Critical Alerts in Laboratory

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Documented procedure

1. Meaning and importance of critical value alerting system
2. Developing and implementation of critical values
3. Examples for critical values: Hematology, Cytopathology, Histopathology, Biochemistry, Microbiology
4. Identifying and informing critical values
5. Records to be maintained: in the laboratory, in the wards
6. Auditing of critical value alerting: internal audit, external audit; NABH/ NABL

What are Critical Values?

Definitions

- **Royal college of Pathologists (*Critical alert value*):** A test result that is life threatening, or indicates significant morbidity or irreversible harm if immediate action is not taken
- **JCI/ CLSI (*Critical test*):** a test that requires immediate communication of result irrespective of whether it is normal, significantly abnormal or critical

- Critical value alerting is an essential component in all laboratories

Importance of Critical Values

Rationale for considering a test as critical

- To assist physician in better patient management
- Not intended to cover all clinically serious test results
- Report shall be considered in the context of clinical history
- Physicians will be held responsible for follow up test results

Developing Critical Values

- Main stakeholders: laboratory faculty
- Multidisciplinary committee including all clinical department heads and laboratory quality officers
- Discuss and define areas requiring critical value alerts

Implementation of Critical Values

- Documentation of all defined critical values in the laboratory register
- Same should be prominently displayed
- All laboratory staff should be trained about:
  - The importance of critical values and their alerting
  - Methodology of alerting
- All nursing staff and CRRIs should be trained about:
  - Receiving the critical values
  - Whom to transmit the information: hierarchy

Examples for Critical Values: Hematology

No.	Test Units	Value less than	Value more than
1	Hemoglobin Conc. gm/dl	<5.0 gm/dl	> 22.0 gm/dl
2	Hematocrit (PCV) %	<18.00%	>60.00%
3	Platelet count Lakh/cu. mm	<10,000/ cu mm	
4.	WBC count cells/cu mm	<2000 cells/cu mm	>50,000 cells/cu mm
5.	PT INR	INR of more than 5.0	
6.	APTT Seconds	>50 seconds for OP >100 seconds for IP	
7	Malarial Parasite (falciparum)	If identified on smear	
8.	Acute Leukemic cells	If identified on smear	

Examples for Critical Values: Cytopathology, Histopathology

- Fat in an endometrial curettage
- Unexpected malignancy
- Significant disagreement between primary pathologist and outside pathologist opinion
- Herpes in Pap smears of near term pregnant patients
- Invasive organisms in specimens of immunocompromised individuals

Examples for Critical Values: Biochemistry

Test	Unit	Critical value
Glucose	mg/dl	> 500 & < 50 & (< 30-Neonatal)
Creatinine	mg/dl	> 10
Urea	mg/dl	> 200
Sodium	mmol/L	>160 or <125
Potassium	mmol/L	> 6 or < 3
Amylase	U/L	> 400
Lipase	U/L	> 500 U/L
TROP- I (Card)		Positive
TROP- I (Quantitative)	ng/ml	>0.49
Ammonia	mcg/dl	> 500
Calcium	mg/dl	<6.5 and ≥ 13.0
Bilirubin- Total	mg/dl	> 15
Creatine Kinase	U/L	> 1000
Uric acid	mg/dl	> 13
ALT/PT	U/L	> 1000
AST/OT	U/L	> 1000
LDH	U/L	> 1000
Osmolality (serum)	mOsm/Kg	<250 and >320
CK-MB	IU/L	>30

Examples for Critical Values: Microbiology

- Bacterial growth from smears of sterile samples (Eg, SCF, synovial fluids etc)
  - Eg: MRSA
- Hanging drop positive (*Vibrio cholerae*)
- *Corynebacterium diphtheriae*
- Fungal: any mucormycosis
- HCV: for patients undergoing dialysis

Identifying Critical Values on a Routine Basis

- Manually
- Software

Protocol for telephonic information of Critical Values for IP cases

- Clear introduction: Informant name, department
- Reason for phone call: Critical value
- Patient details: Name, UHID/age (two identifiers at least)
- Ask for care giver (doctor/nurse): name, designation and employee id
- Inform result
- Request a read back
- Document above details in “critical alert register”

Protocol for telephonic information of Critical Values for OP cases

- Clear introduction: Informant name, department
- Reason for phone call: Critical value
- Patient details: Name, UHID/age (two identifiers at least)
- Ask for doctor name, designation and employee id
- Inform result
- Request a read back
- Document above details in “critical alert register”

Records to be Maintained

In the laboratory

- Laboratory manual should contain details of critical values
- Regularly updated critical value lists
- Critical value alerting register
  - Patient name, UHID, age/ sex, ward
  - Time of testing, time of informing
  - Critical value details
  - SNDT of person informing the critical value
  - Name and Hospital No of the person receiving the critical value

In the ward

- Critical value register
  - SNDT of person receiving the critical value
  - Name and hospital no of the person informing the critical value
  - Patient name, UHID, age/ sex
  - Name of the consultant
  - Time of informing the critical value to the consultant

Critical Alert Record in Laboratory

- Names of assigned doctor and lab technician

Date	Pt name	UHID /Age	Test name	Value	Caregiver Name ID	Time of testing	Time of reporting	Read back done	Sign

- Retention period of the record: at least 1 year

Critical Alert Record in Ward

- Names of assigned doctor and lab technician

Date	Pt name	UHID /Age	Test name	Value	Lab informant Name ID	Time of receiving the alert	Time of transmitting the alert	Name of person to whom the alert was transmitted	Sign

Critical Value Alert and Auditing

- Internal audit
  - By faculty from same department: at least monthly
    - Quality check done followed by CAPA
  - By faculty from other laboratory departments: once every 6 months
- External audit
  - Regular audits from quality control department
  - NABH/ NABL auditing
- Audit report discussion in the laboratory

Contents of the Presentation

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