Sensor Pledia Instrumentgruppe: OC Sensor Pledia
P-Cholesterol; stofk. - Producentgruppe: Roche	Instrument: Cobas 6000/c 501 - Tæki 1 Metodegruppe: Cobas c-modul
P-Hæmoglobin; stofk.	Instrumentgruppe: Spektofotometri, Genesys Principgruppe: Oxyhæmoglobin

Outlier detection

An outlier is a result that differs significantly from the results of the other participants.

DEKS identifies and removes outliers in 3 steps:

Validation rules

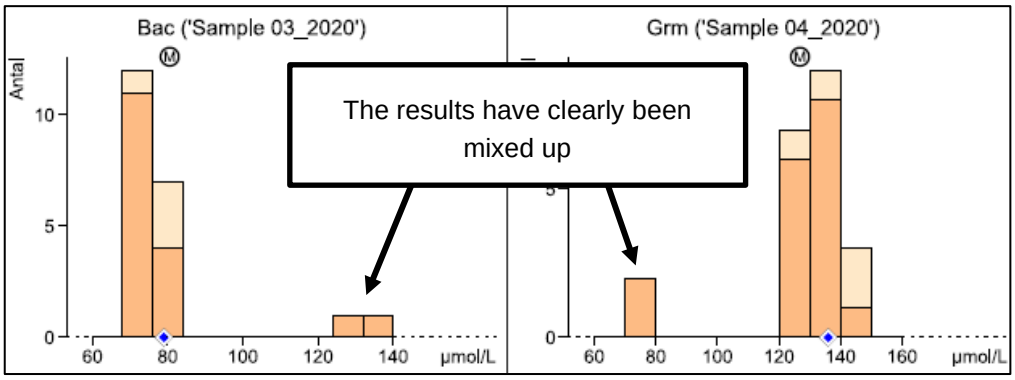
In the entry form in DEKSonline, various validation rules have been defined, e.g. whether negative numbers are allowed or that the result must be in a certain interval, thus typing errors can be avoided.

Pre-screening

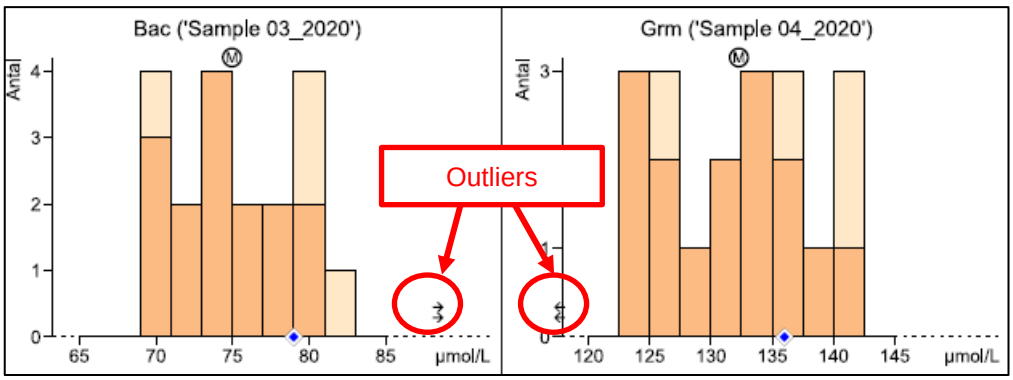
The program coordinator manually finds markedly deviating or obvious incorrect results, e.g. sample or result changes, and removes these as “manual outliers”.

Example of exchange:

Histogram with all data



Histogram after removal of manual outliers



Automatic detection

Outliers are automatically identified either in relation to an algorithm or in relation to the fixed limits.
Different algorithms can be used to identify outliers.
DEKS uses the model where results outside the specified number of standard deviations (sd), e.g. 3,2sd, 3,4sd or 3,6sd, in relation to the mean value is excluded.

The report states which algorithm is used in the specific EQA program.

Graphics

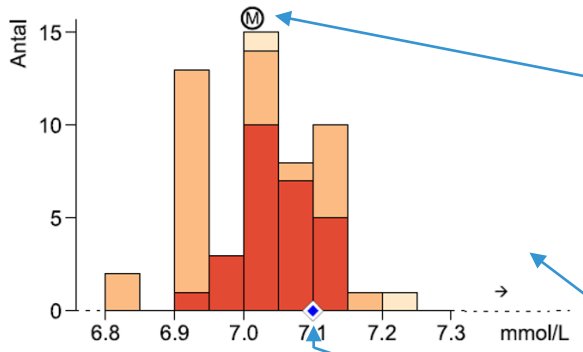
It varies which charts are included in the different reports.

Histogram

The histogram shows the frequency of the values and it shows you how the data is distributed and where your result is in comparison to the target value and the results of the other participants.

Example of what it could look like:

(IIn 'Sample A')



Eget resultat: 7,1 mmol/L (afv. 1,2%)
Middelværdi af alle (M): 7,01 mmol/L
Acceptinterval (M ± 5,6%): 6,62 - 7,41 mmol/L

	Middel	sd	CV%	SEM	N
Producentgruppe	7,01	0,08	1,2	0,0	51
Metodegruppe	7,04	0,05	0,7	0,0	26
Alle	7,01	0,09	1,2	0,0	53

Material code (eg IIn) and sample name (eg "Sample A")

Ⓜ Target value (mean of all results) or

Ⓡ Reference value*

Histogram with:

All results

Own method, reagent, principle, or manufacturer group

Any subgroup group, eg instrument group

→ Outlier

Your result with deviation in percentage from target value

In addition, you can see the acceptance interval and statistics for the various group and for all results under the histogram:

sd = Standard deviation

CV% = Coefficient of variation, calculated as $\frac{sd * 100}{\text{Middel af alle}}$ %

SEM = Standard Error of Mean, calculated as $\frac{sd}{\sqrt{N}}$

N = Number of results

*Reference value is decided by using one of the following methods:

- production of EQA-material (dilution or addition of component) (known value)
- determined by reference laboratory (reference method value)
- determined by analysis and compared to a reference material (reference value)
- determined by expert laborator(y/ies) (consensus value from expert laborator(y/ies)).

You can see in the report, how the actual reference value has been established.

Youden plot

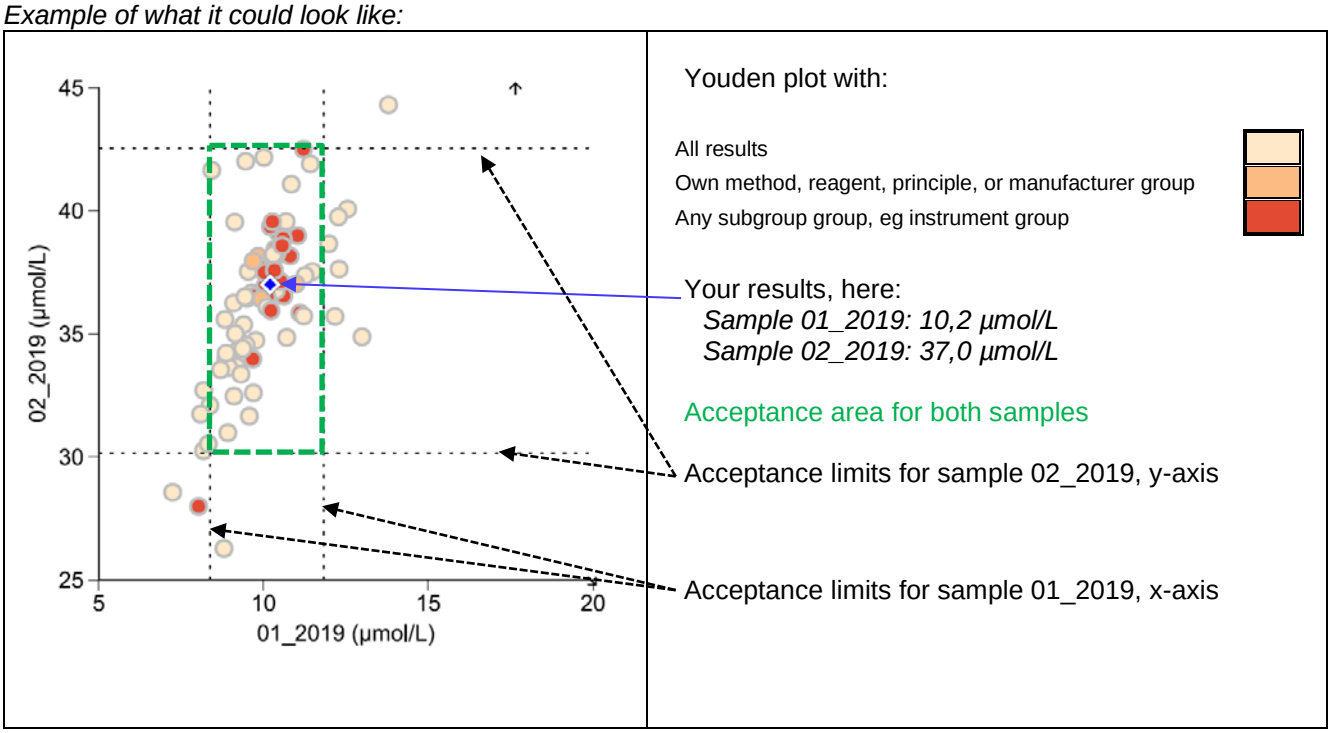
Youden plot is a scatterplot, which is primarily used to show results from two samples from several laboratories in the same graph.

Youden plots show you:

- whether the method measures alike on the two samples, e.g. when the concentration varies
- whether there are bias between methods
- whether methods/results are outside the acceptance area
- whether there are discrepancies between the laboratories.

Your results are within the acceptance range when they are in the green area.

Example of what it could look like:



Historical background

The historical background shows the latest results and results from previous rounds. Up to 12 results are shown. Look for tendencies, e.g.:

- if all results lie to the left of 0 (the black line in the green area), it indicates that the method consequently measures too low.
- if there is a decreasing or rising tendency, it indicates that there is a possible drift at method.

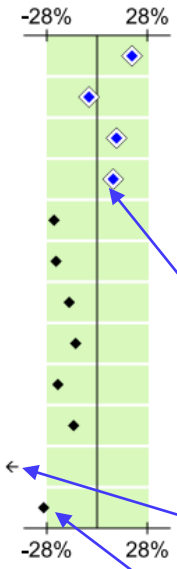
Historical background for components with set acceptance intervals

Your results are within the acceptance range when they are in the green area.

Example of what it could look like:

Historik

Uds.	Materiale	Target	Eget	%dif
19/02	Aoq	2,7797	3,32	19,4
19/02	Gmp	0,2095	0,20	-4,5
19/02	Arp	0,2346	0,26	10,8
19/02	Gpo	0,2753	0,30	9,0
19/01	Inq	1,8150	1,38	-24,0
19/01	Gop	0,3240	0,25	-22,8
19/01	Arp	0,2249	0,19	-15,5
19/01	Gpo	0,2611	0,23	-11,9
18/05	Gtp	0,2558	0,20	-21,8
18/05	Arp	0,2300	0,20	-13,0
18/05	Gmp	0,1924	0,10	-48,0
18/05	Epm	3,1018	2,18	-29,7



Round = Round (year/number)

Material = Material code.
If the material has been distributed several times, the material will have the same code, e.g. Arp
For long-term performance, materials with the same code can be compared, e.g. Arp

Target = Mean value of all results

Own = Your results:
◆ Blue marked are from the latest round
◆ Black are from previous rounds

%diff = Deviation in percentage from target

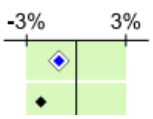
Green area = acceptance interval, in the example ± 28 %

Result, which lies too far outside the acceptance interval (possibly outlier)

Result which lies a little outside the acceptance interval

Or:

Uds.	Target	Eget	%dif	Acc.
18/05	1,959	1,938	-1,0	3
18/04	2,097	2,052	-2,1	3



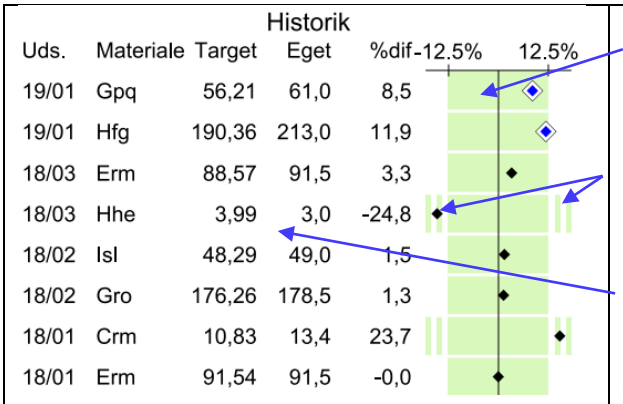
If the same sample is not distributed several times, there is no material code.

Acc. = Acceptance limit, here ± 3 %

Historical background for components with varying acceptance intervals
For some components greater variation for low concentrations is accepted and therefore acceptance intervals based on both percentage and the concentration of samples can be seen.

Your results are within the acceptance range when they are in the green area.

Example of what it could look like:



The wide green field:
For target values above 48 µmol / L, the acceptance interval is ± 12.5%.

The narrow green fields on each side:
For target values below 48 µmol / L or above 48 µmol/L, the acceptance interval is ± 6 µmol / L
Dotted green area: Acceptance interval ± 6 µmol/L

The calculated deviation in percentage is not relevant here, instead you need to look at the difference between you own result and the target, which you calculate yourself
In the example the actual difference is 0,99 µmol/L, which is OK, since 0,99 is less than 6 µmol/L

Difference plot

The difference plot is also known as the Bland-Altmann-plot and shows the deviation from the target value in absolute units for the actual and the previous rounds.

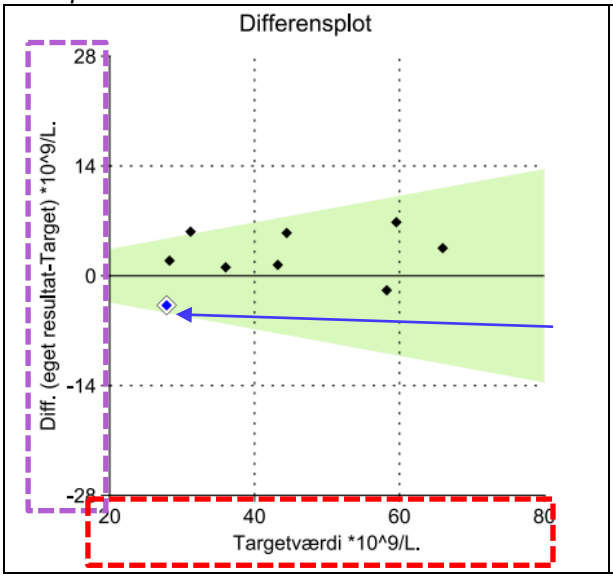
The acceptance interval becomes greater, when the concentration on the target value becomes higher, as the acceptance interval is a percentage of the target value.
Your results are within the acceptance range when they are in the green area.

As opposed to the historical background, the results are shown in the difference plot according to concentration (x-axe), and here it becomes more obvious if your instrument has problems in the low or high concentration area.

Look for concentration dependent tendencies, e.g.:

- if it measures too high at low concentrations and too low at high concentrations. Such tendencies can indicate a skewed calibration chart in the instrument.

Example of what it could look like:



Green area = Acceptance interval, here ± 17 %

Difference between your result and the target value.

The target value's concentration

Your results:
◆ Blue marked is the latest result
◆ Black are from previous rounds

Example:

Target: *27,9 *10⁹/L*
Own result: *24,1 *10⁹/L*
Difference: *-3,8 *10⁹/L ~ -13,5 %*

Document changes

August 2019	Document created
February 2020	EQA-programs that do not exist in English have been removed
February 2021	Interpretation of HIL index added EQA-programs updated The section on outlier detection added
March 2022	Indicating which EQA programs the guide does not cover instead of which one it does. Added that you are within the acceptance range when you are in the green areas.
March 2023	Linguistic changes and the link for interpretation of other reports is changed