

Annual Workshop on External Quality Assessment Schemes in Cambodia

PRESIDENT HOTEL, BATTAMBANG PROVINCE

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Results and gaps of All EQA Programs in 2017 and 2018



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Introduction

What is External Quality Assessment (EQA)?

A system for objectively checking the performance of a laboratory using an external agency

Who/why should participate in the EQA program?

- Recommended for all laboratories
- Required for accreditation
- Required by ISO

What are the benefits of an EQA program?

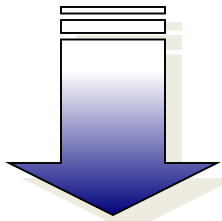
- Objective measure of lab performance
- Independent evidence of testing quality
- Increases credibility of lab results
- Early warning for systemic problems
- Identify areas that need improvement
- Determine training needs

What are the responsibilities of laboratories?

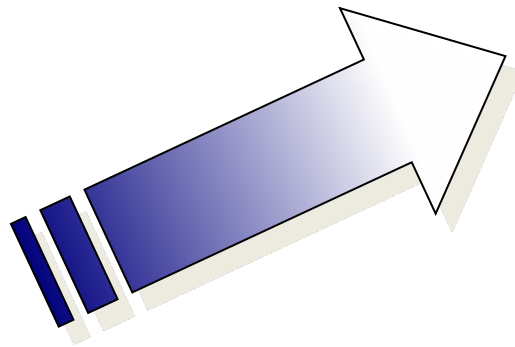
- Follow EQA (PT) instructions carefully
- Treat EQA (PT) samples as patient samples
- Do **not** communicate with other labs
- Do **not** refer samples to other labs
- Complete all paper work accurately
- Submit results before deadline
- Record and store EQA (PT) results
- Investigate problems
- Implement corrective actions
- Learn from mistakes
- Communicate outcomes

EQA should lead to action

EQA

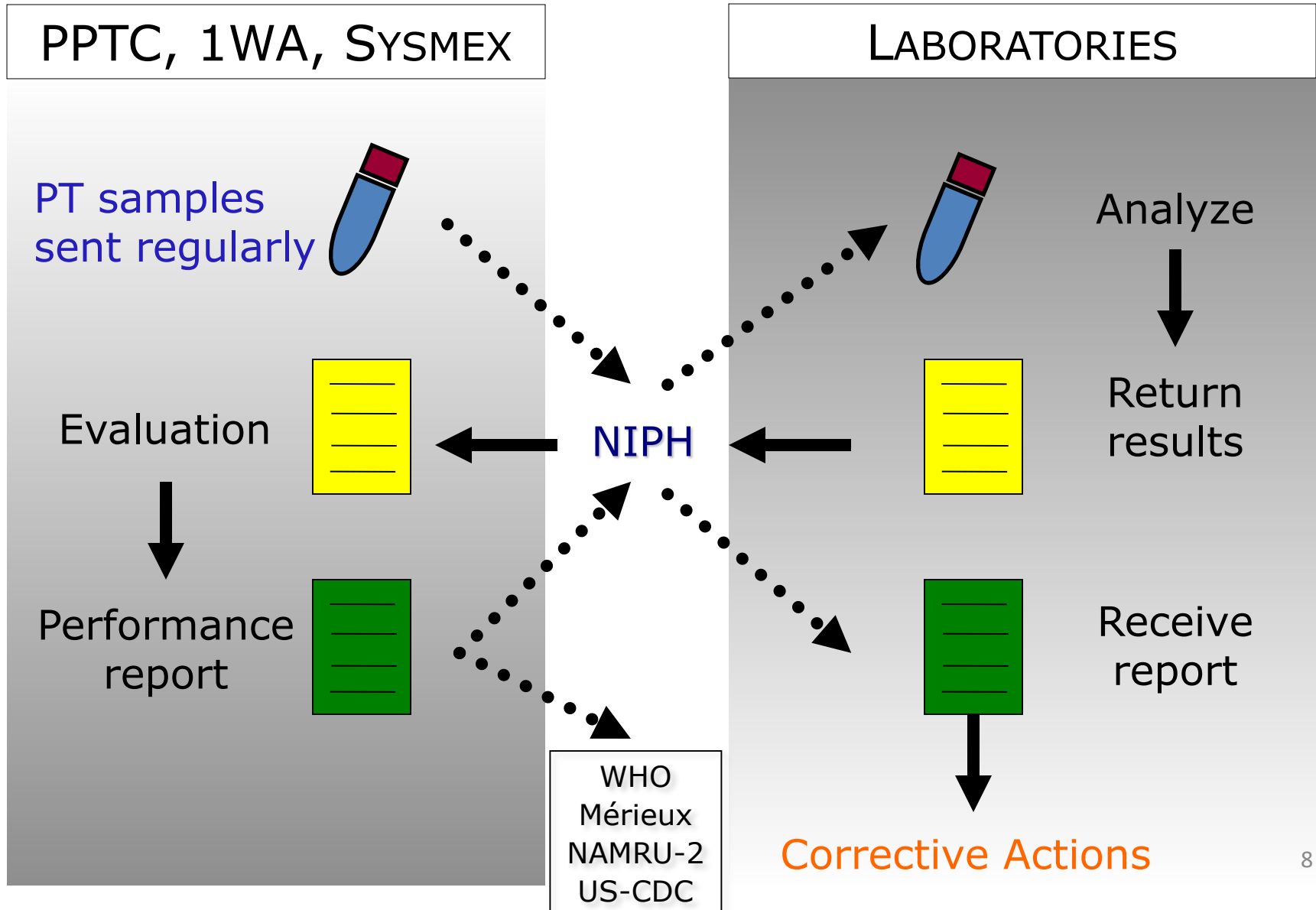


Identify
problems



Take
Corrective
Action

How is Proficiency Testing done in Cambodia?



Role of NIPH

Collaboration between provider and Cambodia lab participants.

- ✚ NIPH receives EQA (PT) panels from provider
- ✚ NIPH distributes EQA (PT) panels to all participants
- ✚ NIPH collects results from all participants, consolidates and submits results to provider
- ✚ NIPH distributes reports from provider to all participants
- ✚ NIPH keeps all data

EQA Provider and Participants of National lab, Provincial labs, NGO labs and Private Lab in 2018

Providers	Unit and Participations
PPTC	<ul style="list-style-type: none">• Microbiology 14 labs• Serology 32 labs• Blood Bank 05 labs
1WA	<ul style="list-style-type: none">• Biochemistry 43 labs• Hematology 1 labs
Sysmex	<ul style="list-style-type: none">• Hematology 61 labs

EQA participants of National lab, Provincial labs, NGO labs and Private Lab

- National Laboratory**

No	Participants	Micro (PPTC)	Sero (PPTC)	BB (PPTC)	Hem (1WA)	Bio (1WA)	Hem (Sysmex)
1	NIPH	Yes	Yes	No	Yes	Yes	Yes
2	Calmette	Yes	Yes	No	No	Yes	Yes
3	NPH	Yes	Yes	No	No	Yes	Yes
4	PKH	Yes	Yes	No	No	Yes	Yes
5	Presh Angdoug	No	Yes	No	No	Yes	Yes
6	MCH	No	Yes	No	No	Yes	Yes
7	KSF(Khmer Soviet)	Yes	Yes	No	No	Yes	Yes
8	NBTC	No	Yes	Yes	No	No	Yes
9	Preah ket Mealea	Yes	No	No	No	No	No
10	Sra Em Military	No	No	No	No	Yes	Yes

- Provincial Laboratory**

No	Participants	Micro (PPTC)	Sero (PPTC)	BB (PPTC)	Hem (1WA)	Bio (1WA)	Hem (Sysmex)
1	Takeo	Yes	Yes	No	No	Yes	Yes
2	Kg Cham	Yes	Yes	Yes	No	Yes	Yes
3	Battambang	Yes	Yes	Yes	No	Yes	Yes
4	Svay Rieng	Yes	Yes	No	No	Yes	Yes
5	Kampot	Yes	Yes	No	No	Yes	Yes
6	Siem Reap	Yes	Yes	Yes	No	Yes	Yes
7	Chey Chomneash	No	Yes	No	No	Yes	Yes
8	Preash Vihear	No	Yes	No	No	Yes	Yes
9	Kampong Chhnang	No	Yes	No	No	Yes	Yes
10	Sihanouk	No	Yes	No	No	Yes	Yes
11	Kampong Speu	No	Yes	No	No	Yes	Yes

- Provincial Laboratory**

No	Participants	Micro (PPTC)	Sero (PPTC)	BB (PPTC)	Hem (1WA)	Bio (1WA)	Hem (Sysmex)
12	Monkulborie	No	Yes	No	No	Yes	Yes
13	Sereysophon	No	Yes	No	No	Yes	Yes
14	Poipet	No	Yes	No	No	Yes	Yes
15	Thmor Pouk	No	Yes	No	No	Yes	Yes
16	Mongrussey	No	Yes	No	No	Yes	Yes
17	Sompovlun	No	Yes	No	No	Yes	Yes
18	ThmorKul	No	Yes	No	No	Yes	Yes
19	Sompovmeas	No	Yes	No	No	Yes	Yes
20	Prey Veng	No	Yes	No	No	Yes	Yes
21	Kratie	No	Yes	No	No	Yes	Yes
22	Pailin	No	Yes	No	No	Yes	Yes
23	Ream Navy Base	No	No	No	No	Yes	Yes

- Provincial Laboratory (New)**

No	Participants	Micro (PPTC)	Sero (PPTC)	BB (PPTC)	Hem (1WA)	Bio (1WA)	Hem (Sysmex)
24	Phnom Penh RH	No	No	No	No	No	Yes
25	Samdech Ov RH	No	No	No	No	No	Yes
26	Pochentong	No	No	No	No	No	Yes
27	Meanchey	No	No	No	No	No	Yes
28	Oddar Meanchey	No	No	No	No	No	Yes
29	Steung Treng	No	No	No	No	No	Yes
30	Ratanakiri	No	No	No	No	No	Yes
31	Kampong Thom	No	No	No	No	No	Yes
32	Memut Tboungkm	No	No	No	No	No	Yes
33	Koh Kong	No	No	No	No	No	Yes
34	Mondulkiri	No	No	No	No	No	Yes
35	Keb	No	No	No	No	No	Yes

- NGOs Laboratory**

No	Participants	Micro (PPTC)	Sero (PPTC)	BB (PPTC)	Hem (1WA)	Bio (1WA)	Hem (Sysmex)
1	Angkor Hospital for Children	Yes	No	No	No	Yes	Yes
2	Center of Hope	No	No	No	No	Yes	Yes
3	Mercy Medical Center	No	No	No	No	Yes	Yes
4	UHS/JATA Medical Diagnostic Center	No	Yes	No	No	Yes	Yes
5	Patient Information Center	No	No	No	No	Yes	No
6	Namru-2 Phnom Penh	Yes	No	No	No	No	No

- Private Laboratory**

No	Participants	Micro (PPTC)	Sero (PPTC)	BB (PPTC)	Hem (1WA)	Bio (1WA)	Hem (Sysmex)
1	Biomed Phnom Penh	No	No	No	No	Yes	Yes
2	N Health Laboratory	No	No	Yes	No	No	Yes
3	Central Hospital Lab	No	No	No	No	Yes	Yes
4	Royal Angkor Inter.	No	No	No	No	Yes	Yes
5	Prolabo	No	No	No	No	Yes	Yes
6	Analab Laboratory	No	No	No	No	No	Yes
7	International Standard	No	Yes	No	No	No	Yes
8	Sunrise Japan Hospital	No	No	No	No	No	Yes
9	Paratech Laboratory	No	No	No	No	Yes	Yes
10	Samaki Medical Lab.	No	No	No	No	Yes	Yes
11	Saravoan Laboratory	No	No	No	No	No	Yes
12	Master Lab	No	No	No	No	Yes	Yes
13	BP Healthcare	No	No	No	No	No	Yes

Program frequency

Program	Frequency per year
Hematology	2 times per year
Biochemistry	3 times per year
Microbiology	
Serology	
Blood Bank	

Characteristic of Microbiology and Serology EQAS from PPTC

PPTC for Microbiology	PPTC for Serology	PPTC for Blood Bank
<p>3 Rounds/year</p> <ul style="list-style-type: none"> ■ Organism Identifications <ul style="list-style-type: none"> • Species level • Genus level ■ Anti susceptibility test 	<p>3 Rounds/year</p> <ul style="list-style-type: none"> ■ HIV screen ■ HIV supplementary ■ HBsAg ■ Anti-HCV ■ RPR ■ Syphilis TP ■ TPPA/TPHA ■ Dengue (IgG, IgM, NS1) 	<p>3 Rounds/year</p> <ul style="list-style-type: none"> ■ Blood Grouping <ul style="list-style-type: none"> • Patient • Donor ■ Cross-Matching ■ Clerical-Check

Characteristics of Biochemistry EQAS Panels

1WA

- 3 Rounds/year
- 99 tests which participants can join
- There are 5 samples per round (A, B, C, D, E)
- Online submission
- Peer group of Instrument and Reagent

Characteristics of Hematology EQAS Panels

Sysmex

- 2 Rounds/year
- Complete Blood Count
 - 8 Parameters (WBC, RBC, HGB, HCT, MCV, MCH, MCHC, PLT)
 - 2 samples + Fresh whole blood
 - Run 3 times consecutively
 - At most 3 analyzers can participate

Who should you report result to?

- Ph. Touch Sokha
 - Email: touchsokha@niph.org.kh
 - Tel: 012 87 35 87

- Ph.Hem Keodane
 - Email: ega-niph@niph.org.kh
 - Tel: 011 485 574

When should you report EQA results?

- Deadline from PPTC provider (for NIPH submission):
appears in the EQA file. **Ex: 21-November-2018**
- Deadline for participants submit to NIPH: 3 working
days **before the deadline from PPTC provider:**
Ex: 16-November-2018
- Alert Email: two working days **before the deadline**
for submission to NIPH: Ex: 14-November-2018

RESULTS IN 2017

Problem of PT Microbiology in 2017

- Did not have enough test to identify the species of organism (API/ Serotype)
- Mistake on AST (did not follow CLSI)

Round 1 / Sample	Your result	Reference result
1.	<p>Wrong AST:</p> <ul style="list-style-type: none"> Nitrofurantoin: Intermediate <p>Wrong specie:</p> <ul style="list-style-type: none"> E.coli inactive 	<ul style="list-style-type: none"> Nitrofurantoin: Resistant Morganella morganii
2.	<p>Wrong specie:</p> <ul style="list-style-type: none"> Salmonella spp. Salmonella enterica Salmonella typhimurium Salmonella enterica subsp. arizoniae Salmonella spp. other than S. typhi Salmonella Group H Salmonella spp. non typhi, non paratyphi A 	<ul style="list-style-type: none"> Salmonella enterica subsp.IIIb (diarizoniae)
3.	<p>Wrong AST:</p> <ul style="list-style-type: none"> Tetracycline/Doxycycline: Susceptible Clindamycin: Resistant, Intermediate 	<ul style="list-style-type: none"> Resistant Susceptible
Parasite case study	<ul style="list-style-type: none"> Shistosomiasis 	<ul style="list-style-type: none"> Schistosoma mansoni

Result PT of Serology in 2017

	# Other	# PPTC	Laboratory	Serology (PPTC)		
				Part 1	Part 2	Part3
		40		100%		
		41		97%		
		42		100%		
		43		90%		
		44		100%		
		45		98%		
		46		100%		
		47		92%		
		48		100%		
		49		100%		
		50		100%		
		51		100%		
		52		100%		
		53		100%		
		54		96%		
		55		90%		
		56		100%		
		57		100%		
		58		100%		
		61		100%		
		62		92%		
		63		96%		
		64		85%		
		65		100%		
		66		100%		
		67		100%		
		68		98%		
		69		100%		
		79		100%		
		80		100%		
		81		100%		
		82		100%		
		<i>Average of Cambodian Labs</i>		98%		
		<i>Median of Cabodian Labs</i>		100%		
		<i>Average of all Participating Labs</i>				
		<i>Average of Other Participants</i>				

2017

Problem of PT Serology in 2017

- **Wrong Dilution**
- **False Negative**
 - Syphilis TP
 - Dengue IgG
 - Dengue IgM
 - Anti HCV
 - HBs Ag
- **False Positive**
 - Syphilis RPR
 - HIV Screen
 - HBs Ag
- **Wrong titer value**
 - Syphilis RPR
- **Not provide complete information about expiry date of reagents**
- **Performed Supplementary Tests HIV even the HIV screen was negative.**
- **Did not provide titer value when test positive for TPPA, RPR**
- **Insufficient test and reagents to perform PT panels**

Round 1/ Sample	Your result	Reference result
1.	Syphilis TP: <ul style="list-style-type: none"> • Reactive 1:160 • Positive 	<ul style="list-style-type: none"> • Non-Reactive
2.	Syphilis RPR: <ul style="list-style-type: none"> • Reactive 1:8 • Positive Syphilis TP: Negative	<ul style="list-style-type: none"> • Reactive 1:2 • Reactive 1:320
3.	HBs Ag: Positive Anti-HCV: Negative	<ul style="list-style-type: none"> • Negative • Positive
4.	HBsAg: Negative	<ul style="list-style-type: none"> • Positive
5.	HIV Screen: Positive Anti-HCV: Negative Syphilis RPR: Positive	<ul style="list-style-type: none"> • Negative • Positive • Non-reactive
6.	Dengue IgG: Negative Dengue IgM: Negative	<ul style="list-style-type: none"> • Positive • Positive
Test Kit	Not provide Expire reagent Syphilis RPR: Not provide Expire reagent	

Result PT of Hematology round1 in 2017

Lab ID	Instruments	Manufacturer	Model	RE%	AE%
40	3596101736	Sysmex-KX	KX-21	100	97.5
40	3596102206	Sysmex- Others	XT-1800i	100	94.17
41	3596102226	Sysmex- Others	XT-1800i	98.33	95
41	3596102216	Sysmex- Others	XT-2000i	98.33	93.33
42	3596102236	Sysmex-KX	KX-21	100	96.67
42	3596102246	Sysmex-KX	KX-21	93.33	87.5
43	3596102276	Others	M-Series	84.17	90.83
44	3596102296	Sysmex-XP	XP-100	95	88.33
45	3596173136	Sysmex- Others	XS-500i	86.67	83.33
45	3596102316	Others	M-Series	91.67	95
46	3596102326	Sysmex-XP	XP-100	96.67	84.17
47	3596227636	Sysmex-XP	XP-100	100	90
47	3596102346	Sysmex-XP	XP-100	95	91.67
48	3596102356	Sysmex-XP	XP-100	100	96.67
49	3596102376	Sysmex-KX	KX-21	61.67	70.83
49	3596102386	Others	BC3000/3200	70.83	87.5
50	3596102396	Others	BC3000/3200	58.33	82.5
51	3596102406	Sysmex- Others	XS-500i	75.83	68.33
52	3596102426	Sysmex-XP	XP-100	100	95
52	3596102436	Sysmex- Others	XS-500i	100	95.83
53	3596102446	Sysmex-XP	XP-100	98.33	94.17
54	3596102456	Others	Humacount	76.67	88.33
55	3596102466	Sysmex-XP	XP-100	98.33	90
55	3596102476	Others	ABX Micro ES-60	82.5	91.67
56	3596102486	Sysmex-KX	KX-21	90	86.67
57	3596102496	Sysmex-XP	XP-100	89.17	83.33
57	3596102506	Others	BC3000/3200	85	94.17

Result PT of Hematology round 1 in 2017

Lab ID	Instruments	Manufacturer	Model	RE%	AE%
60	3596173146	Sysmex- Others	XS-500i	91.67	92.5
60	3596102516	Sysmex-KX	KX-21	93.33	93.33
61	3596102526	Sysmex-XP	XP-100	92.5	89.17
62	3596173156	Others	ABX Micro ES-60	82.5	89.17
63	3596102556	Sysmex-KX	KX-21	88.33	88.33
63	3596102566	Others	BC3000/3200	80.83	92.5
64	3596102576	Sysmex-KX	KX-21	96.67	91.67
65	3596102586	Sysmex-XP	XP-100	98.33	90.83
66	3596102606	Sysmex-KX	KX-21	96.67	93.33
67	3596102616	Sysmex-KX	KX-21	91.67	90.83
68	3596102626	Sysmex-XP	XP-100	98.33	90.83
69	3596102646	Sysmex-KX	KX-21	65	69.17
KH1032AI	3596227646	Sysmex-Other	XN-100	98.33	93.33
KH1033AI	3596141566	Sysmex-Other	XT-1800i	100	95.83
KH1033AI	3596141556	Sysmex-KX	KX-21	98.33	93.33
KH1034AI	3596141626	Others	Yumizen H500	86.67	96.67
KH1034AI	3596141636	Others	Pentra ES-60	85	96.67
KH1034AI	3596141676	Others	M-Series	81.67	94.17
KH1035AI	3596141596	Sysmex-KX	KX-21	96.67	88.33
KH1036AI	3596227686	Sysmex- Others	XN-350	88.33	88.33
KH1040AI	3596227676	Others	ABX Micro ES-60	42.5	61.67
KH1050	3596227666	Sysmex-KX	KX-21	85	79.17
KH1051	3596227696	Sysmex- Others	XS-800i	93.33	92.5
KH1051	3596227706	Sysmex- Others	XN-1000	93.33	81.67
			Average Score	89.23	89.13

Result PT of Hematology round 2 in 2017

Lab ID	Manufacturer	Model	RE %	AE %
40	System ex	XT-1800i	85.83	100
41	System ex	XT-1800i	93.33	96.67
41	System ex	XT-2000i	81.67	93.33
42	System ex-KX	SYSMEX-KX21	90	93.33
42	System ex-KX	SYSMEX-KX21	65	70.83
43	Medonic	Others-Mseries	91.67	91.67
44	System ex-KX	SYSMEX-KX21	82.5	85
44	System ex	XP-100	86.67	98.33
45	Medonic	Others-Mseries	83.33	83.33
45	System ex	XS-500i	85.83	87.5
46	System ex-XP	XP-100	77.5	100
47	System ex-XP	XP-100	92.5	100
47	System ex-XP	XP-100	75	100
48	System ex-XP	XP-100	75	88.33
49	Min dray	BC 30 00/3200	73.33	57.5
49	System ex-KX	SYSMEX-KX21	66.67	62.5
50	Min dray	BC 30 00/3200	85	79.17
51	System ex	XS-500i	65.83	90
52	System ex-XP	XP-100	86.67	98.33
52	System ex	XS-500i	93.33	98.33
53	System ex	XP-100	74.17	95.83
55	Horiba	ABX	80.83	85
55	System ex	XP-100	69.17	95

Result PT of Hematology round 2 in 2017

Lab ID	Manufacturer	Model	RE %	AE %
56	System ex-KX	SYSMEX-KX21	41.74	29.57
60	System ex-KX	SYSMEX-KX21	95.83	93.33
60	System ex	XS-500i	95.83	100
61	System ex-XP	XP-100	85	98.33
62	Horiba	ABX	90.83	96.67
63	Mindray	BC3000/3200	64.17	59.17
63	System ex-KX	SYSMEX-KX21	72.5	70
64	System ex-KX	SYSMEX-KX21	90.83	96.67
65	System ex-XP	XP-100	87.5	98.33
66	System ex-KX	SYSMEX-KX21	90.83	100
67	System ex-KX	SYSMEX-KX22	82.5	87.5
68	System ex-XP	XP-100	98.33	98.33
78	SIEMENS	SIEMENS	40.83	25
78	System ex	XT-1800i	30.83	32.5

Result PT of Hematology round 2 in 2017

Lab ID	Manufacturer	Model	RE %	AE %
79	Min dray	BC3000/3200	83.33	95
80	Sysm ex-IX	SYSMEX-IX2 1	93.33	90.83
80	Sysm ex-XP	XP-100	81.67	98.33
82	Sysm ex	XS-500i	71.67	83.33
KH 0029	Sysm ex	XN-1000	90	98.33
KH 0030	Sysm ex-IX	SYSMEX-IX2 1	92.5	96.67
KH 0030	Sysm ex	XT-1800i	76.67	98.33
KH 0031	Sysm ex-IX	SYSMEX-IX2 1	85	85.83
KH 0033	Medonic	Others- Ms eries	73.33	75
KH 0033	Horiba	Horiba-P entra	90.83	86.67
KH 0033	Horiba	Horiba	86.67	84.17
KH 0038	Sysm ex-IX	SYSMEX-IX2 1	85	98.33
KH 0039	Horiba	ABX	88.33	88.33
KH 0039	Horiba	ABX	84.17	85.83
KH 0039	Horiba	ABX	75	60.83
KH 0040	Sysm ex	XN-L	88.33	100
KH 0041	Sysm ex	XS-800i	82.5	91.57
KH 0042	Sysm ex	XN-1000	61.67	73.33
		Average score	80.33	85.93

Problem of PT Hematology in 2017

- Did not follow the instruction in performing PT panels
- Did not understand the instruction in performing PT panels
- Did not complete the checklist or completed incorrectly
- The analyzer not calibrate
- No IQC run
- Lack of reagent for IQC

Result of PT Biochemistry in 2017

	# Other	# PPTC	Laboratory	Biochemistry(1WA)		
				Part 1	Part 2	Part 3
		40		84%	88%	96%
		41		78%	82%	95%
		42		53%	47%	71%
		43		87%	86%	75%
		44		69%	86%	73%
		45		78%	87%	84%
		46		75%	74%	52%
		47		72%	88%	78%
		48		87%	93%	58%
		49		62%	80%	82%
		50		69%	90%	81%
		51		76%	85%	93%
		52		77%	86%	89%
		53		42%	100%	91%
		54		100%	97%	97%
		55		42%	51%	76%
		56		78%	80%	62%
		57		66%	80%	71%
		58		N/A	N/A	N/A
		60		92%	87%	85%
		61		70%	78%	83%
		62		70%	100%	92%

2017

Result of PT Biochemistry in 2017

	# Other	# PPTC	Laboratory	Biochemistry(1WA)		
				Part 1	Part 2	Part 3
2017		63		32%	64%	76%
		64		72%	44%	52%
		65		40%	48%	93%
		66		65%	65%	70%
		67		fail to participate	52%	68%
		68		84%	75%	78%
		69		62%	60%	71%
		77		N/A	N/A	N/A
		78		N/A	N/A	N/A
		79		51%	67%	67%
		80		68%	77%	67%
		81		51%	94%	99%
		82		N/A	N/A	N/A
		KH1030AI		80%	70%	77%
		KH1032AI		100%	100%	98%
		KH1033AI		95%	99%	98%
		KH1034AI		82%	91%	94%
		KH1035AI		58%	53%	51%
		KH1036AI		85%	98%	90%
		KH1040AI		77%	88%	89%
	<i>Average of Cambodian Labs</i>			71%	79%	80%
	<i>Median of Cambodian Labs</i>			72%	84%	80%
	<i>Average of all Participating Labs</i>					
	<i>Average of Other Participants</i>					

Problem of PT Biochemistry in 2017

Pre-analytic	Analytic	Post-analytic
<ul style="list-style-type: none">• Not follow instruction<ul style="list-style-type: none">- Insufficient mixing of sample,- Inaccurate reconstitution (wrong diluent, inaccurate diluent amount)• Incorrect storage of test kits and/or reagents and/or EQA samples• Temperature of samples not proper for testing (room temperature is required for some samples)	<ul style="list-style-type: none">• No pipette Calibration• Sample mix-up testing not performed immediately after sample diluted• Used expire reagents• Instrument parameters changed• Analyzer not calibrated, expired calibration• IQC<ul style="list-style-type: none">- Fail- Rule violation	<ul style="list-style-type: none">• Incorrect result unit submitted• Online result entry errors• Late in submitting result• No cross-check system

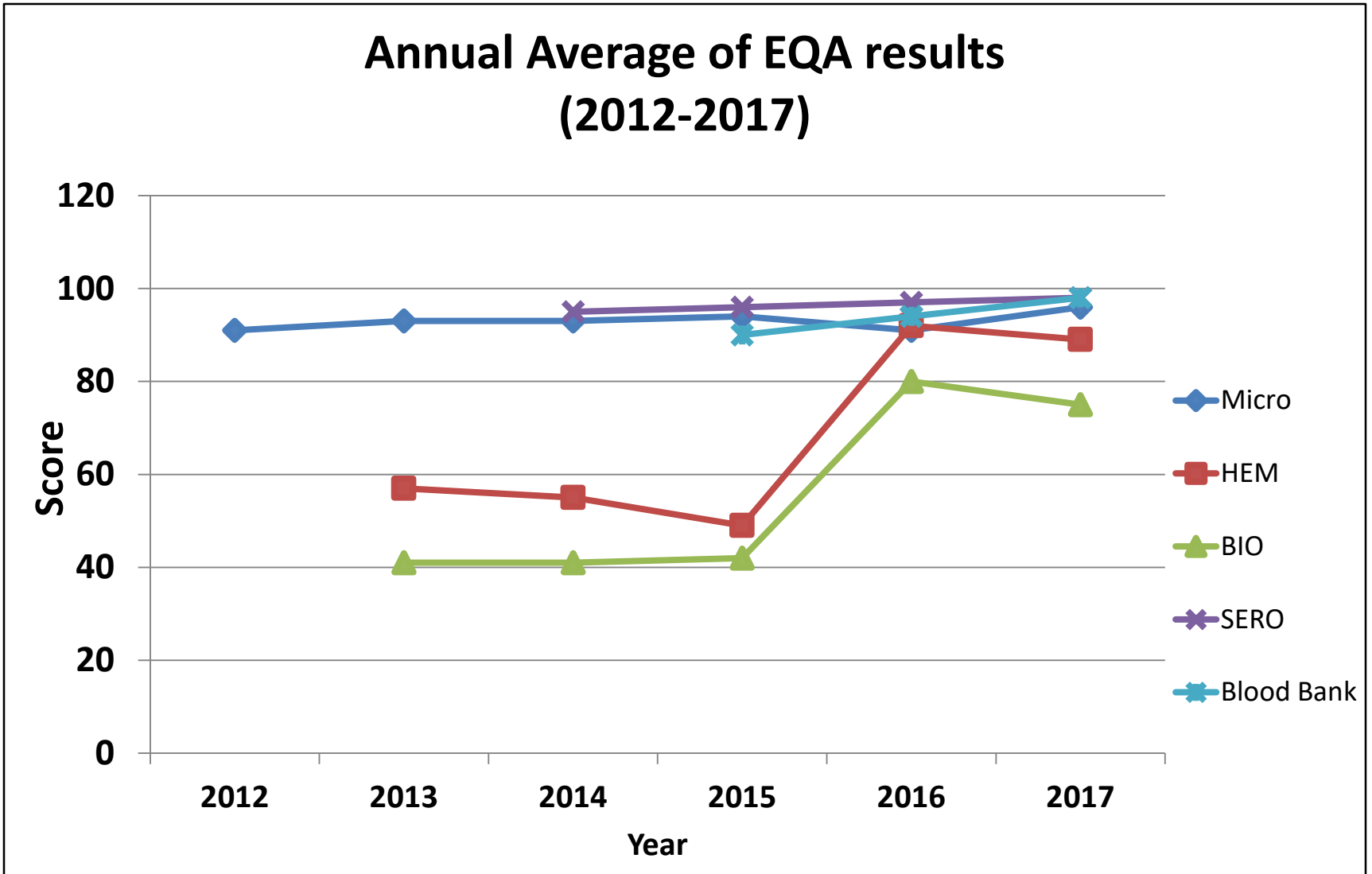
Result of PT Blood Bank in 2017

	# Other	# PPTC	Laboratory	Blood Bank (PPTC)			
				Part 1	Part 2	Part 3	
2017		44		93%	93%	93%	
		46		100%	100%	97%	
		52		93%	100%	100%	
		58		100%	100%	100%	
		78		100%	100%	93%	
	<i>Average of Cambodian Labs</i>				<i>97%</i>	<i>99%</i>	<i>97%</i>
	<i>Median of Cambodian Labs</i>				<i>100%</i>	<i>100%</i>	<i>97%</i>
	<i>Average of all Participating Lab</i>						
	<i>Average of Other Participants</i>						

Problem of PT Blood Bank in 2017

- Mistake on Clerical Check by using:
 - Expired reagent used

Average score of PT Microbiology, Serology Blood Bank Hematology & Biochemistry of all Labs from 2012-2017



RESULTS IN 2018

Result of PT Microbiology in 2018

	# Other	# PPTC	Laboratory	Microbiology (PPTC)		
				Part 1	Part 2	Part 3
2018		40		100%	91%	
		41		94%	91%	
		42		88%	91%	
		43		75%	96%	
		44		93%	100%	
		45		88%	96%	
		46		94%	88%	
		47		94%	86%	
		48		82%	87%	
		49		N/A	N/A	N/A
		50		N/A	N/A	N/A
		51		94%	100%	
		52		100%	100%	
		53		N/A	N/A	N/A
		54		N/A	N/A	N/A
		55		N/A	N/A	N/A
		56		N/A	N/A	N/A
		57		N/A	N/A	N/A
		58		N/A	N/A	N/A
		60		100%	100%	
		61		N/A	N/A	N/A
		62		N/A	N/A	N/A
		63		N/A	N/A	N/A
		64		N/A	N/A	N/A
		65		N/A	N/A	N/A
		66		N/A	N/A	N/A
		67		N/A	N/A	N/A
	68		N/A	N/A	N/A	
	69		N/A	N/A	N/A	
	71		100%	100%		
	78		N/A	N/A	N/A	
	77		94%	96%		
	<i>Average of Cambodian labs</i>			93%	94%	
	<i>Median of Cambodian labs</i>			94%	96%	
	<i>Average of all participating labs</i>					
	<i>Average of others participants</i>					

Problem of PT Microbiology in 2018

- Did not have enough test to identify the species of organism (API/ Serotype)
- Mistake on AST (did not follow CLSI)
- Did not provide the detail of the biochemical results

Round1/sample	Your result	Reference result
1.	<p>Wrong AST:</p> <ul style="list-style-type: none"> Erythromycin: Intermediate <p>Wrong species:</p> <ul style="list-style-type: none"> <i>Staphylococcus lugdunensis</i> Staphylococcus aureus Coagulase Negative 	<ul style="list-style-type: none"> Erythromycin: Susceptible <i>Staphylococcus epidermidis</i>
2.	<p>Wrong species:</p> <ul style="list-style-type: none"> Salmonella paratyphi A 	<ul style="list-style-type: none"> Salmonella Typhimurium
3.	<p>Wrong species:</p> <ul style="list-style-type: none"> <i>Coagulase negative staphylococcus</i> Staphylococcus pseudintermedius Staphylococcus lugdunensis Micrococcus Staphylococcus lugdunensis <p>Wrong AST:</p> <ul style="list-style-type: none"> Erythromycin: Intermediate Clindamycin : Intermediate 	<ul style="list-style-type: none"> <i>Staphylococcus aureus</i> Erythromycin: Susceptible Clindamycin : Susceptible

Round2/sample	Your result	Reference result
1.	Wrong AST : <ul style="list-style-type: none">• Nitrofurantoin : Susceptible	<ul style="list-style-type: none">• Nitrofurantoin : Resistant
3.	Wrong AST: <ul style="list-style-type: none">• Erythromycin: Intermediate• Clindamycin : resistant	<ul style="list-style-type: none">• Erythromycin: Susceptible• Clindamycin : Susceptible
4.	Wrong species: <ul style="list-style-type: none">• <i>Cryptosporidium</i>	<ul style="list-style-type: none">• <i>Cyclospora</i>

Result PT of Serology in 2018

	# Other	# PPTC	Laboratory	Serology (PPTC)		
				Part 1	Part 2	Part 3
2018		40		97%	100%	
		41		100%	97%	
		42		100%	96%	
		43		92%	96%	
		44		93%	100%	
		45		100%	98%	
		46		97%	100%	
		47		100%	100%	
		48		96%	98%	
		49		97%	100%	
		50		100%	97%	
		51		100%	100%	
		52		96%	100%	
		53		100%	96%	
		54		96%	96%	
		55		90%	100%	
		56		100%	0%	
		57		100%	100%	
		58		N/A	N/A	
		60		N/A	N/A	
		61		100%	96%	
		62		100%	100%	
		63		96%	100%	
		64		100%	96%	
		65		100%	100%	
		66		90%	91%	
		67		100%	100%	
		68		93%	90%	
		69		100%	92%	
		71		N/A	N/A	
		78		N/A	N/A	
		77		N/A	N/A	
		79		96%	96%	
	80		100%	100%		
	81		100%	100%		
	82		100%	97%		
	<i>Average of Cambodian labs</i>			96%	95%	
	<i>Median of Cambodian labs</i>			100%	98%	
	<i>Average of all participating labs</i>			97%	97%	
	<i>Average of others participants</i>					

Problem of PT Serology in 2018

- **Wrong titer value**
Syphilis RPR
- **Not provide complete information about expiry date of reagents**
- **Did not provide titer value when test positive for TPPA, RPR**
- **Insufficient test and reagents to perform PT panels**
- **Result inconsistent with referee result**

Round1,2 /sample	Your result	Reference result
1.	N/A	N/A
2.	N/A	N/A
3.	N/A	N/A
4.	Syphilis RPR: <ul style="list-style-type: none"> • Negative 	Syphilis RPR : <ul style="list-style-type: none"> • Reactive with Titer 1:2
5.	N/A	N/A
Test kit	<ul style="list-style-type: none"> • HBsAg kits recorded was past expiry • No kit information was recorded for Syphilis-TP testing • No kit information was recorded for Syphilis-RPR testing • supplementary HIV kits used were expired • The aHIV test kit recorded was past expiry 	

Result PT of Hematology round 1 in 2018

Lab ID	Manufacturer	Model	RE %	AE %
40	Sys mex	XP-100	99.17	84.17
40	Sys mex	XT-1800i	87.5	90
41	Sys mex	XT-2000i	83.33	95
41	Sys mex	XT-1800i	95	85
42	Sys mex-KOX	KOX-21	92.5	95.83
42	Sys mex-KOX	KOX-21	86.25	100
43	Medonic	Other -Mseries	85.83	94.17
44	Sys mex	KOX-21	87.5	94.17
44	Sys mex	XP-100	96.67	84.17
45	Sys mex	XS-500i	77.5	82.5
45	Boule	Quintus 5-part	89.17	87.5
46	Sys mex	XP-100	53.33	37.5
46	Sys mex	XN-L	31.67	37.5
47	Sys mex	XP-100	50	35
47	Sys mex	XP-100	45.83	37.5
48	Sys mex	XP-100	87.5	91.67
49	Sys mex	KOX-21	60	76.67
49	Mindray	BC3000/3200	85.83	85.83
50	Mindray	BC3000/3200	95.83	92.5
51	Sys mex	XS-500i	70.83	88.33

Result PT of Hematology round 1 in 2018

Lab ID	Manufacturer	Model	RE %	AE %
52	Sys mex	XP-100	92.5	79.17
52	Sys mex	XS-500i	90.83	92.5
53	Sys mex	XP-100	90.83	75
54	Sys mex	pocH-100i	85	85.83
55	Sys mex	XP-100	90	88.33
55	H oriba	ABXMicro ES-60	81.67	75
56	Sys mex	KX-21	47.83	60.87
57	Sys mex	XP-100	78.33	72.5
57	Mindray	BC 3000/3200	81.67	75.83
60	Sys mex	KX-21	91.67	95.83
60	Sys mex	XS-500i	82.5	92.5
61	Sys mex	XP-100	85	81.67
62	H oriba	ABXMicro ES-60	95.83	98.33
63	Sys mex	KX-21	81.67	96.67
63	Mindray	BC 3000/3200	95	98.33
64	Sys mex	KX-21	83.33	95.83

Result PT of Hematology round 1 in 2018

Lab ID	Manufacturer	Model	RE %	AE %
65	Sysmex	XP-100	87.5	84.17
66	Sysmex	KX-21	87.5	95.83
67	Sysmex	KX-21	78.33	92.5
68	Sysmex	XP-100	88.33	86.67
69	Sysmex	KX-21	55	82.5
77	Mindray	BC-series	95	96.67
77	Mindray	BC-series	75.83	74.17
77	Medonic	Other -Mseries	78.33	79.17
78	SIEMENS	SIEMENS	73.33	72.5
78	Sysmex	XT-1800i	80.83	90
79	Mindray	BC 3000/3200	79.17	82.5
80	Sysmex	XP-100	91.67	85.83
81	Sysmex	XN-1000	87.5	90.83
82	Sysmex	XS-500i	78.33	85.83
KH0029	Sysmex	XN-1000	85.83	94.17
KH0030	Sysmex	KX-21	82.5	88.33
KH0030	Sysmex	XT-1800i	84.17	86.67
KH0031	Sysmex	KX-21	80.83	95.83
KH0033	Horiba	HORIBA	92.5	96.67
KH0033	Horiba	Horiba-Pentra	90.83	93.33
KH0033	Medonic	Other -Mseries	72.5	69.17

Result PT of Hematology round 1 in 2018

Lab ID	Manufacturer	Model	RE %	AE %
KH0039	Horiba	ABX	75	70.83
KH0039	Horiba	ABX	95	98.33
KH0039	Horiba	ABX	92.5	95.83
KH0040	Sysmex	XN-L	83.33	94.17
KH0041	Sysmex	XN-1000	88.33	93.33
KH0042	Sysmex	XN-1000	86.67	92.5
KH0044	Horiba	ABX	63.33	55.83
KH0045	Medonic	Other M 32B	86.67	87.5
KH0046	Mindray	BC-series	73.33	71.67
KH0047	Horiba	ABX	88.33	90
KH0048	Mindray	BC-series	72.5	63.33
KH0049	Horiba	ABX	68.33	68.33
KH0050	Sysmex	poch-100i	85	85.83
KH0051	Mindray	BC-series	88.33	87.5
KH0052	Sysmex	poch-100i	66.67	80.83
KH0053	Mindray	BC-series	40.83	25

Result PT of Hematology round 1 in 2018

Lab ID	Manufacturer	Model	RE %	AE %
KH0054	Horiba	ABX	81.67	83.33
KH0055	Sysmex	KX-21	87.5	100
KH0057	Horiba	ABX	58.33	44.17
KH0058	Medonic	Other-M series	69.17	61.67
KH0059	Mindray	BC3000/3200	45	28.75
KH0059	Sysmex	XN-L	43.33	50.83
KH0060	Sysmex	XN-L	75.83	87.5
KH0061	Mindray	BC 3000+	88.33	90
		Average score	79.56	81.11

Problem of PT Hematology in 2018

- Did not follow the instruction in performing PT panels
- Did not understand the instruction in performing PT panels
- Did not complete the checklist or completed incorrectly
- The analyzer not calibrate
- No IQC run
- Lack of reagent for IQC

Result of PT Biochemistry in 2018

	# Other	# PPTC	<i>Laboratory</i>	Biochemistry (1WA)		
				<i>Part 1</i>	<i>Part 2</i>	<i>Part 3</i>
2018		40		71%	93%	100%
		41		79%	88%	96%
		42		50%	79%	86%
		43		92%	92%	100%
		44		85%	85%	85%
		45		39%	88%	89%
		46		83%	83%	100%
		47		75%	90%	83%
		48		91%	64%	82%
		49		70%	60%	60%
		50		77%	100%	86%
		51		83%	83%	66%
		52		91%	95%	92%
		53		78%	56%	89%
		54		50%	100%	67%
		55		82%	82%	64%
	56		22%	56%	33%	
	57		77%	46%	69%	
	58		N/A	N/A	N/A	

Result of PT Biochemistry in 2018

	# Other	# PPTC	<i>Laboratory</i>	Biochemistry (1WA)		
				<i>Part 1</i>	<i>Part 2</i>	<i>Part 3</i>
2018		60		50%	85%	95%
		61		71%	86%	43%
		62		60%	88%	38%
		63		83%	57%	43%
		64		60%	60%	60%
		65		50%	83%	14%
		66		67%	80%	60%
		67		20%	75%	57%
		68		56%	89%	78%
		69		63%	63%	56%
		71		N/A	N/A	N/A
		78		N/A	N/A	N/A
		77		N/A	N/A	N/A
		79		33%	44%	67%
		80		67%	83%	60%
		81		100%	100%	100%
		82		N/A	N/A	N/A
		PI		64%	92%	73%
		SM		52%	64%	67%
		PT		75%	100%	100%
		PL		80%	80%	90%
		RA		96%	96%	96%
	CT		96%	91%	91%	
	BM		100%	83%	97%	
	COH		100%	96%	100%	
	MM		75%	75%	75%	
	RN		42%	67%	58%	
	<i>Average of Cambodian labs</i>			75%	77%	75%
	<i>Median of Cambodian labs</i>			75%	83%	78%
	<i>Average of all participating labs</i>					
	<i>Average of others participants</i>					

Problem of PT Biochemistry in 2018

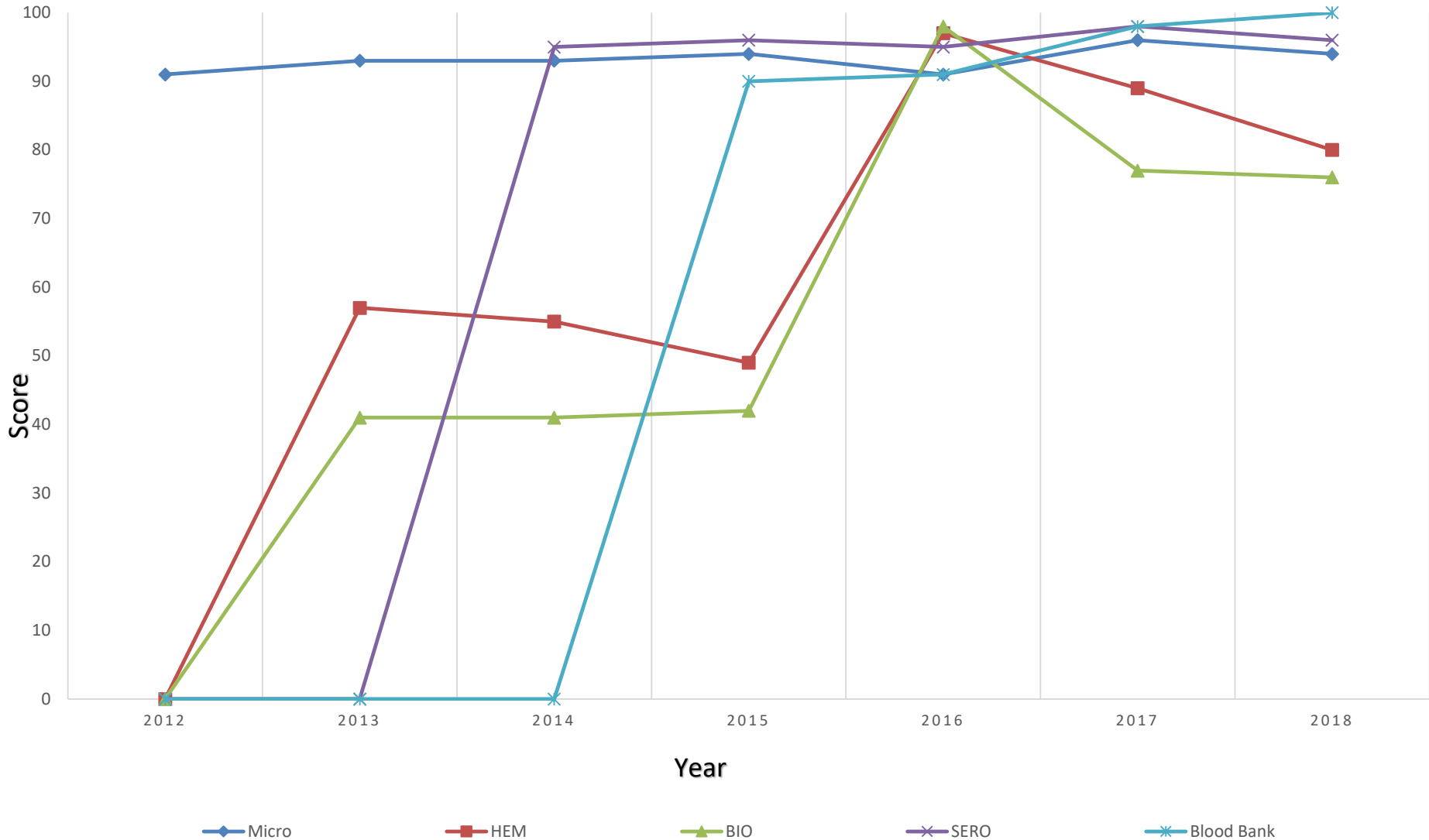
Pre-analytic	Analytic	Post-analytic
<ul style="list-style-type: none">• Not follow instruction<ul style="list-style-type: none">- Insufficient mixing of sample,- Inaccurate reconstitution (wrong diluent, inaccurate diluent amount)• Incorrect storage of test kits and/or reagents and/or EQA samples• Temperature of samples not proper for testing (room temperature is required for some samples)	<ul style="list-style-type: none">• No pipette Calibration• Sample mix-up testing not performed immediately after sample diluted• Used expire reagents• Instrument parameters changed• Analyzer not calibrated, expired calibration• IQC<ul style="list-style-type: none">- Fail- Rule violation	<ul style="list-style-type: none">• Incorrect result unit submitted• Online result entry errors• Late in submitting result• No cross-check system

Result of PT Blood Bank in 2018

2018	# Other	# PPTC	<i>Laboratory</i>	Blood Bank (PPTC)		
				<i>Part 1</i>	<i>Part 2</i>	<i>Part 3</i>
		78		100%	100%	
	<i>Median of Cambodian labs</i>			100%	100%	
	<i>Average of all participating labs</i>					
	<i>Average of others participants</i>					

Average score of PT Microbiology, Serology, Blood Bank, Hematology and Biochemistry of all Labs from 2012-2018

ANNUAL AVERAGE OF EQA RESULTS (2012-2018)



Q&A
Thank you for
your attention

