Success in Preanalytical EQA

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Background

Labquality is an international provider of professional external quality assessment (EQA) services. In 2014 Labquality launched four new EQA schemes for the preanalytical phase (Type I as defined by Kristensen et al., 2014) in order to provide a unique means for laboratories and point-of-care (POC) units to assess a larger part of the total laboratory testing process. The preanalytical EQA schemes include clinical chemistry, phlebotomy and POCT, microbiology and blood gas analyzers (integrated EQA from 2017 on).

Materials and Methods

Real life scenarios are used as case studies in the preanalytical EQA schemes. In every case the participants are asked to define the action they would do if they encountered a similar case in their daily work and also to identify possible preanalytical error(s). The results are grouped by the informed professions of the participants. The expected corrective action and preanalytical error(s) are defined in the reports by the scheme expert based on general recommendations. Challenges are sometimes faced due to differences between organizations and countries.

For this study the results from altogether five preanalytical EQA rounds (15 cases) of clinical chemistry (rounds 1/2014–1/2016 with three cases per round) were gathered. The success of determining the expected corrective action and finding the expected preanalytical error(s) was assessed for all cases. Since biomedical laboratory scientist (BLS) and group reply (later "team") were the biggest profession groups the results of these two groups were compared to the results of all participants. Other profession groups were for example chemist, medical doctor and nurse but there were fewer respondents in these groups per round and in some rounds only few or none.

Results

The number of participating units ranged from 22 to 56 per round from approximately ten different countries. The response percentage on the rounds varied from 68% to 87%.

Differences were observed between the professional groups. The BLSs gave the expected corrective action in 51.2% (range 0–80.0%) and found the expected preanalytical error(s) in 33.2% (2.9–97.6%) of the cases on average. Respectively, the teams acted as expected in 52.5% (0-100%) and determined the expected preanalytical error(s) in 34.4% (0–96.2%) of the cases on average. All participants agreed with the expert's corrective action in 48.4% (6.1–83.7%) and preanalytical error(s) in 33.1% (3.6–97.4%) of the cases on average. The success of defining the expected corrective action and preanalytical error(s) in each case are presented in figures 1 and 2, respectively.

The success of participants was highly case-dependent. Some cases represented more common situations than others and the more seldom cases seemed to be more difficult to all participants. For instance wrong patient preparation (including fasting), lipemic and hemolytic samples, sample contamination, incorrect sample transportation or storage conditions were identified usually quite well as preanalytical error(s), whereas lipid-soluble drug analysis process and floating gel effect were more unfamiliar to the participants. Case 2 in round 1/2015 was the most difficult with success rates of 6.1% in action and 8.2% in preanalytical error(s) for all participants. This case included a patient ID confirmation error based on two significantly different creatinine results from the same patient on two following days. Luckily many respondents considered the creatinine results suspicious and majority of them would call the requesting physician before releasing the results. Delta checks could be recommended. As listed in the articles by Plebani et al., 2014a, 2014b, identification errors are one of the most frequent preanalytical errors which may cause significant diagnostic errors for patients.

Conclusions

Both BLSs and teams did better in determining the expected corrective action and finding the expected preanalytical error(s) compared to all participants on average. The success of determining the corrective action was higher than finding the preanalytical error(s). Overall, the teams succeeded slightly better than the BLSs. Therefore when (re)thinking the organizational procedures it might be worth to consider using knowledge of the whole staff.

Key words: EQA, PT, preanalytical error, corrective action

References

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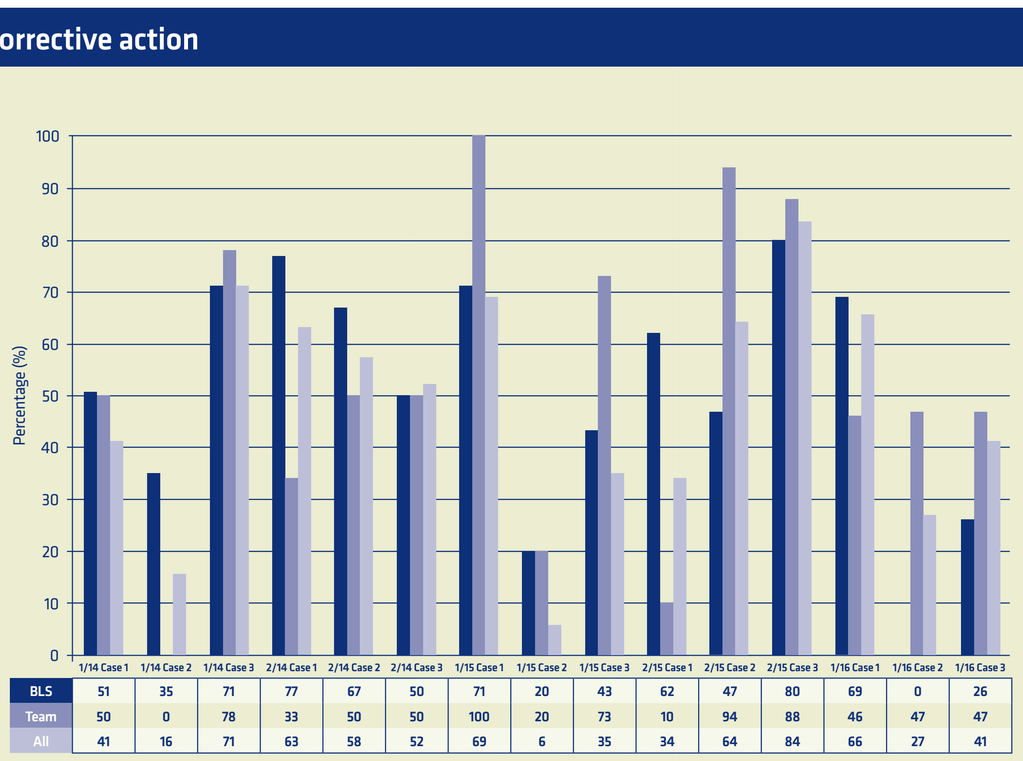
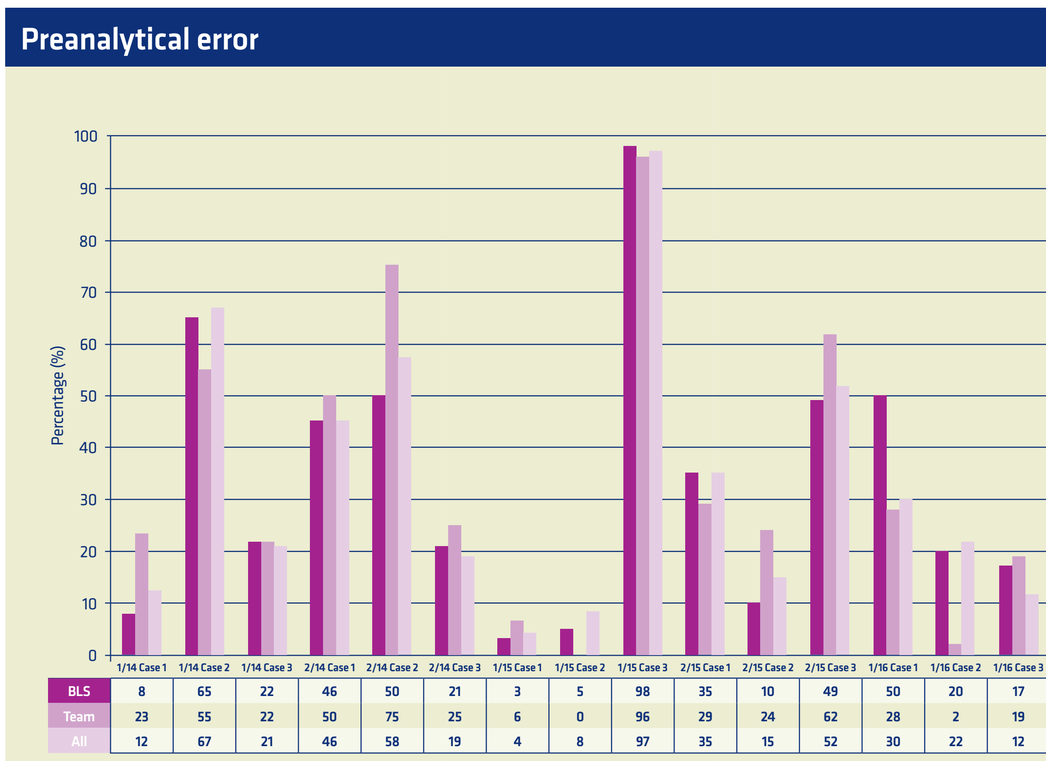
Corrective action



	1/14 Case 1	1/14 Case 2	1/14 Case 3	2/14 Case 1	2/14 Case 2	2/14 Case 3	1/15 Case 1	1/15 Case 2	1/15 Case 3	2/15 Case 1	2/15 Case 2	2/15 Case 3	1/16 Case 1	1/16 Case 2	1/16 Case 3
BLS	51	35	71	77	67	50	71	20	43	62	47	80	69	0	26
Team	50	0	78	33	50	50	100	20	73	10	94	88	46	47	47
All	41	16	71	63	58	52	69	6	35	34	64	84	66	27	41

Figure 1. The success of defining the expected corrective action for biomedical laboratory scientists (BLS), group reply (team) and all participants in clinical chemistry preanalytical EQA rounds 1/2014–1/2016.

Preanalytical error



	1/14 Case 1	1/14 Case 2	1/14 Case 3	2/14 Case 1	2/14 Case 2	2/14 Case 3	1/15 Case 1	1/15 Case 2	1/15 Case 3	2/15 Case 1	2/15 Case 2	2/15 Case 3	1/16 Case 1	1/16 Case 2	1/16 Case 3
BLS	8	65	22	46	50	21	3	5	98	35	10	49	50	20	17
Team	23	55	22	50	75	25	6	0	96	29	24	62	28	2	19
All	12	67	21	46	58	19	4	8	97	35	15	52	30	22	12

Figure 2. The success of defining the expected preanalytical error(s) for biomedical laboratory scientists (BLS), group reply (team) and all participants in clinical chemistry preanalytical EQA rounds 1/2014–1/2016.

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