

S1 Table .The way how to calculate quality indicators in clinical chemistry and hematology laboratory

	Pre-analytical errors	Ways of calculation
1	Missing patient name	(No of requests with error concerning patient name /total number of requests)
2	Missing patient age	(No of requests with error concerning patient age /total number of requests)
3	Missing patient sex	(No of requests with error concerning patient sex /total number of requests)
4	Missing clinical history	(No of requests with error concerning patient clinical diagnosis /total number of requests)
5	Absence of patient location	(No of requests with error concerning site of ordered /total number of requests)
6	Absence of name of clinician	Absence of name of clinician (No of requests with error concerning physician name /total number of requests)
7	Missing date of sampling	(No of requests with error concerning date of collection /total number of requests)
8	Missing time of collection	(No of requests with error concerning time of collection /total number of requests)
9	Missing name of sample collector	(No of requests with error concerning name of phlebotomist /total number of requests)
10	Repeated sample	(No of requests with repeated sample /total number of requests)
11	Eligibility of handwriting	(No of requests with error concerning on legibility of handwriting /total number of requests)
12	Missing ID number	(No of requests with error concerning ID number /total number of requests)
13	Missing date of request	(No of requests with error concerning on date of request /total number of requests)
14	Missing time of request	(No of requests with error concerning on time of request /total number of requests)
15	Inappropriate request paper	(No of requests with inappropriate request paper /total number of requests)
	Total number of errors from test request	Total no of errors arisen from test requests(the summation of the above 15 quality indicator errors)/ total number of quality indicators arising from test requests (4140 x 15=62,100)
16	Hemolysis	(Number of samples hemolyzed/ total number of samples)

17	Inadequate sample volume	(Number of insufficient sample/ total number of samples)
18	Icteric	(Number of samples icteric / total number of samples)
19	Clotted	(Number of samples clotted / total number of samples)
20	Sample with wrong tube Number	Total samples with wrong tube/ total number of samples
21	Sample without request paper	(Number of samples without request paper / total number of samples)
22	Specimen collected for without testing	(Number of samples collected for test unavailability / total number of samples)
23	Unlabeled	(Number of samples with unlabeled / total number of samples)
24	Mislabeled	(Number of samples with mislabeled / total number of samples)
25	Sample lost	(Number of samples lost / total number of samples)
Total pre analytical errors		Total number of pre analytical errors (test request + samples)/ total number of pre analytical quality indicators(4140 x25= 103,500)
Analytical quality indicators		
26	Total analytical errors	(the summation of all analytical quality indicator errors)/ total number of analytical quality indicators (4205)
Service interruption due to stock-out		the summation of all tests which was service interrupted due to stock-out during the study period/(total number of tests x total working days in the study period)= $(303/(40 \times 43))=17.6\%$
Service interruption due to equipment failed		the summation of all tests which was service interrupted due to equipment failed during the study period/(total number of tests x total working days in the study period) = $(152/(40 \times 43))=8.8\%$
Post-analytical quality indicators		
27	Total post analytical errors	(the summation of all post-analytical quality indicator errors)/ total number of post-analytical quality indicators (29017)
Total errors in the three phases		((Total number of errors in three phases ,21504+526+11762=33792) /(total number of quality indicators in the three phases,29,017+103,500+4,205=136,722)

S2 Table: Analysis of errors in pre analytical quality in clinical chemistry and hematology laboratory

S. No	Pre-analytical quality indicator	(%error/total)	% total error
1	Patient name on the request paper	0(0/4140)	0
2	patient age on the request paper	0.8(33/4140)	0.15
3	Patient sex	1.9(78/4140)	0.36
4	Site of ordered	3.9(162/4140)	0.75
5	Clinical history	94.6(3918/4140)	18.2
6	Physician name	67(2781/4140)	12.9
7	Date of request	2.9(120/4140)	0.56
8	Time of request	98.7(4086/4140)	19
9	Sample collected by	80.6(3336/4140)	15.5
10	Date of collection	45.6(1866/4140)	8.7
11	Time of collection	88.8(3675/4140)	17
12	Inappropriate request paper	6.7(279/4140)	1.29
13	Identification number(ID)	6.5(27/4140)	0.12
14	Legibility of handwriting	4.5(186/4140)	0.86
15	Repeated sample	10.2(423/4140)	1.96
16	Hemolysis	2.2(93/4140)	0.43
17	Icteric	0.07(3/4140)	0.01
18	Insufficient sample	8.3(342/4140)	1.6
19	Sample with wrong tube	0.29(12/4140)	0.06
20	Sample without request paper	0.07(3/4140)	0.01
21	Unlabeled specimen	0.43(18/4140)	0.08

22	Clotted	0.43(18/4140)	0.08
23	Specimen collected for unavailable test	0.14(6/4140)	0.03
24	Mislabeled	0.65(27/4140)	0.13
25	Sample lost	0.29(12/4140)	0.06
	Over all rejection rate of specimens	12.9(534/4140)	2.5
	Over all pre analytical errors arising from test requests	33.8(20970/62100)	97.5
Total	Over all pre-analytical errors (specimens +test requests)	20.8(21,504/103,500)	

S3 Table. Comparing Performance level with respect to IFCC Working Group Project in clinical chemistry and hematology laboratory

Pre analytical quality indicators	Performance level					
	optimum	Desirable	Minimum	Unacceptable	Result	
Number of test with clinical comments or diagnosis/total number of requests	>87	58-87	29-57	<29	6.5	Unacceptable
Number of appropriate requests with respect to clinical question/total number of requests reporting clinical question	>97	65-97	32-64	<32	95.9	Desirable
Number of requests with errors concerning patient identification/total number of requests	<0.4	0.4-0.5	0.5-0.6	>0.6	1.08	Unacceptable

Number of requests without/with errors in physician' identification/total number of requests	<5	5-6	6.1-8	>8	67.2	Unacceptable
Number of requests with errors concerning test input (missing)/total number of requests	<0.3	0.3–0.4	0.4–0.5	>0.5	12.9	Unacceptable
Number of requests with errors concerning test input (misinterpreted/ illegible handwriting)/total number of requests	<0.2	0.2-0.25	0.26–0.3	>0.3	4.1	Unacceptable
Number of samples improperly labeled or sample mix-ups/total number of samples	<0.07 7	0.07–0.15	0.16–0.2	>0.2	0.65	Unacceptable
Number of samples collected in inappropriate container/total number of samples	<0.07 7	0.07–1.13	1.14–0.20	>2.0	0.3	Desirable
Number of samples with insufficient sample volume/total number of samples	<0.4	0.4–0.8	0.81–1.20	>1.2	8.3	Unacceptable
Number of samples lost or not received/total number of samples	<0.2	0.2–0.4	0.41–0.6	>0.6	0.29	Desirable
Number of samples hemolyzed/total number of samples	<1.0	1.0–1.5	1.6–2.0	>2.0	2.2	Unacceptable
Post-analytical indicators						
No. of reports delivered outside the specified time/total no. of reports	<0.4	0.4–0.5	0.6–0.7	>0.7	58.4	Unacceptable
No. of critical values communicated to clinician immediately /total no. of critical values	>96	77–96	58–76	<58	19.1	Unacceptable