

# AMERICAN HOSPITAL DUBAI

## ELITE IN-HOSPITAL BIOMEDICAL MAINTENANCE



# WHAT DO YOU THINK THE 2<sup>ND</sup> HIGHEST RISK IN A HEALTHCARE ENVIRONMENT?

## The List for 2019

1. Hackers Can Exploit Remote Access to Systems, Disrupting Healthcare Operations
2. “Clean” Mattresses Can Ooze Body Fluids onto Patients
3. Retained Sponges Persist as a Surgical Complication Despite Manual Counts
4. Improperly Set Ventilator Alarms Put Patients at Risk for Hypoxic Brain Injury or Death
5. Mishandling Flexible Endoscopes after Disinfection Can Lead to Patient Infections
6. Confusing Dose Rate with Flow Rate Can Lead to Infusion Pump Medication Errors
7. Improper Customization of Physiologic Monitor Alarm Settings May Result in Missed Alarms
8. Injury Risk from Overhead Patient Lift Systems
9. Cleaning Fluid Seeping into Electrical Components Can Lead to Equipment Damage and Fires
10. Flawed Battery Charging Systems and Practices Can Affect Device Operation



Quality is a Journey,  
not a Destination



MAYO CLINIC  
CARE NETWORK  
Member

# Improving Maintenance Services is:

a continuous process

team work (mgt, doctors, QI, and suppliers)

a learning curve

Investigative role & building a database



As engineers, we are committed to maintain the highest standards of care





WE ARE COMMITTED TO A TWO-MINUTE  
RESPONSE TIME





# CERTIFICATE OF COMPLETION

This is to certify that

**Amer Salha, Biomed**

has successfully completed the continuing educational activity:

**Cranial Navigation  
(StealthStation® S7® System)**

November 19-20, 2014  
Medtronic Navigation Clinical Education Institute  
Louisville, CO

Contact Hours Awarded: 14.0 Hours

A handwritten signature in blue ink, appearing to read "Amer Salha", written over a horizontal line.

Clinical Education Specialist

**Academia**  
Medical Education

Provider approved by the California Board of Nursing  
Provider number 13668  
Medtronic Midas Rex Institute  
4620 North Beach Street  
Fort Worth TX 76137

This certificate must be maintained by the licensee  
for a period of 4 years after the course concludes.

Medtronic is an approved provider from the California Board of Nursing. The acceptance of our educational contact hours is determined by the healthcare professional's organization.



## ***Product Education Certificate***

Presented To:

Amer Omar Salha

For Attending the Training Course on the  
GammaMed™ iX Afterloader System

Training Course: Dubai, August 28-30, 2017

Instructor

Dr. Georg Schwickert



**Varian BrachyTherapy – The Better Solution.**

**PARTNERS  
FOR** 

The Eagleson Institute,  
Globally promoting the principles and practices of health and  
safety in the life sciences community,  
certifies that

**Amer Salha**

has successfully completed the course titled

**Safety Cabinet Technology**

conducted in

**Sanford, Maine**

presented on

**May 7-8, 2014**

*Mary Ann Sordani*  
Executive Director, Eagleson Institute



**EAGLESON INSTITUTE**



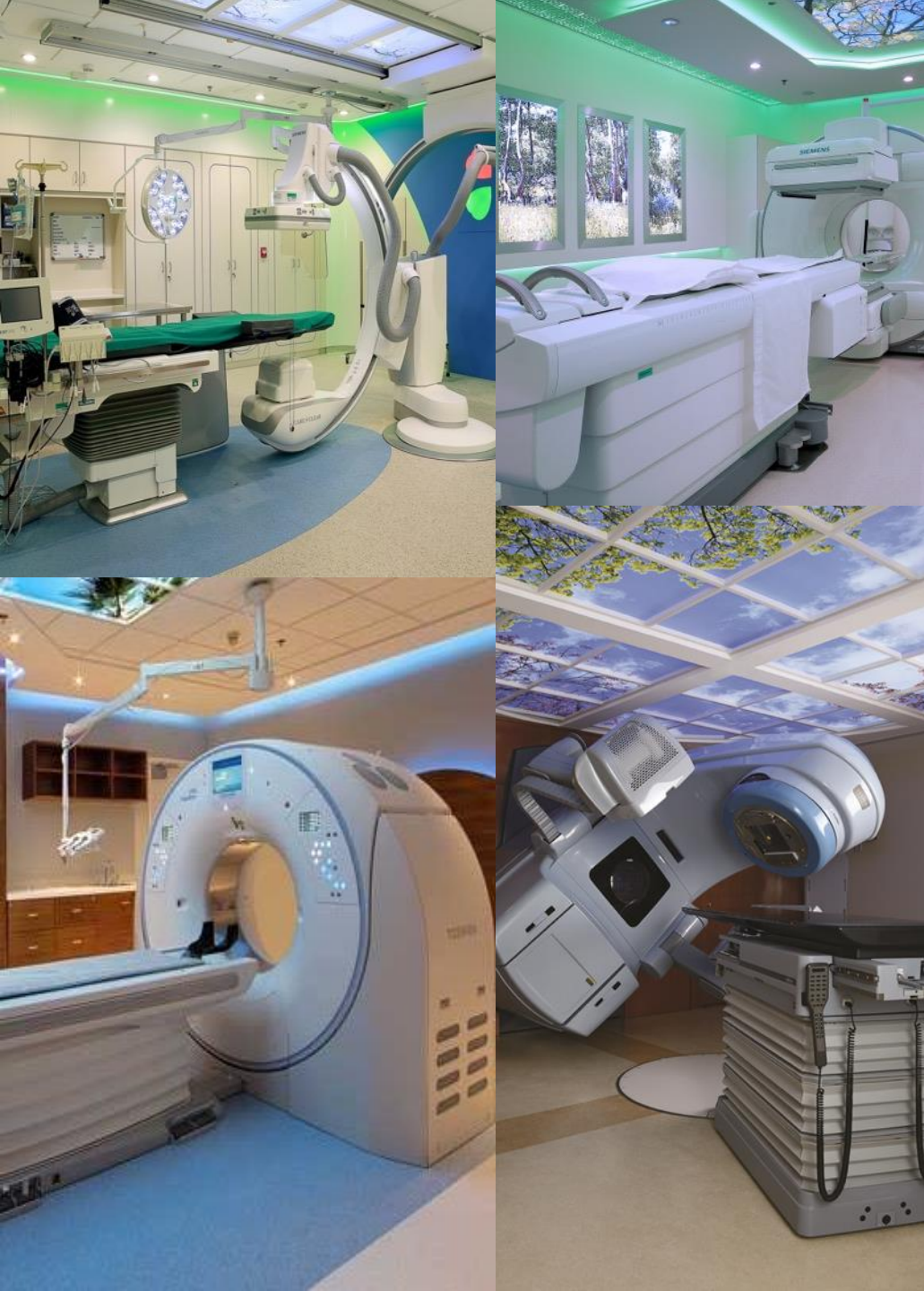












# State-of-the-art Technology

- Radiation Oncology Program (Linear Accelerator) and Brachytherapy
- Positron Emission Tomography(PET/CT), a cancer diagnostic modality using FDG (Flurodeoxyglucose)
- Single Photon Emission Computed Tomography(SPECT/CT), a cancer diagnostic modality using SPECT Isotopes
- 640 slice CT
- 3 Tesla MRI
- Bi Plane Cathlab with EP (Electrophysiology) capabilities
- Multi-purpose Fluoroscopy and comprehensive vascular studies
- O Arm with Neuronavigation surgeries with mm accuracy
- Eight Integrated Digital ORs
- Patient Ceiling lifters (to the room recliner & toilet)
- Automated bathing system in Stroke Rehab







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# WE HAD TO BUILD A DATABASE

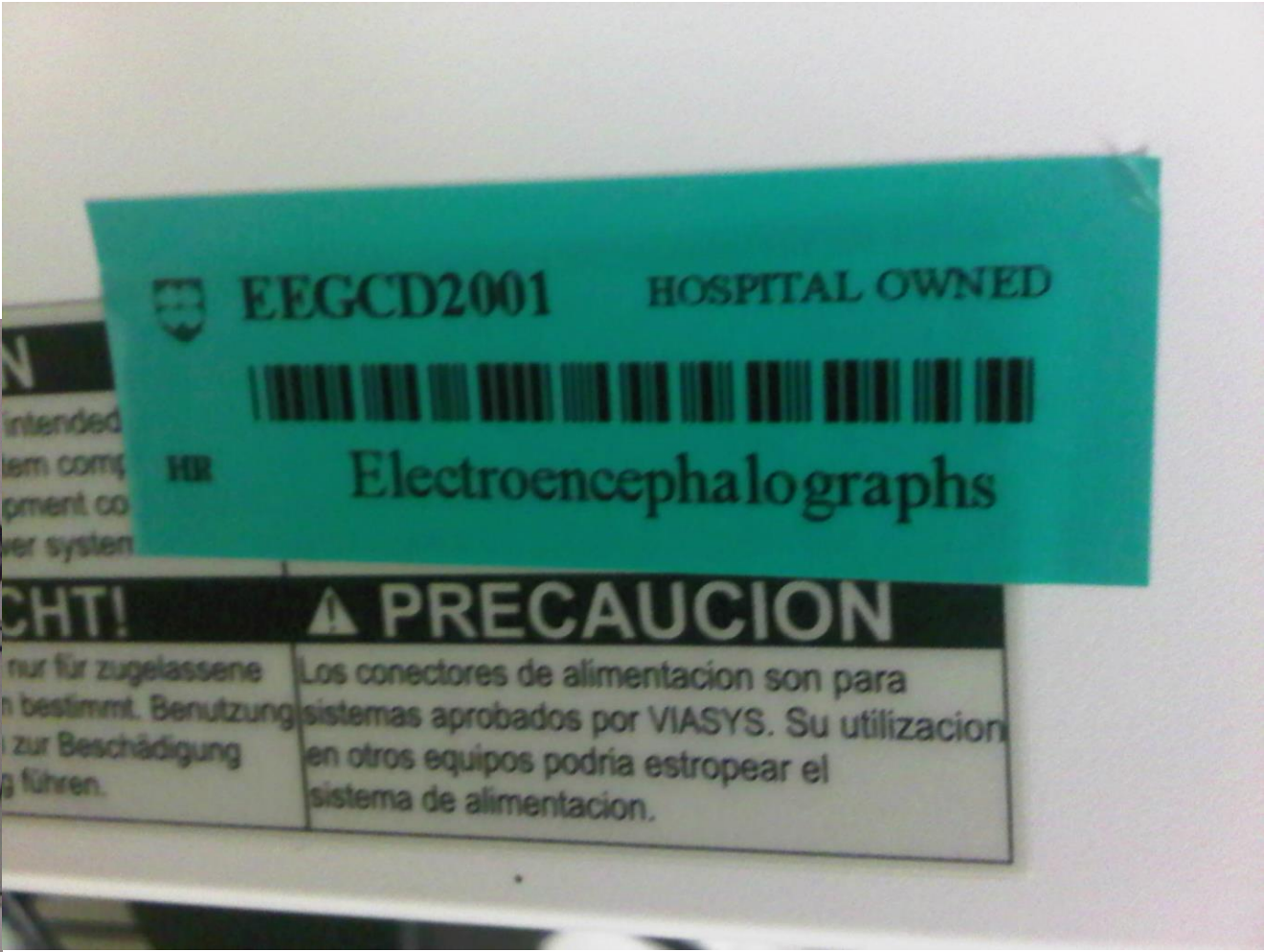
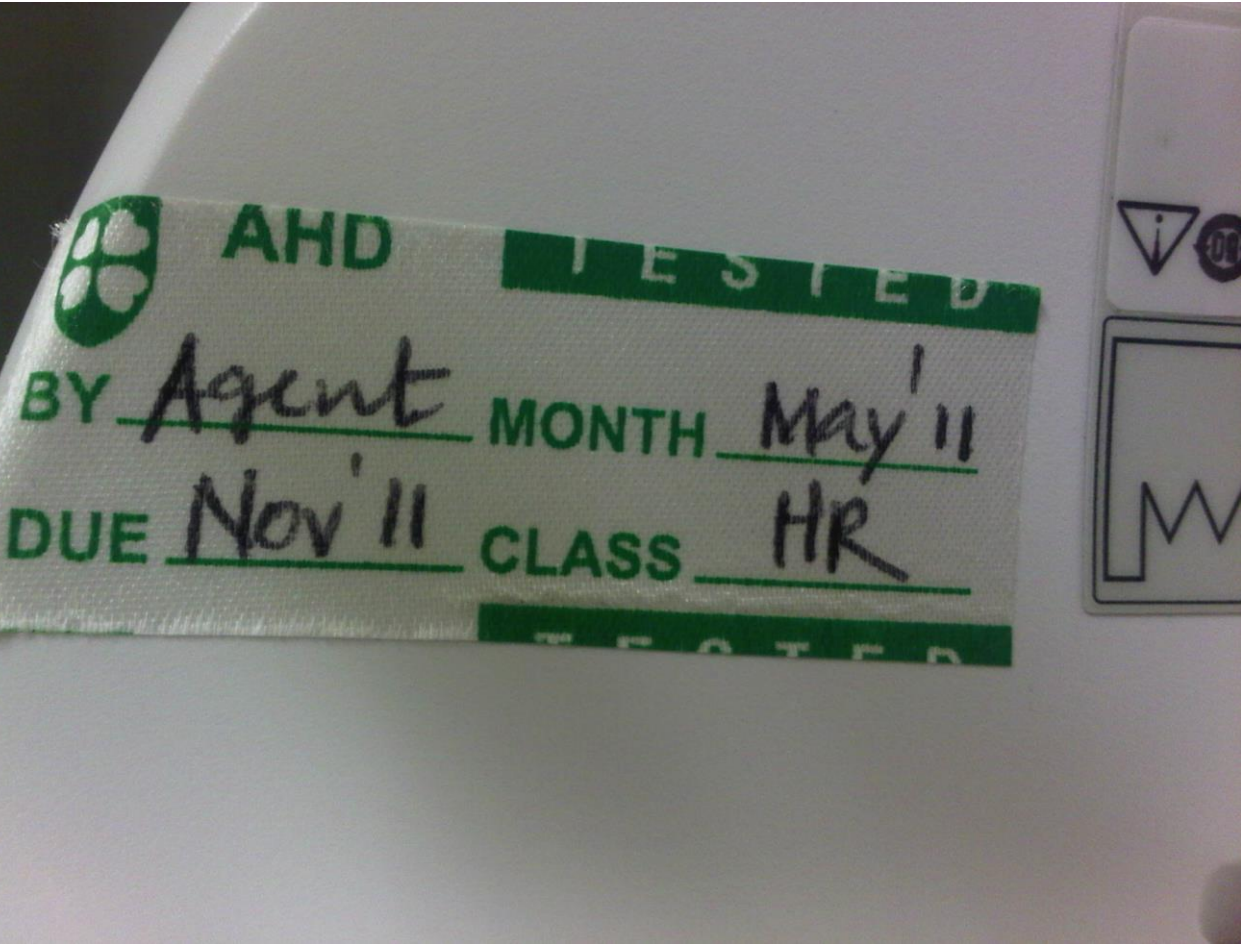
	A	B	C	D	E	F	G	H	I	J
1	AURED1001	AUTO READER		305465	12/7/2003 0:00	NURSING CSSD	3M GULF LTD	193G	2	AL MANU TRADING EST.
620	PMPIN1128	PUMP/CNTRLR		713108539	14/02/2010 00:00	MEDICAL SURGICAL	ALARIS MEDICAL	SIGNATURE PC-1GOLD	0	GULF AND WORLD TRADERS
621	PMPIN1129	PUMP/CNTRLR		713108543	14/02/2010 00:00	JOINT REPLACEMENT UNIT	ALARIS MEDICAL	SIGNATURE PC-1GOLD	0	GULF AND WORLD TRADERS
622	PMPIN1130	PUMP/CNTRLR		713108546	14/02/2010 00:00	JOINT REPLACEMENT UNIT	ALARIS MEDICAL	SIGNATURE PC-1GOLD	0	GULF AND WORLD TRADERS
623	PMPIN1131	PUMP/CNTRLR		713108548	14/02/2010 00:00	JOINT REPLACEMENT UNIT	ALARIS MEDICAL	SIGNATURE PC-1GOLD	0	GULF AND WORLD TRADERS
624	PMPIN1132	PUMP/CNTRLR		713108552	14/02/2010 00:00	JOINT REPLACEMENT UNIT	ALARIS MEDICAL	SIGNATURE PC-1GOLD	0	GULF AND WORLD TRADERS
625	PMPIN1133	PUMP/CNTRLR		713108555	14/02/2010 00:00	JOINT REPLACEMENT UNIT	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
626	PMPIN1134	PUMP/CNTRLR		713108558	14/02/2010 00:00	JOINT REPLACEMENT UNIT	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
627	PMPIN1135	PUMP/CNTRLR		713108560	14/02/2010 00:00	MEDICAL SURGICAL	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
628	PMPIN1136	PUMP/CNTRLR		713108563	14/02/2010 00:00	MEDICAL SURGICAL	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
629	PMPIN1137	PUMP/CNTRLR		713108570	14/02/2010 00:00	MEDICAL SURGICAL	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
630	PMPIN1138	PUMP/CNTRLR		713108572	14/02/2010 00:00	JOINT REPLACEMENT UNIT	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
631	PMPIN1139	PUMP/CNTRLR		713108573	14/02/2010 00:00	JOINT REPLACEMENT UNIT	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
632	PMPIN1140	PUMP/CNTRLR		713108574	14/02/2010 00:00	PAEDIATRIC WARD	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
633	PMPIN1141	PUMP/CNTRLR		713108575	14/02/2010 00:00	PAEDIATRIC WARD	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
634	PMPIN1142	PUMP/CNTRLR		713108576	14/02/2010 00:00	PAEDIATRIC WARD	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
635	PMPIN1143	PUMP/CNTRLR		713108578	14/02/2010 00:00	OB/GYN WARD	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
636	PMPIN1144	PUMP/CNTRLR		713108579	14/02/2010 00:00	OB/GYN WARD	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS
637	PMPIN1145	PUMP/CNTRLR		713108580	14/02/2010 00:00	OB/GYN WARD	ALARIS MEDICAL	SIGNATURE PC-1GOLD	1	GULF AND WORLD TRADERS

# AND CLASSIFY IT BY DEPARTMENT

	A	B	C	D	E
1	SEQ	DEPARTMENT	CONTROL NO.	DESCRIPTION	LOCATION
2	1	CARDIAC CENTRE	SCAPA1018	PATIENT WEIGH SCALE	EXAM ROOM 1
3	2		SPHAW1025	SPHYGMO ADULT WL-MTD	
4	3		OTOOP1026	OTO/OPHTHSCPE WALLMT	
5	4		LITET1034	LIGHT,EXAM, TABLE MT	
6	5		XBXSS2042	XRAY VIEW BOX,2 BANK	
7	6		TBLEM1010	TABLE,EXAM/TREAT MNL	
8	7		SCAPA1006	PATIENT WEIGH SCALE	
9	8		SPHAW1117	SPHYGMO ADULT WL-MTD	
10	9		OTOOP1015	OTO/OPHTHSCPE WALLMT	
11	10		LITET1036	LIGHT,EXAM, TABLE MT	
12	11		XBXSS2043	XRAY VIEW BOX,2 BANK	
13	12		TBLEM1027	TABLE,EXAM/TREAT MNL	
14	13		THERM5023	THERMOMETER,CLINICAL	
15	14		SCAPA1036	PATIENT WEIGH SCALE	EXAM ROOM 3
16	15		SPHAW1010	SPHYGMO ADULT WL-MTD	
17	16		OTOOP1011	OTO/OPHTHSCPE WALLMT	
18	17		LITET1017	LIGHT,EXAM, TABLE MT	
19	18		XBXSS2025	XRAY VIEW BOX,2 BANK	
20	19		TBLEM1002	TABLE,EXAM/TREAT MNL	
21	20		SCAPA1034	PATIENT WEIGH SCALE	
22	21		SPHAW1026	SPHYGMO ADULT WL-MTD	
23	22		OTOOP1012	OTO/OPHTHSCPE WALLMT	
24	23		LITET1031	LIGHT,EXAM, TABLE MT	
25	24		XBXSS2014	XRAY VIEW BOX,2 BANK	
26	25		TBLEM1025	TABLE EXAM/TREAT MNL.	

WE MAINTAIN STOCK  
IN HAND  
TO  
MAXIMIZE UPTIME

# WE HAD TO CONTROL ASSETS AND VERIFY PMS





And we had to build & verify our inventory





We needed to set standards  
to follow for PMs

We chose ECRI

# Low-risk Devices

**Low-risk Devices:** *Devices whose failure or misuse is unlikely to result in serious consequences.*

Alternating-Pressure Pads

Aspirators (Low Volume)

Breast Pumps

Cast Cutters

Circulating-Fluid Pumps

Diathermy Units (Physical Therapy)

Electric Beds

Electric Wheelchairs

Operating Tables

Oto/Ophthalmoscopes

Regulators (Low-Volume Suction)

Smoke Evacuators

Sphygmomanometers

Stimulators (Physical Therapy)

Surgical Lights

Surgical Microscopes



# Medium-risk Devices

**Medium-risk Devices:** *Devices, including many diagnostic instruments, whose misuse, failure, or absence (e.g., out of service with no replacement available) would have a significant impact on patient care, but would not be likely to cause direct serious injury.*

Ambulatory ECG Recorders and Scanners

Aspirators (Surgical, Thoracic, Uterine)

Blood Bank Refrigerators

Blood Gas/pH Analyzers

Blood/Solution Warmers

Cardiac Output Units

Centrifuges and Clinical Lab Equipment

Lithotripters

Noninvasive Blood Pressure Units

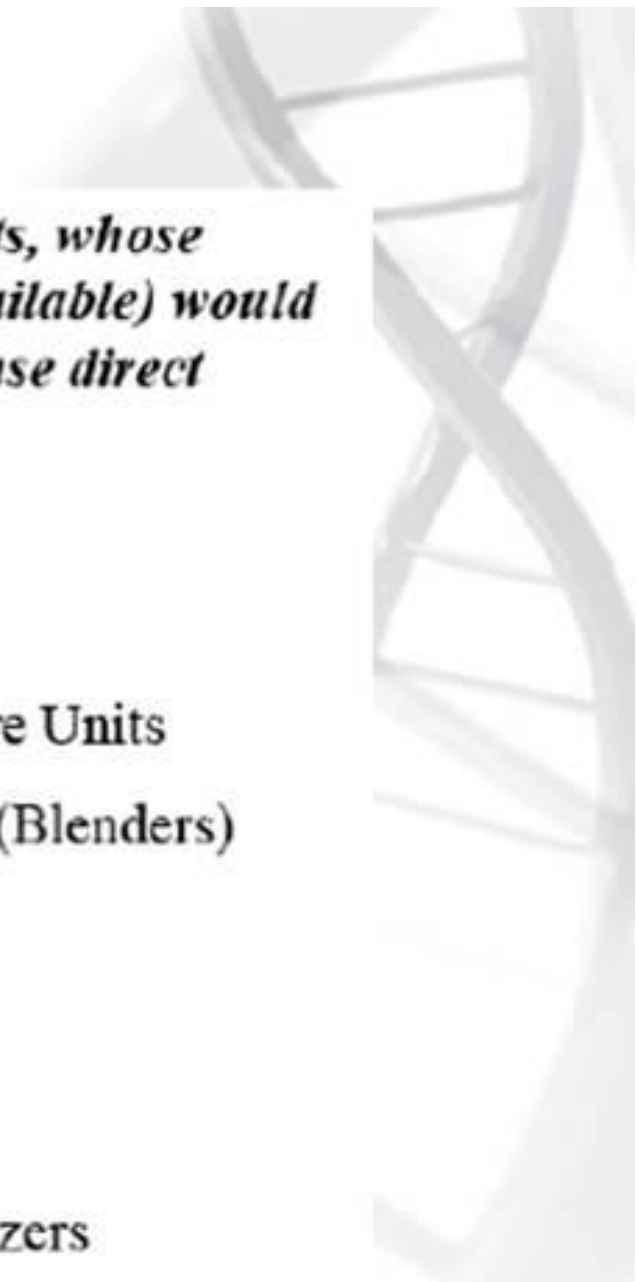
Oxygen-Air Proportioners (Blenders)

Oxygen Concentrators

Paraffin Baths

Phototherapy Units

Pulmonary Function Analyzers



# High-risk Devices

**High-risk Devices:** *Life-support, key resuscitation, critical monitoring, energy emitting, and other devices whose failure or misuse is reasonably likely to seriously injure patients or staff.*

Anesthesia Units and Vaporizers

Apnea Monitors

Argon-Enhanced Coagulation Units

Aspirators (Emergency and Tracheal)

Autotransfusion Units

Blood Pressure Units (Invasive)

Capnometers

Defibrillators/Noninvasive Pacemakers

Lasers (Surgical)

Nuclear Medicine Systems

Oximeters (Pulse)

Oxygen Monitors and Analyzers

Patient Lifts

Patient Warming Units

Peritoneal Dialysis Units

Phacoemulsification Units

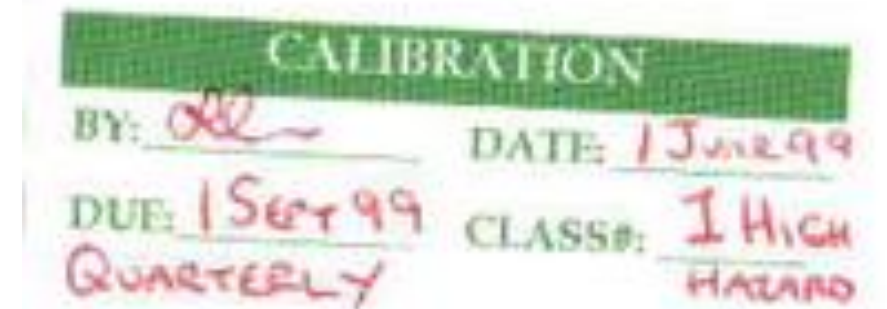
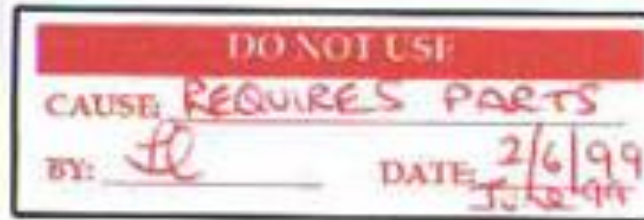
# Continuous Quality Improvement

Monthly reports

Incident reports

Statistics failure Report

Continuous In-Service Program



## **FORMS USED**

- **CONDEMN FORM**
- **EQUIPMENT ACCEPTANCE SHEET**
- **ELECTRICAL SAFETY TEST FORM**
- **ELECTRICAL SAFETY INSPECTION FORM**
- **GOODS ISSUED/EQUIPMENT TRANSFER FORM**
- **EQUIPMENT PICK/UP FORM FOR REPAIR/REPLACEMENT**
- **MAINTENANCE REQUEST FORM**

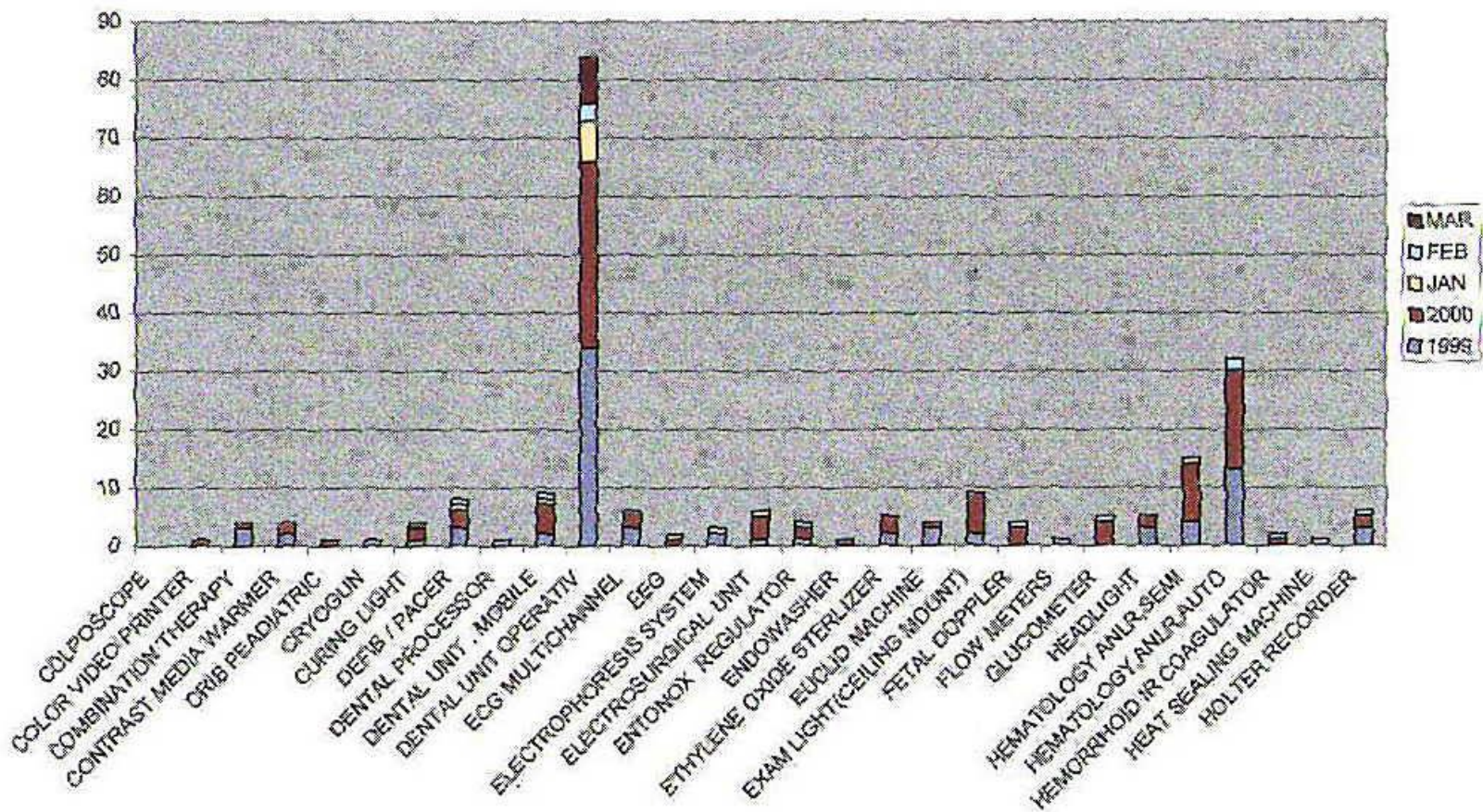


## **MANAGEMENT REPORTS**

- **MEDICAL EQUIPMENT PURCHASE STATUS REPORT**
- **MONTHLY PM/CM STATUS REPORT**
- **INSERVICE REPORT**
- **QI INDICATORS MONITORING REPORT**
- **REPORTS ON SPECIAL PROJECTS**



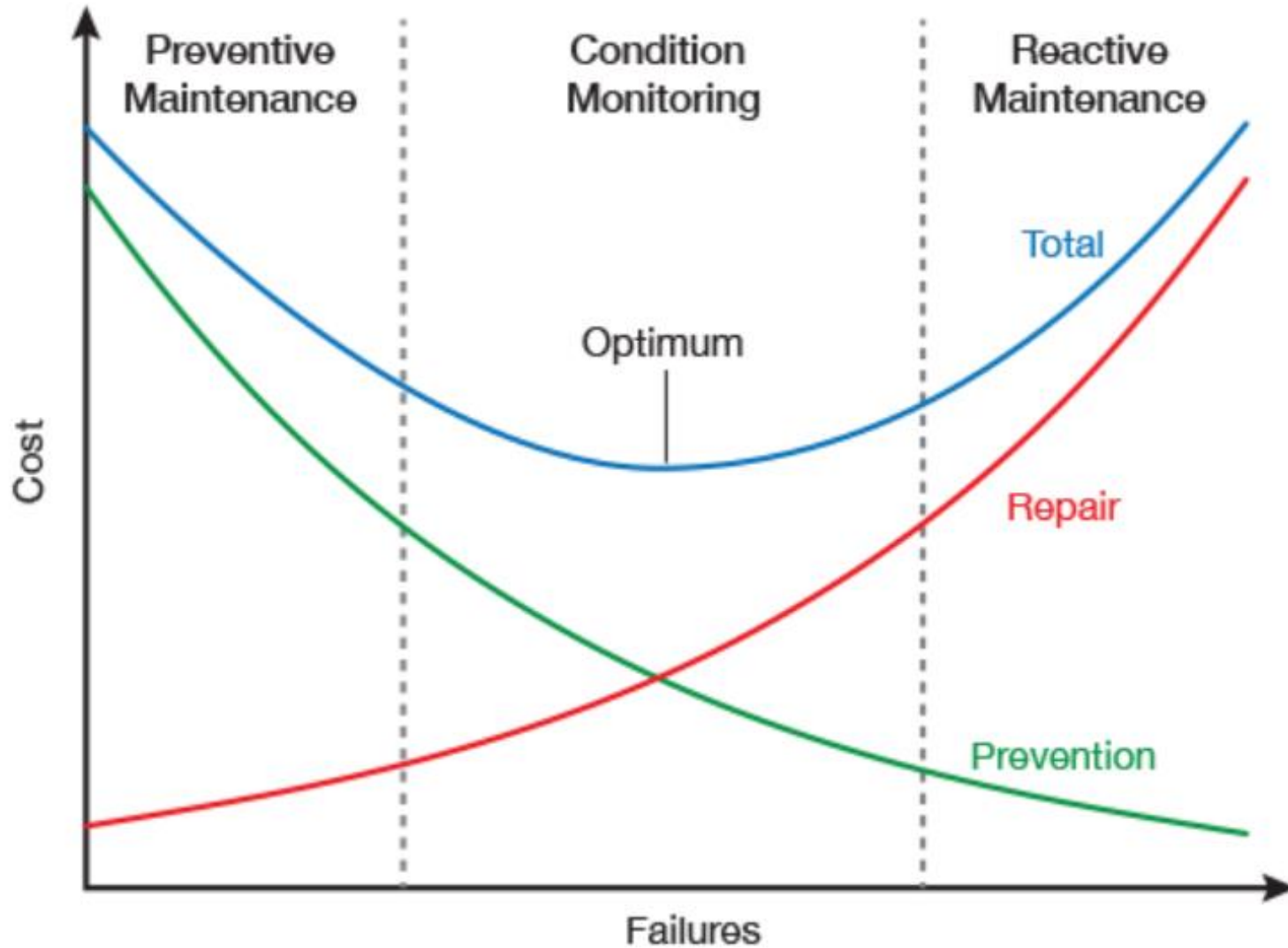
### CM STATUS



# Asset control from commissioning to decomm



# The formula

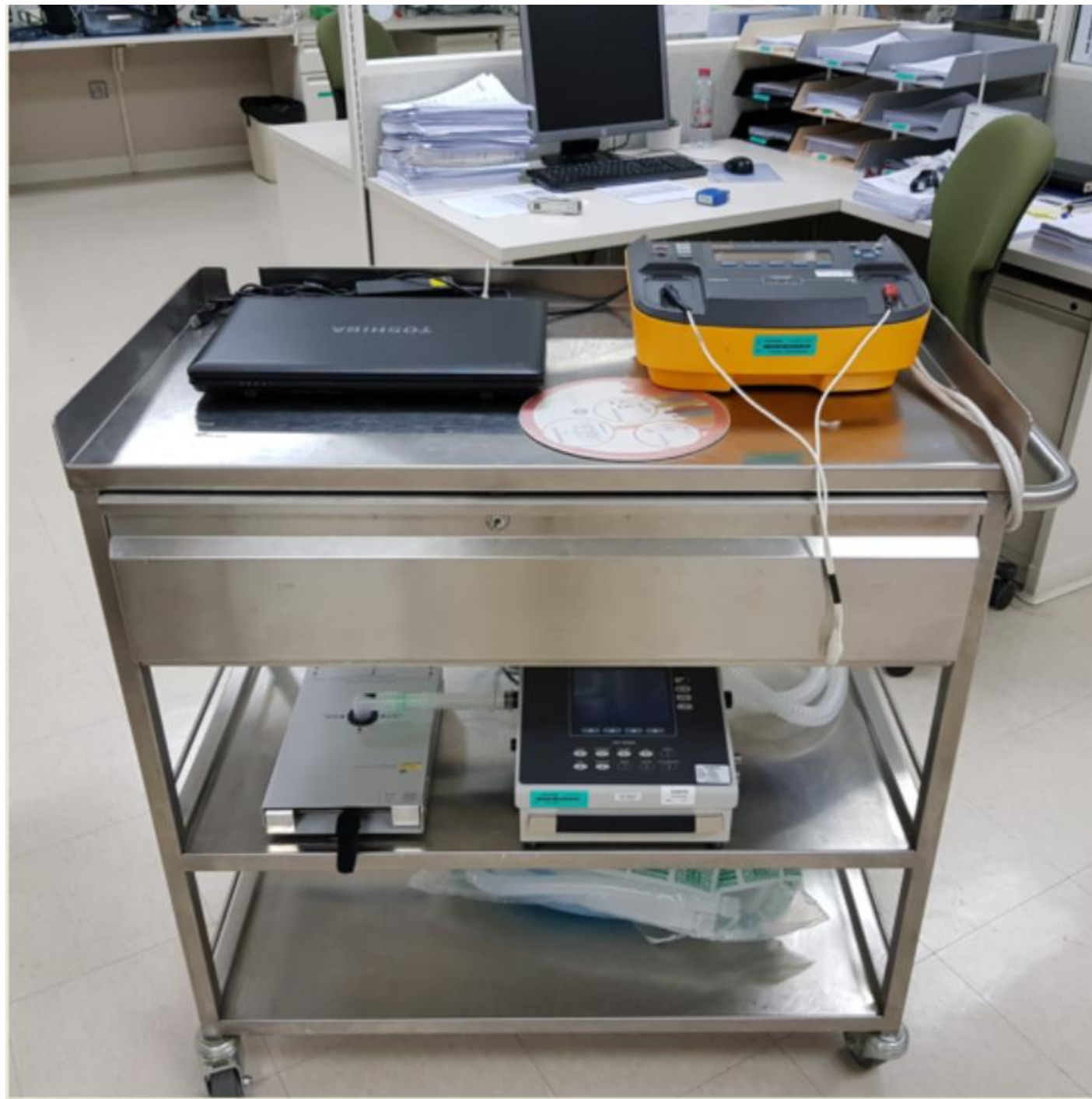


# FAILURE CAUSES



# WHAT ARE OUR TOOLS







**FLUKE**

**BP Pump 2**  
NON-INVASIVE BLOOD PRESSURE MONITOR ANALYZER

Biomedical

ANLBP2001 HOSPITAL OWNED



MR BP APPARATUS ANALYSER

**CALIBRATED**  
Sr No: 1487004  
Cal Date: 05-Aug-19  
Exp Date: 30-Jul-20  
Cert No: 10-C833265  
www.fluke.com

INVENTORIED 2017  
MRD - BIOMED



ENT

TESTS AND SIMULATIONS

PRESSURE LEAK  
1

PRESSURE RELIEF  
2

STATIC PRESSURE  
3

STANDARD BP  
4

PATIENT CONDITIONS  
5

ARRHYTHMIAS  
6

RESPIRATORY ARTIFACT  
7

NEONATE  
8

WRIST  
9

USER DEFINED  
0

WA46703  
30/07/2019  
Acc:0 2 / 6

PRESSURE PORT



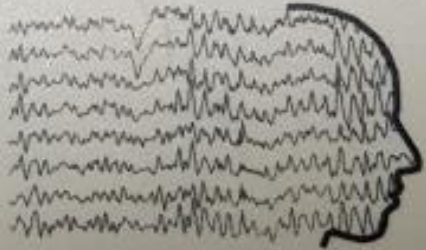




signal

INVENTORIED 2017  
AHD - BIOMED

off on



Digital EEG Simulator

EEG  
TECHNOLOGY



FLUKE ACCU LUNG PRECISION TEST LUNG  
Biomedical

LEAK

OFF

Rp = 20  
(cmH<sub>2</sub>O/L/s)

Rp = 5  
(cmH<sub>2</sub>O/L/s)

NO SPRINGS FOR C=50 (mL/cmH<sub>2</sub>O)

ENGAGE LEFT AND RIGHT SPRING FOR C = 20 (mL/cmH<sub>2</sub>O)

ADD CENTER SPRING FOR C = 10





DO NOT USE WITH OXYGEN  
NE PAS UTILISER EN  
PRESENCE D'OXYGENE

ADJUSTED

FLUKE INCU™ INCUBATOR



CALIBRATED  
Sr No 924  
Cal Date 04-Aug-19  
Due Date 03-Aug-20  
Cert. No 10-C337389  
www.flukecal.com



EVENT !

SELECT ↻



TTC-AL3001 NORTH AMERICA  
MR CALIBRATION THERMOMETER

**COVIDIEN**  
Genius 2  
Checker/Calibrator

F/C

F/C







**RTI** TDA-4B  
AEROSOL GENERATOR

NOZZLE CONTROL

**RTI** Division of Hamilton Beach, Inc.  
AIR TECHNOLOGY INTERNATIONAL  
10750 SHELTON BLVD., SUITE 100  
MILWAUKEE, WI 53222-3200  
Product: AEROSOL GENERATOR  
Model: 4B  
Serial No.: 10000  
Manufactured: April 2010  
MSRP: \$299.99

WARNING  
DO NOT USE FOR  
SMOKING

APPROVED BY  
BY GENETEC  
www.genetec.com





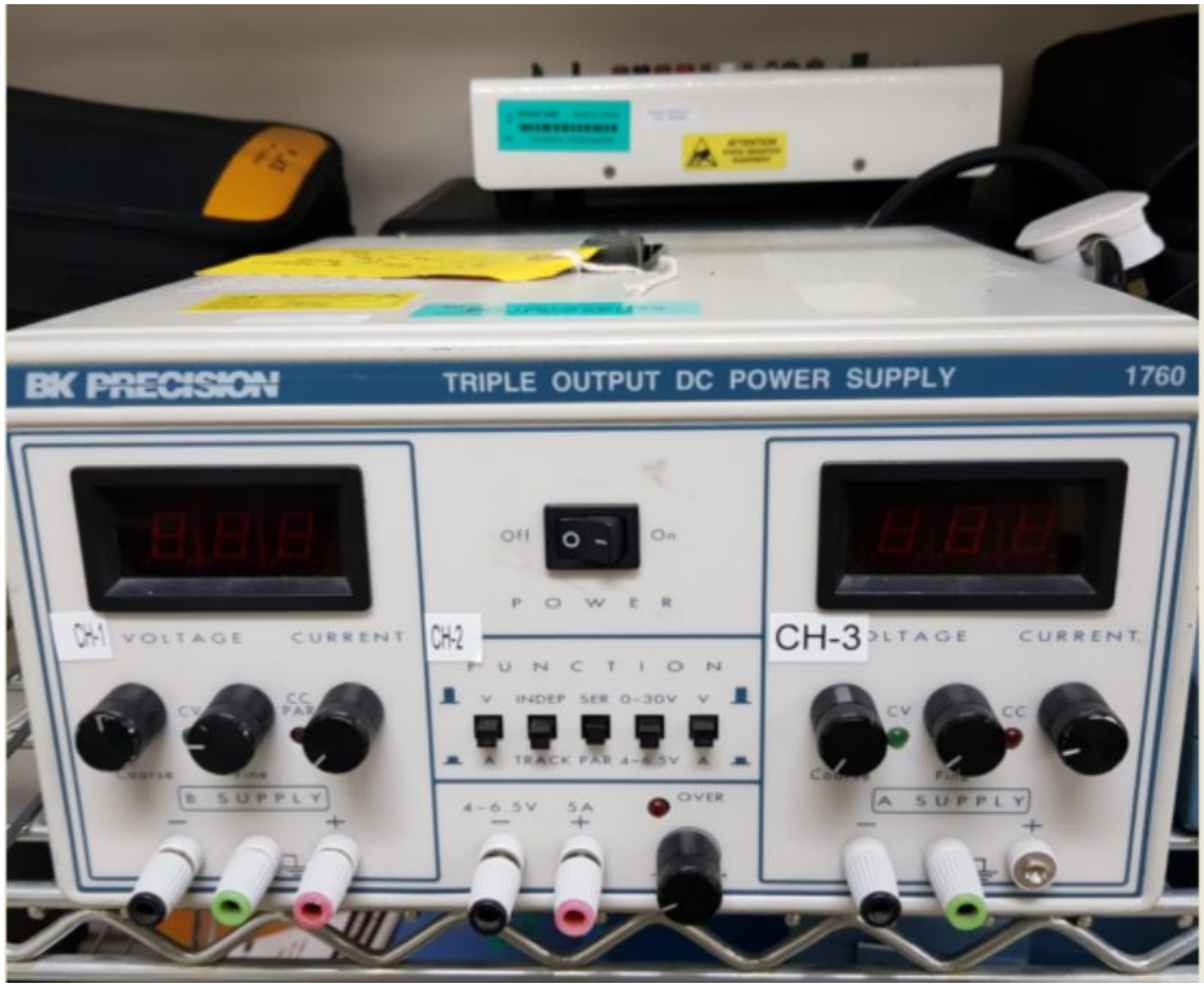
**OR Ambience.** 22 C temp, 30 – 70% humidity, 20 air changes per hour, but.











BK PRECISION

TRIPLE OUTPUT DC POWER SUPPLY

1760

CH-1  
VOLTAGE CURRENT

Off On  
POWER

CH-3  
VOLTAGE CURRENT

CV CC PAR  
Coarse Fine

CH-2  
FUNCTION  
V INDEP SER 0-30V V  
A TRACK PAR 4-6.5V A

CV CC  
Coarse Fine

B SUPPLY

4-6.5V 5A OVER

A SUPPLY

- +

- +

- +

FLUKE®

# Current Clamp Multimeter Accessory

1410



④ 400A DC

④ 400A AC  
to crest factor 3

DC zero adjust to  
null out offset

Shielded heat-resistant  
silicone rubber cable

On/off LED indicator

Battery check mode

Output: 1 millivolt per  
ampere

600 Voltz CAT III

English instruction sheet included

④ Troubleshooting algorithms  
included

④ Input can accept a fault for  
interrupted use temporarily

④ Auto-ranging for accurate display

④ Backlit LCD screen with  
auto-contrast

④ Auto-ranging for current or  
voltage

④ Auto-ranging for resistance  
and impedance

④ Auto-ranging for frequency  
and period

④ Auto-ranging for duty cycle  
and pulse width

④ Auto-ranging for temperature

④ Auto-ranging for capacitance

④ Backlit LCD screen with  
auto-contrast

④ Japanese instruction sheet  
included

④ Chinese instruction sheet  
included

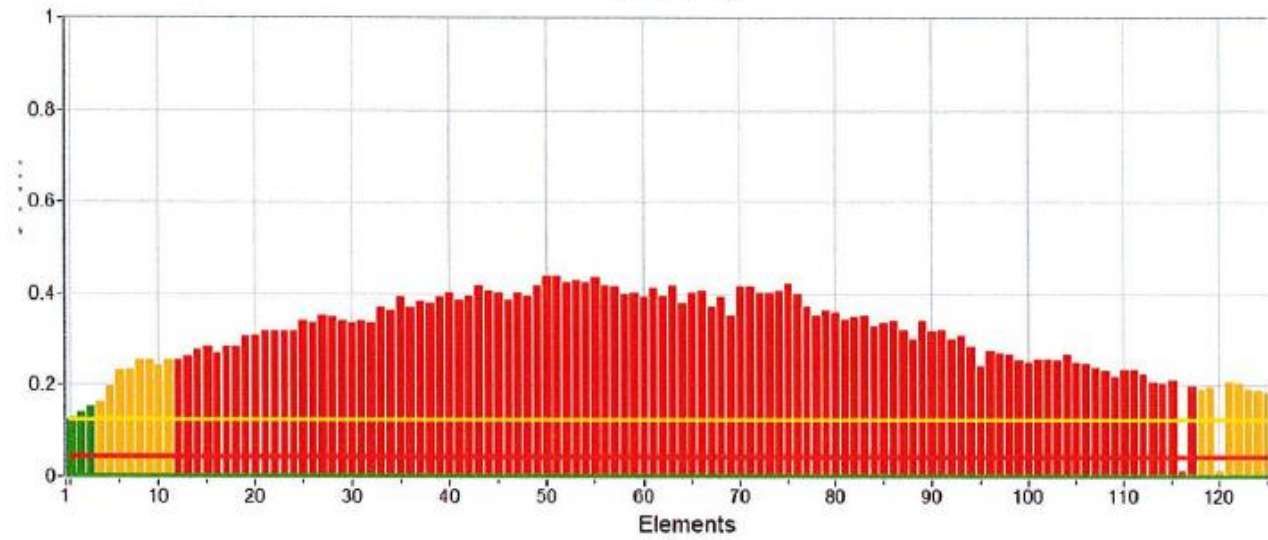
④ Korean instruction sheet  
included

④ Spanish instruction sheet  
included

Patient Simulator  
Electrical Safety Analyzer  
Infusion Pump Analyzer  
TTL Tester  
CMOS Tester  
Radiation Survey Meters



### Sensitivity



Mean: 0.310

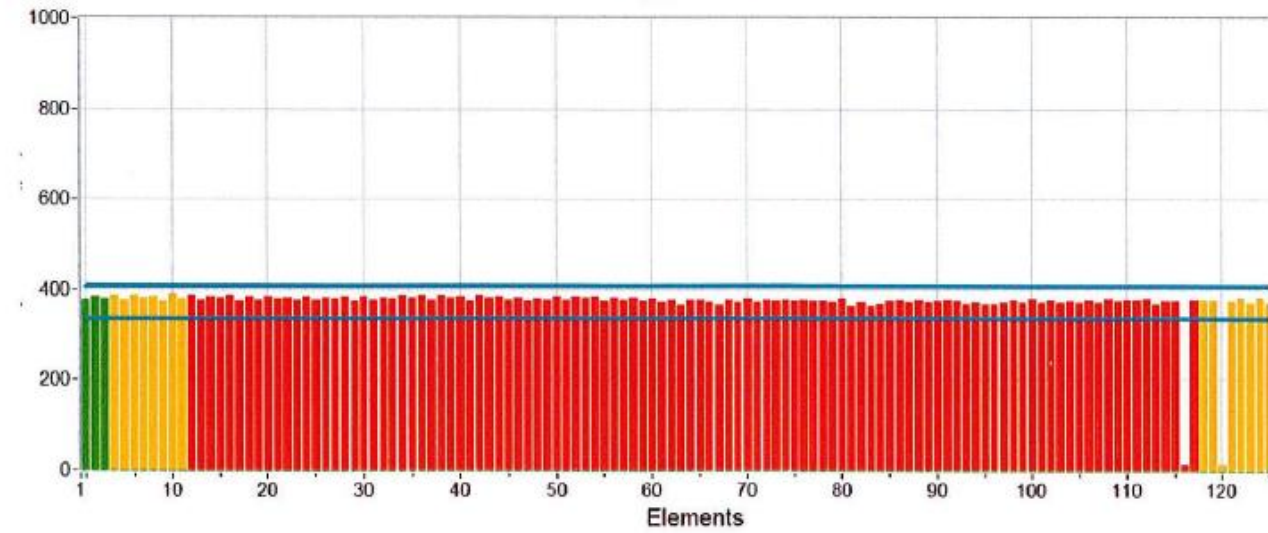
Max: 0.438

Min: 0.012

Std Dev: 0.089

Gain: 8

### Capacitance

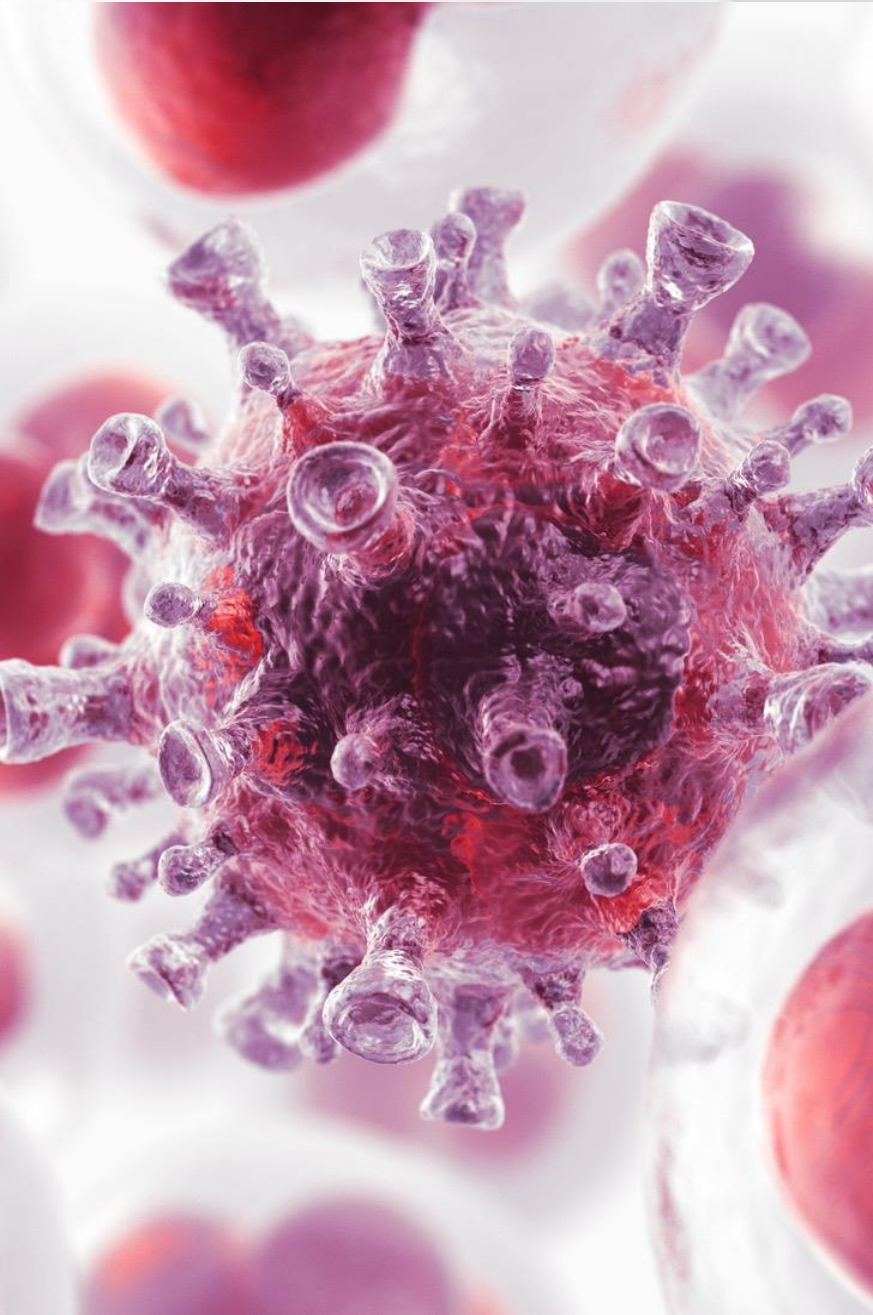


an: 371.124

Max: 388.135

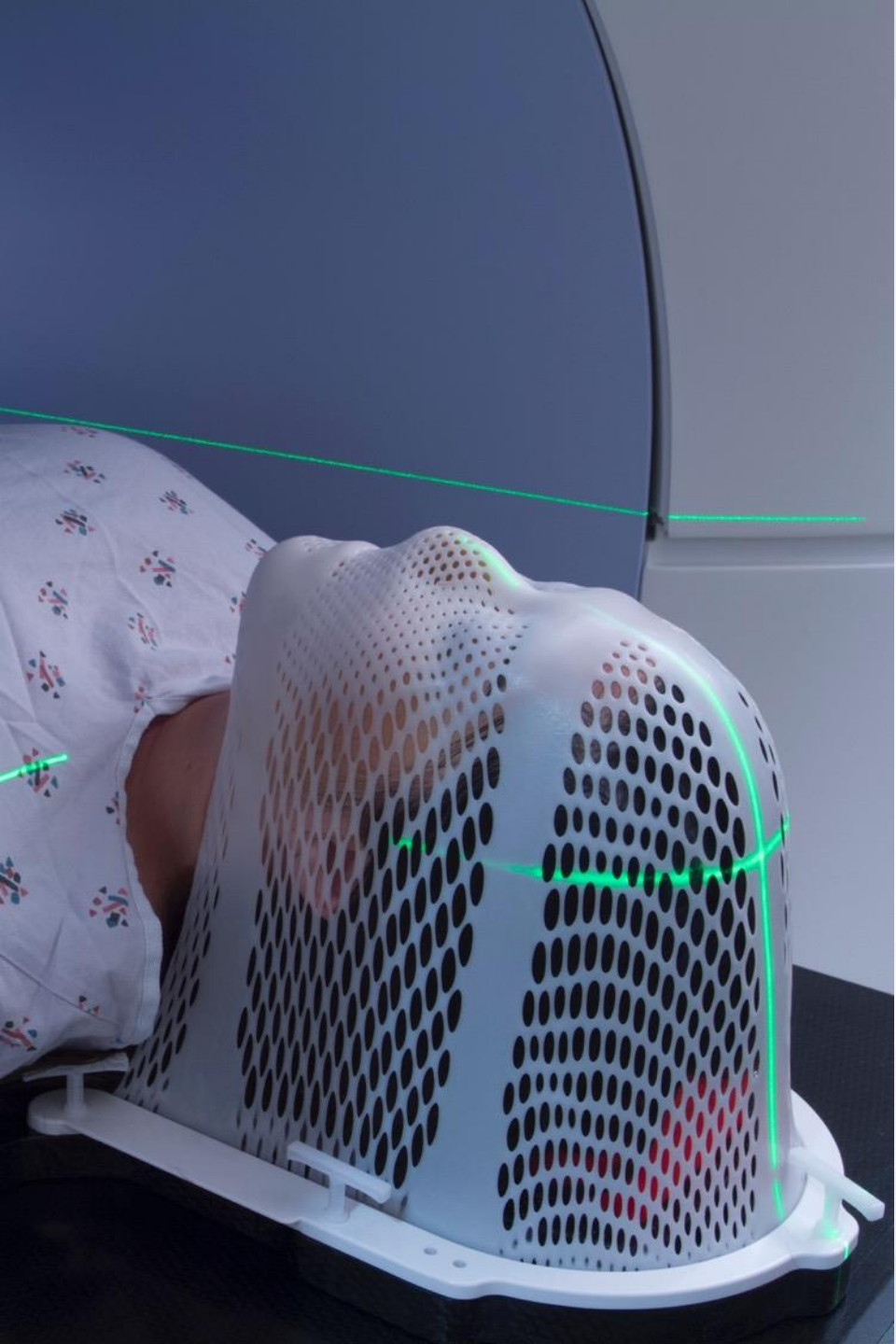
Min: 11.636

Std 45.429



## Restore equipment to factory condition with every PM

- Calibration based on factory intervals and specs
- Original, factory rebuild, or OEM certified parts
- New overlay if required.
- Cleaned with Clinell upon collection and return.



SOME MODLITIES ARE AWARDED TO MANUFACTURERS WITH STRINGENT UPTIME CLAUSE.

SOME ARE CONNECTED DIRECTLY via VPN

OTHERS ARE BASED ON A MGT C



WE STILL HAVE TO DEAL WITH A FEW LOUD DOCTORS AND  
SOME UNPLEASANT PATIENTS



THANK YOU



المستشفى الأمريكي  
AMERICAN HOSPITAL  
DUBAI دبي



MAYO CLINIC  
CARE NETWORK

Member