

Day to Day troubleshoots in Clinical Laboratory



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Major troubleshoots:

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1. IQC outlier
2. EQC/ PT outlier
3. Samples
4. Reagent problems
5. Equipment failures

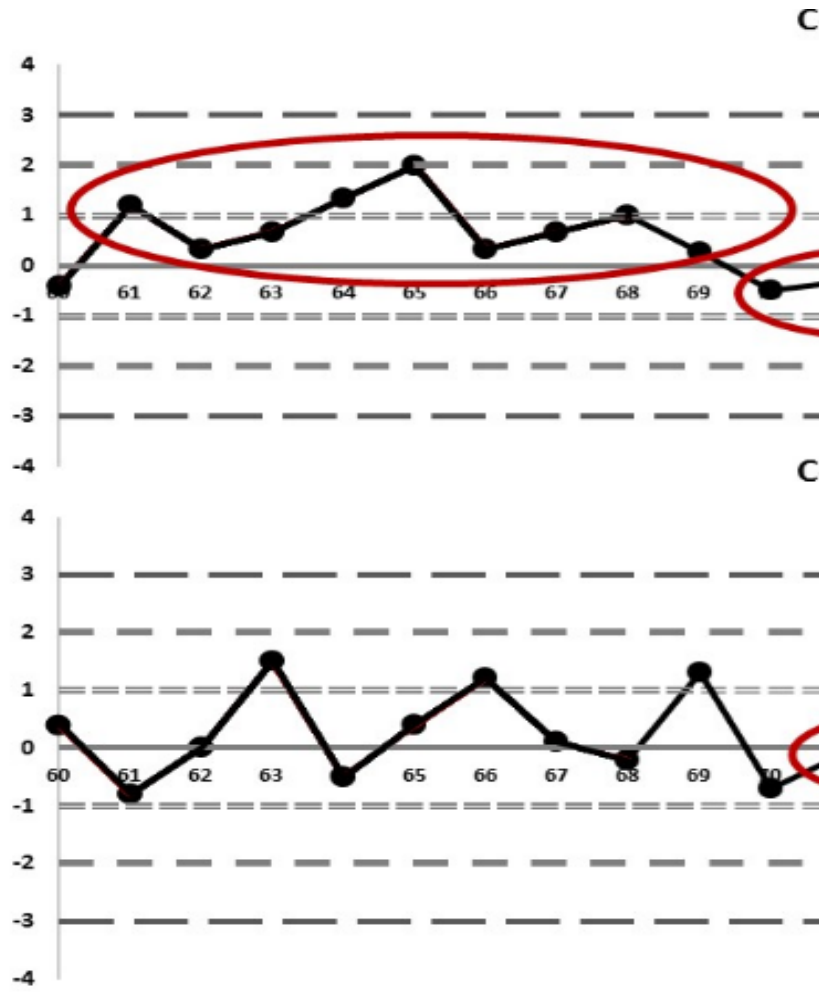
1. IQC outlier:

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- Major challenge
- Define your rules: 1_{2S} , 1_{3S} , 2_{2S} rules
- Manufactures mean vs Lab mean
- Concept of provisional mean & fixed mean
- Prepare RCA & CA plan for IQC outlier.

Manufactures mean vs Lab mean

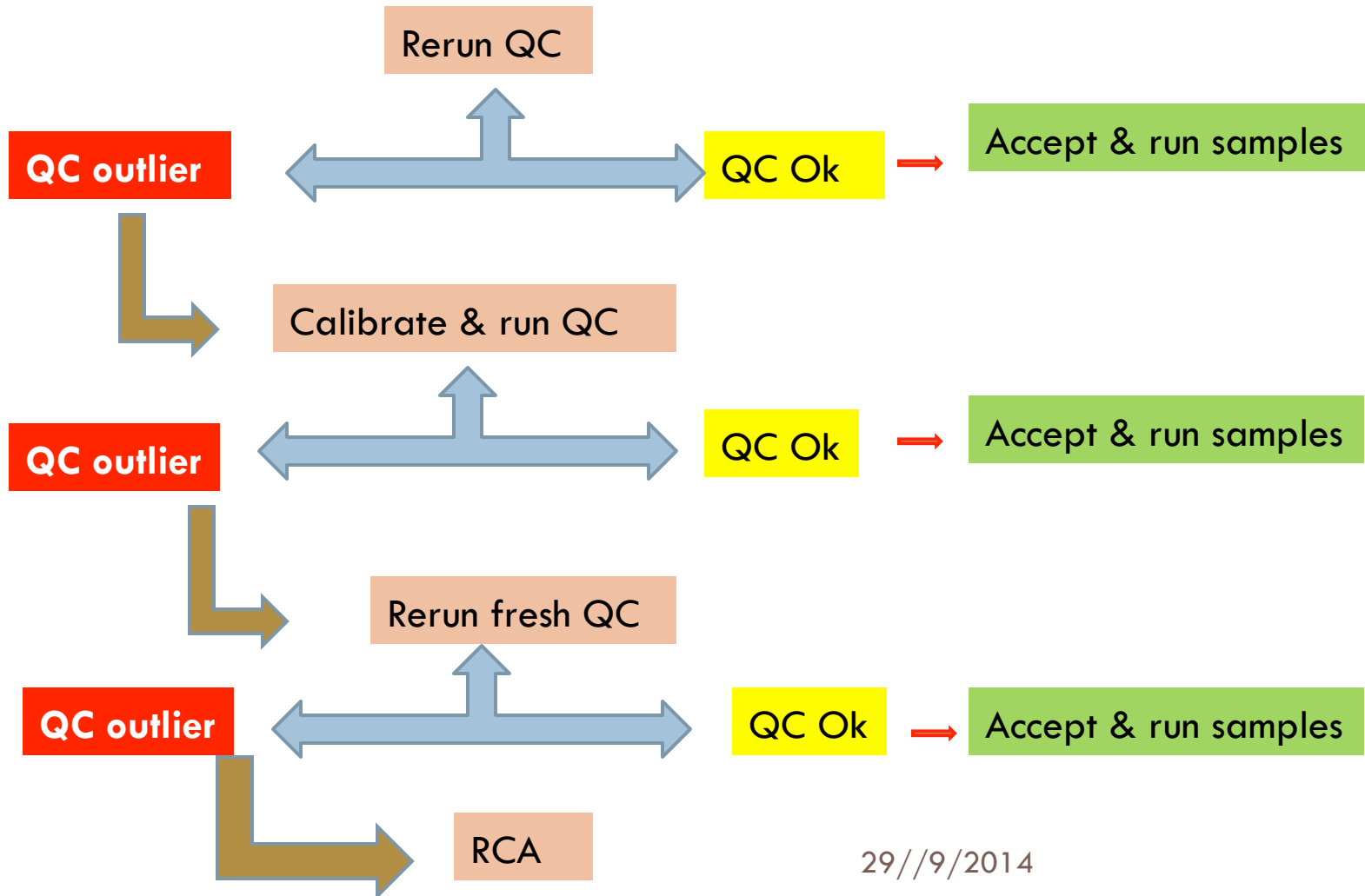
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- Manufactures mean is at “0” level
- Lab mean almost close to +1 SD
- Results in positive Bias.
- Can be avoided by using lab mean values for LJs.

IQC outlier : What next ?

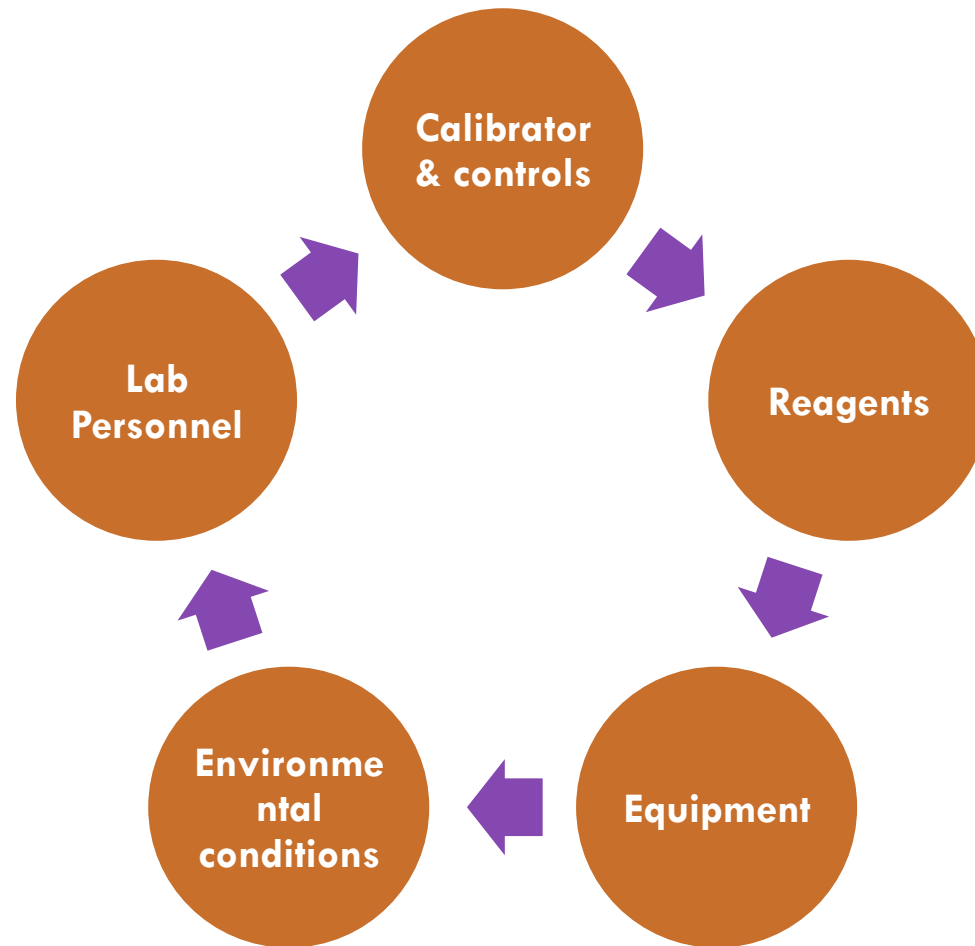
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IQC outlier : RCA

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Calibrators & controls:

New lot
Lot to lot results
Expiry
Reconstitution & aliquots
Values

Reagents:

New lot
Lot to lot results
Abnormal colour
Expiry
Reconstitution
Water

Equipments:

Recent breakdown
Calibration status
Programming
Any pop up error

Environmental conditions:

Lab & refrigerator temperatures
Storage of controls, calibrators &
reagents

Personnel:

Training
New staff member
Human errors

- After RCA, carry out necessary CA & rerun QC.
- If outlier exists, contact reagent/ equipment expert.
- **Remember:** No samples to be processed till IQC are through.

2. EQC/ PT outlier:

EQC sample

- Condition on receipt
- Correct cycle/ program
- Proper storage
- Correct reconstitution
- Calibrated pipette used
- Quality of water used

Sample processing

- Was the sample brought to room temperature
- Proper thawing achieved
- Correct sample / program analyzed
- Time of sample processing

Reagent

- Proper reagent
- Proper storage
- Proper reconstitution
- Expiry

Calibration & IQC

- Was last calibration acceptable
- Any IQC deviation on the day of assessment
- Any trends/ shifts noted

Instrument

- was the equipment functioning properly
- Daily maintenance carried out
- Trained operator

Reporting

- Correct data entry- test, method, units & final results etc
- Correction factor-if any- applied

Sample retesting

- Sample retested
- Results acceptable Yes: RE

No: Need help

EQC comparison

- Compared with correct peer group

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3: Samples

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	Issue	Troubleshoot
1	Sample contains fibrin & blood cells	Remove fibrin, recentrifuge etc...
2	HIL	Check for HIL
3	Bubbles on serum surface	Remove bubbles
4	Concentrated/diluted/deteriorated sample	New sample
5	Improperly stored samples	New sample. Modify storage conditions
6	Improper placement of sample cups/racks	Set them right.

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4: Reagents

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	Issue	Troubleshoot
1	Improper bottle sequence	Correct it
2	Bubbles in reagent	Remove them
3	Incorrect preparation of reagent	Discard & prepare new one
4	Deteriorated/ expired reagent	Replace
5	Frequent addition of reagent in reagent bottle: Crystallization or presence of suspended matter	Clean reagent bottle, dry it & then refill with new reagent
6	Different make detergent/ expired detergent	Replace

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5: Equipment :

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- a) Incorrect dispensing of sample & reagents
- b) Incorrect mixing
- c) Cuvettes & wash station
- d) Photometer & Lamp
- e) Water
- f) Incubation temperature
- g) Reagent refrigerator
- h) Bar codes
- i) Printer

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a. Incorrect Dispense of Samples & Reagents

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	Issue	Troubleshoot
1	Leakage of sample/ reagent from respective syringe	Tighten syringe cases / Tighten probe connectors
2	Leakage from dispense tubing line	Tighten the connectors
3	Leakage from detergent rolling pump units	Tighten the connectors/ Replace
4	Bubbles getting generated in dispenser tubing system	Prime
5	Clogging of dispenser tubing/ probes	Clean the probes internally using mandolin string, clean all tubes. Replace

Probes can also get blocked due to improper drainage of detergent

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a. Incorrect Dispense of Sample & Reagent contd...

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	Issue	Troubleshoot
6	Bent or deformed sample/ reagent probe tip	Replace
7	Improper positioning of sample probe/ Probe tip not centrally positioned	Reposition Replace if deformed/ bent
8	Defect in liquid level sensing	Replace

b. Incorrect mixing

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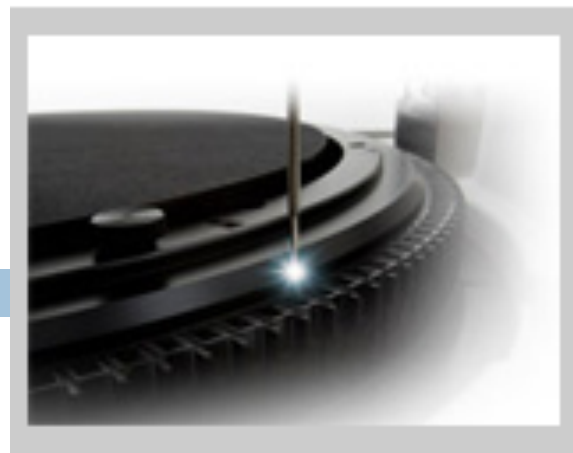


	Issue	Troubleshoot
1	Contaminated mixer bars	Wash
2	Coating on mixer bars removed	Replace
3	Abnormal sound of mixer bars	Replace/ company engineer
4	Improper drainage of wash water & detergent from the wash well	Company engineer
5	Improperly mounted mixer bars	Replace/ company engineer

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c. Cuvettes & wash stations

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1	Scratches, fingerprints or foreign material on cuvettes	Wash/ Replace
2	Stained cuvettes	Wash/ Replace
3	Damaged cuvettes	Replace
4	Dampness on outside of cuvettes & Cuvette wheel	Check tube joints, nozzles for leakages
5	Large amount of water remains in cuvettes after washing	Check tube joints, nozzles for leakages. Wash nozzles could be clogged

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d. Photometer lamp/ Photometer Unit

1	Deterioration of photometer lamp	Replace
2	Lamp doesn't stay lit constantly	Photocal/ Replace

e. Deionised water tank & water:

1	DI water tank slimy & stained. Formation of water scale inside the tank. Dust in tank	Thorough cleaning without keeping any residues of detergent.
2	High water conductivity : affecting Ca, Mg & Fe	Check water quality. Replace filters
3	Clogging of filters / piping	Replace filters/ piping

f. Incubation temperature

Analysis started immediately

Wait till incubation temperature is attained

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g. Reagent refrigerator:

Inappropriate reagent temperature

Keep sufficient space between rear panel & wall.

Check room temperature- 18 to 32 degree Cen.

Company engineer

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h. Bar codes

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1	Water drops/ stains on barcodes	Wipe/ replace. Check for leakages
2	Peeled bar codes	Replace
3	Staining/ scratching of reflecting mirror of barcode reader	Company engineer

i. Printer:

1	No print / Light print	Check power Not in online status Ribbon/ cartridge consumed Thermal heads needs replacement
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To conclude...

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- It is important to understand common troubleshoots & their correction.
- Good quality of sample, reagents & properly maintained equipments form backbone of quality reports.
- It is important to have QC plan for the laboratory
- Many issues related to equipments can be sorted out without approaching the service engineers.
- Issues will vary from equipment to equipment.
- Rectify errors only if you are confident.

