

Module 5: Routine/Preventative Maintenance of Equipment

Key Message ...

My lab maintains equipment to provide uninterrupted service.

Desired Outcome

Equipment functioning all the time to ensure uninterrupted and quality service.

Laboratory Equipment

Well maintained equipment is critical to the operations of any laboratory

- Assures testing is accurate and reliably available for patient care needs
- Prevents instrument failures and prolongs life of the instrument



No patient results should be reported until:

- Maintenance is performed, acceptable and documented
 - Daily maintenance procedures
 - System checks
- Quality control is performed, acceptable, and documented

Tasks

- 5.1 - Consolidate and post equipment service information at site
 - Contact
 - Service frequency
 - Dates
- 5.2 - Ensure proper preventative maintenance on instruments when used
 - Cleaning
 - Proper shutdown
- 5.4 - Review and sign maintenance logs to ensure regular preventative maintenance and timely repairs

Not documented, not done!

Creating a Maintenance and QC Log

Operator's Manual

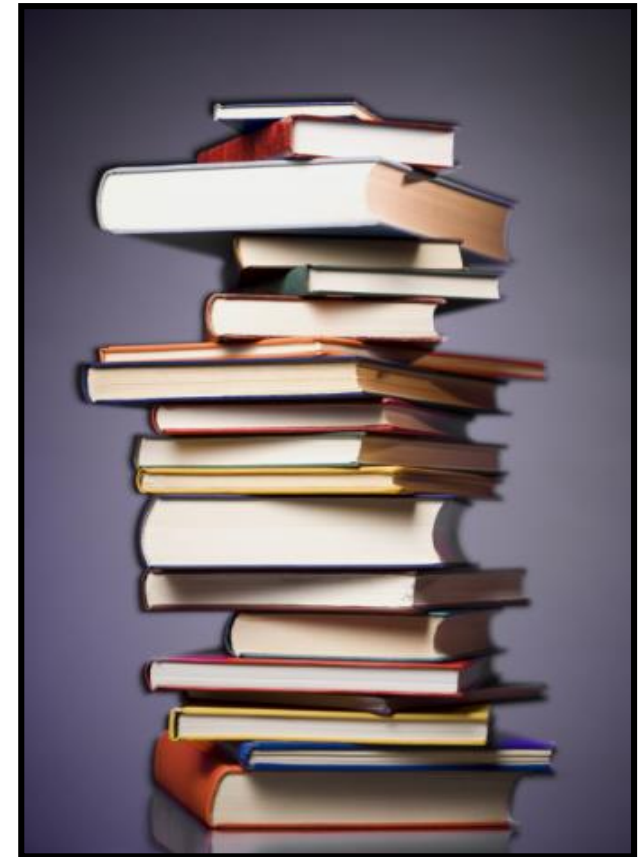
- Preventative maintenance procedures and schedules are indicated
- Frequently includes maintenance logs that can be photocopied
- Step-by-step instructions are provided to perform maintenance, system checks and basic troubleshooting.
- Explanation of error codes and alerts

Standard Operating Procedures (SOPs)

- Current
- Easily accessible at the workbench
- Available for all tests performed
- Customized to reflect site-specific instructions
- Provide step-by-step instructions

Instrument Records

- Maintenance Logs
 - Daily
 - Weekly
 - Monthly and Periodic
 - Calibration
 - Corrective Action
 - Quality Control Logs
- Service Logs



Reagent Log

- Documents the reagents on-board
- Should include:
 - Opened date
 - Manufacturer's expiration date
 - Lot number
 - On-board expiration date
 - Initials

Activity: Creating a Maintenance and QC Log

Purpose

To create an instrument log

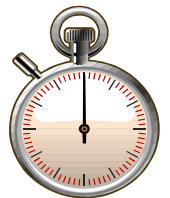
What will you need?

- Handout 1: Reflotron Operator's Manual Excerpts
- Worksheet: Creating a Maintenance/QC Log

What will you do?

Work in pairs (groups of 2)

- Read Handout 1
- Create a Maintenance and QC log (Worksheet) for the Reflotron based on information supplied in the Handout 1



15 minutes

Roche Reflotron Plus



Photograph from Reflotron Plus Operator's Manual. Roche Diagnostics, November 2007
Permission granted for use May 5, 2009

Suggested Format Example

Reflotron Plus Maintenance and QC Log

Month _____ Optic Check Precinorm U Bilirubin Test Strips Creatinine Test Strips

Year _____ lot number _____ lot number _____ lot number _____ lot number _____

 exp date _____ exp date _____ exp date _____ exp date _____

Date	Initials	Clean	Optic Check			Precinorm U		Notes
			642 nm	567 nm	951nm	Bilirubin (umol/L)	Creatinine (umol/L)	
<i>acceptable range</i>								

Supervisor Review/Date: _____

Applied Log Example

Reflotron Plus Maintenance and QC Log

Month March Optic Check Precinorm U Bilirubin Test Strips Creatinine Test Strips
 Year 20XX lot number 1234 lot number A231 lot number B32 lot number C84
 exp date 15/1/20XX exp date 15/4/20XX exp date 5/30/20XX exp date 6/30/20XX

Date	Initials	Clean	Optic Check			Precinorm U		Notes
			642 nm	567 nm	951nm	Bilirubin (umol/L)	Creatinine (umol/L)	
acceptable range			630 - 650	631 - 651	622 - 642	14.5 - 15.5	55-65	
1/3/20XX	TJ					14.3	55	
2/3/20XX	AM	✓	632	633	628	15.1	62	
3/3/20XX	LB					14.9	57	
4/3/20XX	AM					15.8	68	excessive serum noted on holder, cleaned transporter
4/3/20XX	AM	✓	640	639	631	14.8	61	performed check, repeated QC; check & QC acceptable
5/3/20XX	AM					15.2	60	
6/3/20XX	TJ							
7/3/20XX	AM					14.8	60	
8/3/20XX	BW					14.7	63	
9/3/20XX	TJ					15.2		
10/3/20XX	TJ					15.1	61	
11/3/20XX	BW	✓	641	639	632	14.8	60	new bottle Optic; same lot number
12/3/20XX	BW					14.6	58	
13/3/20XX	LB					14.8	59	
14/3/20XX	AM					15.7	67	excessive serum noted on holder, cleaned transporter
14/3/20XX	AM	✓	640	641	630	15.1	59	performed check, repeated QC; check & QC acceptable
15/3/20XX	BW					14.7	63	

Supervisor Review/Date: CC 1/3/20XX CC 14/3/20XX

Reflotron Plus Analyzer MQC: #1-October 8, 20XX

Tasks

- 5.3 - Perform and record troubleshooting on malfunctioning equipment
- 5.5 - Take corrective actions or issue repair orders and record all issues
- 5.6 - Follow-up on all corrective action
 - See if equipment is properly functioning
 - Observe for trends
 - Determine training needs
- 5.7 - Communicate to upper management equipment specifications and maintenance needs

Activity: Making a Service Call

Purpose

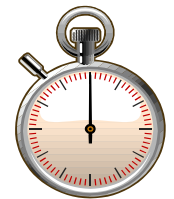
To make a service call, document it, and follow-through until the issue is resolved.

What will you need?

- Handout: L-J Chart
- Worksheet: Corrective Action Log

What will you do?

- Review the Handout to understand the instrumentation issue presented in the scenario
- Document the corrective action on the Worksheet
- Role-play calling the instrument's service contact number.



25 minutes

Levey-Jennings (L-J) Chart

Clinic Laboratory
L-J Chart for Control XYZ

Date From: 17/05/XX Date To:
Analyte Creatinine (umol/L) Lot # N854 Exp Date 30/11/XX

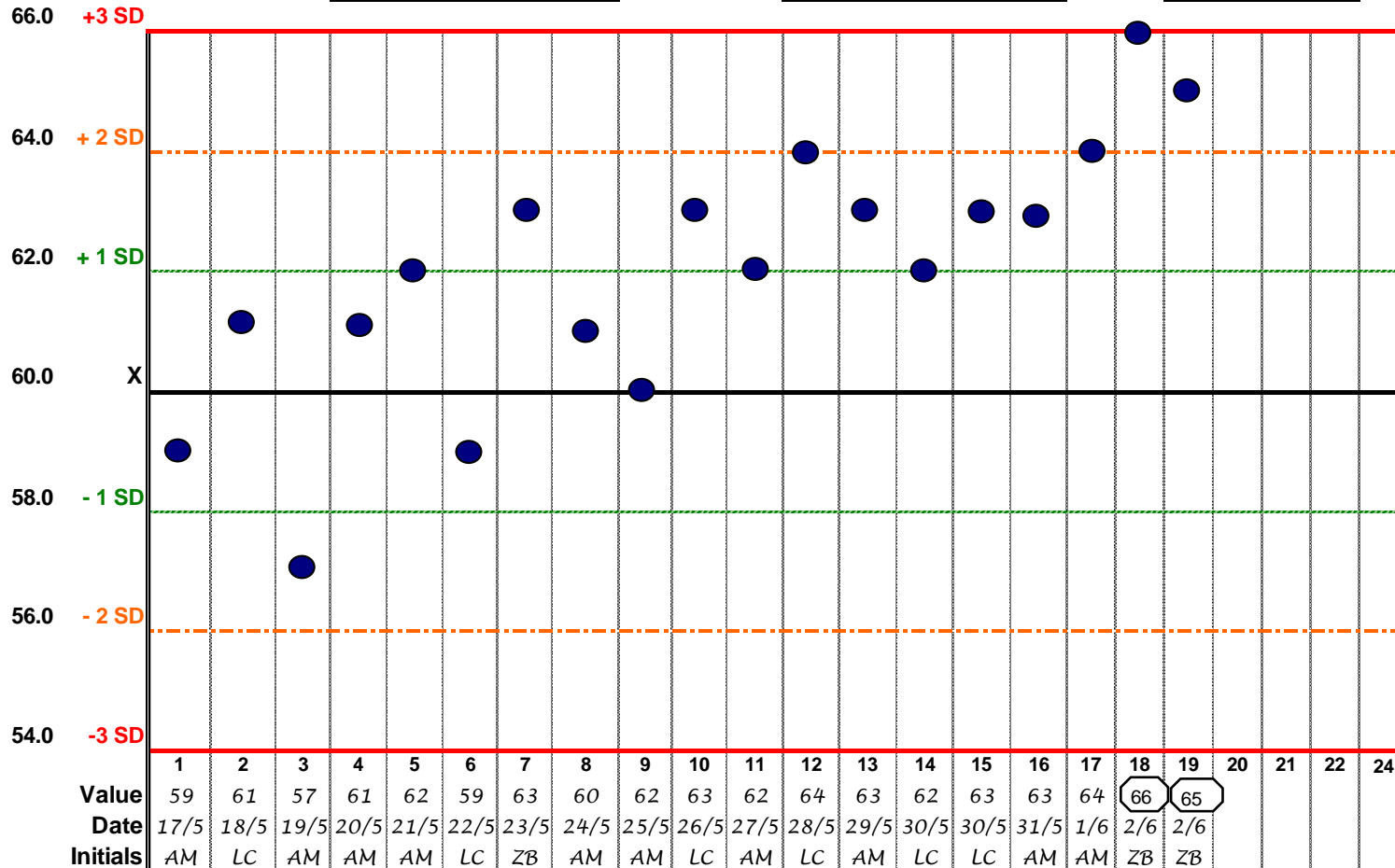




Photo from Cape Regional Medical Center

Tool Kits

- Provided by manufacturer
- Includes specific tools to perform maintenance and troubleshooting
- Stores commonly needed spare parts (bulbs, filters, probes, and tubing)



Photo from Cape Regional Medical Center

Activity: Workstation Set-up

Purpose

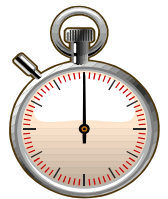
To create and organize an efficient and productive workstation using elements developed from each module.

What will you need?

Laboratory Accreditation
Preparedness Checklist

What will you do?

- Participate in the classroom's discussion
- Integrate key concepts from earlier activities



15 minutes

Information and Supplies at the Instrument's Workstation

- Operator's manual
- SOP for the analyzer
- Supplies to perform maintenance and testing
- Instrument logs
- Toolkit
- Contact information
- Supplies (gloves, waste receptacle)
- Extra Reagents (if space permits)



Photo from Cape Regional Medical Center

MICROSCOPE WORKSTATION MONTHLY MAINTENANCE LOG

month/year May 20XX

Chemtreck Wright Stain

KOH

NaCl

lot # WS0845A

lot # SA#73

SA#1123

exp date 12/09/XX

exp date 13/07/XX

21/06/XX

Reviewed by / date:

AM 4/5/XX

AM 11/5/XX

AM 18/5/XX

DAY	WRIGHT STAIN		CENTRIFUGES	EYE WASH STATION	WORK SURFACES	10% KOH		0.9% NaCl		MICROSCOPE	INITIALS
	no ppt/ quality O.K. (each day of use)	changed (weekly)	cleaned (weekly)	checked & flushed; caps cleaned with 10% bleach (weekly)	cleaned with 10% fresh bleach sol'n (daily)	no ppt or contam. (each day of use)	changed (weekly)	no ppt or contam. (each day of use)	changed (weekly)	oil removed with lens paper, 10x objective in position, light source off, covered (after each day of use)	
1	✓				✓					✓	RSM
2	✓				✓	✓	✓	✓	✓	✓	RSM
3	✓	✓			✓	✓				✓	TY
4	✓				✓	✓		✓		✓	TY
5			✓	✓	✓					✓	RSM
6					✓	✓				✓	RSM
7	✓				✓					✓	RSM
8	✓				✓	✓	✓	✓	✓	✓	RSM
9	✓	✓			✓			✓	✓	✓	LLC
10					✓					✓	RSM
11	✓		✓		✓	✓		✓		✓	RSM
12	✓			✓	✓	✓				✓	TY
13	✓				✓	✓				✓	LLC
14	✓				✓					✓	RSM
15	✓	✓			✓					✓	RSM
16	✓				✓					✓	RSM
17	✓				✓	✓	✓	✓	✓	✓	RSM
18	✓		✓	✓	✓			✓		✓	TY
19	✓				✓	✓		✓		✓	TY
20	✓				✓	✓		✓		✓	TY

Date:

Initials:

16/05XX

replaced microscope bulb

RSM

19/05/XX

biomed engineer checked rpm's and timer on centrifuge; service report filed

TY

Ancillary Equipment

Require Periodic Maintenance and Service

- Maintenance logs
- Service orders
- Replacement parts and supplies

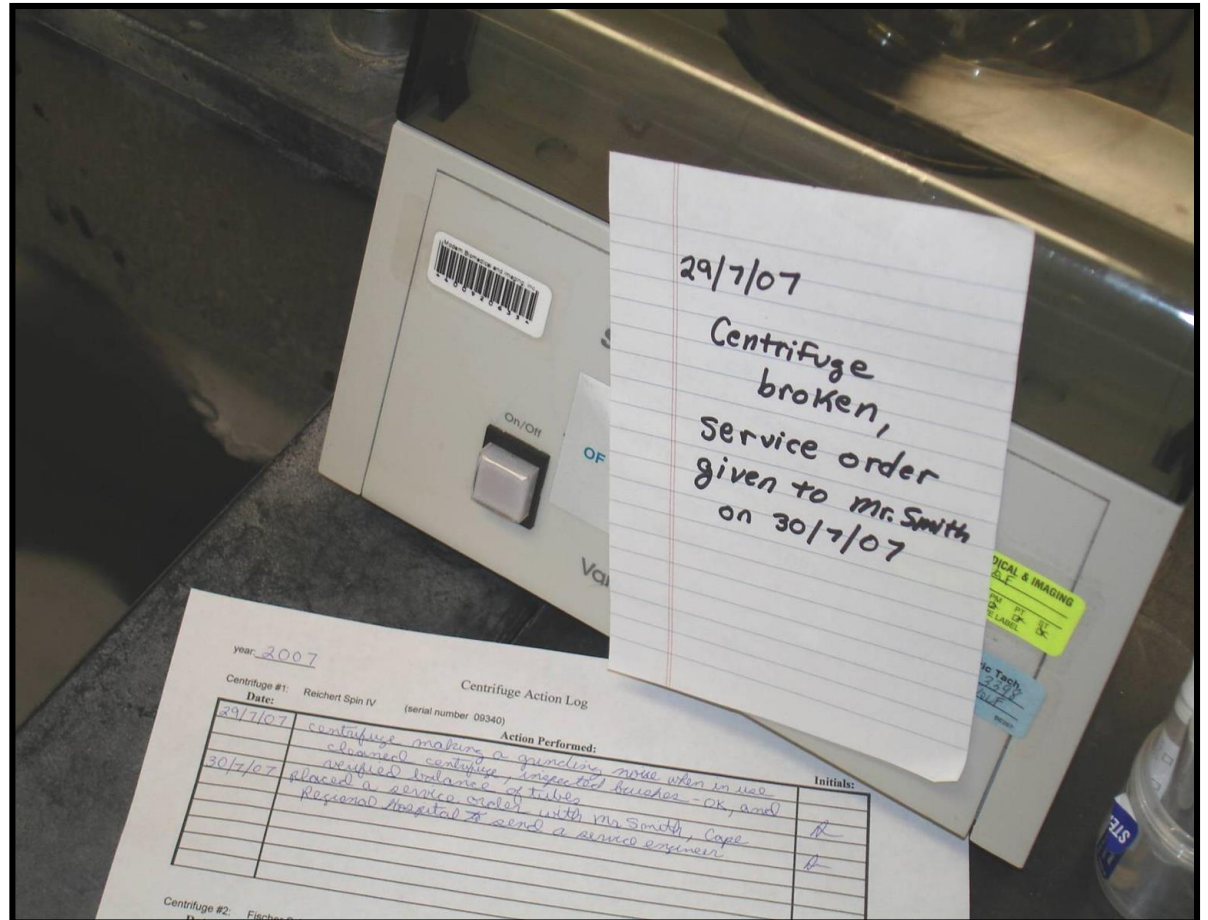


Photo from Cape Regional Medical Center



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Permission granted for use, CMRC, 1/2/09

Activity: What Would You Do?

Purpose

To integrate the module's lessons and apply them to the case scenario.

What will you need?

Handout: Case Study Scenarios

What will you do?

Divide into groups of 4-5

- Select a spokesperson for your group
- Formulate specific action steps to address the scenario from the Handout.
- The group's spokesperson presents the proposed steps during the 2 minute class report.



5 minutes

What Would You Do?

Upon monthly review of the maintenance and temperature charts, it appears documentation was missed on most days.

How will you address:

- The staff member who is responsible for performing and documenting the activities?
- The staff member who says they forgot or did not know it was expected?
- The staff member who explains that at the beginning of the month, the past month's charts were still posted and the new month's charts were not available?

Tasks

- Consolidate and post equipment service information at site
- Ensure proper preventative maintenance on instruments when used
- Review and sign maintenance logs to ensure regular preventative maintenance and timely repairs
- Perform and record troubleshooting on malfunctioning equipment
- Take corrective actions or issue repair orders and record all issues
- Follow-up on all corrective action
- Communicate to upper management equipment specifications and maintenance needs