Elizabeth Glaser Pediatric AIDS Foundation

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Task Shifting for Point-of-Care Early Infant Diagnosis Testing: Comparison of Internal Quality Control Failure Rates Between Nurses and Specialized Laboratory Trained Personnel

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BACKGROUND

- Decentralizing point-of-care (POC) early infant HIV diagnosis (EID) and task-shifting to nurses can give HIV-exposed and infected infants greater access to diagnosis and early treatment initiation.
- Unlike conventional testing that requires specialised laboratory personnel, POC EID uses automated technology and may be operated by non-specialised personnel.
- POC EID technologies include internal error controls that detect user control issues.
- High rates of error may suggest inadequate user capacity.
- Comparing internal quality control failure (IQC) rates (also known as error rates) and results return to caregivers for samples run on a POC EID technology (Alere q HIV 1/2 Detect) by two types of operators (nurses versus lab personnel [MLSc/Techs]) allows assessment of user competence and can be used to inform POC EID rollout in other resource-limited settings.

RESULTS

- A total of 1,847 tests were conducted by 45 testers (12 MLSc/Techs and 33 nurses), resulting in 165 IQC failures.
  - Nurses performed 1,483 tests and MLSc/Techs performed the other 364 tests.
- Overall IQC failure rate was 8.93%: 7.69% MLSc/Techs vs. 9.24%, for nurses, p=0.36
- User IQC failure rate was 6.17%: 5.22% for MLSc/Techs and 6.41% for nurses, p=0.38
  - There was no statistical difference between IQC failure rates for MLSc/Techs and for nurses.
  - Over time, both cadres' IQC failure rates decreased.
- Of results, 98.75% were issued to clients by MLSc/Techs; versus 98.92% by nurses.
- Median TATs were similar for tests conducted by nurses and those conducted by MLSc/Techs (overall TAT of one day (Q_1=0.5, Q_3=3.5) for MLSc/Techs versus same day (Q_1=0.5, Q_3=2.5) for nurses.

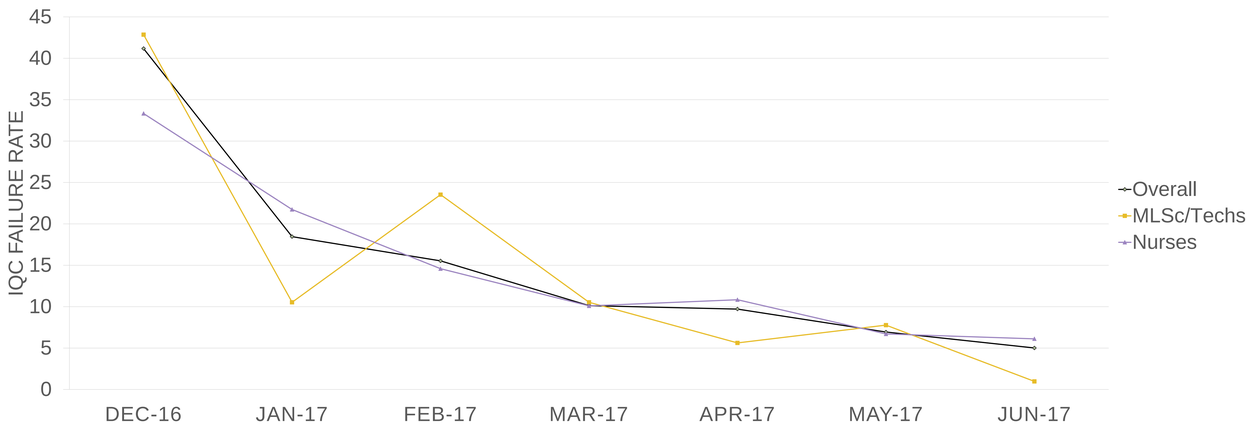

Figure 1. IQC failure rates by type of operator over time

METHODS

- All ten pilot sites providing POC EID for routine clinical use in Zimbabwe were included in the study.
- POC EID machines in two sites are operated by MLSc/Techs only, in six sites by nurses only, and in the other two sites by both cadres.
- All sites received the same type of training and were mentored/supported at the same frequencies.
- Data from December 2016 to June 2017 were reviewed.
- IQC failure rates were downloaded from each POC EID machine and exported to excel to analyse IQC failures by type of operator.
- The dataset had a total of 1,847 EID entries with unique identifiers.
- Turnaround time (TAT) from sample collection to caregiver receipt of results was extracted from the EID testing form (test request and result form) and uploaded into an excel-based database for analysis.

Table 1: Comparison of IQC failure rates in the use of Alere q platform for POC EID by type of operator in Zimbabwe, 2017 (n=1847)

Error Category	Testing Cadre	Error Rate	P-Value
General IQC Failures	MLSc/Techs	7.69%	0.36
	Nurses	9.24%	
End-User IQC Failures	MLSc/Techs	5.22%	0.38
	Nurses	6.41%	

Table 2: Issuing of results by type of operator

	MLSc/Techs	Nurses
Proportion of results issued to clients	98.75%	98.92%
Median time from sample collection to receipt of results by caregiver	1 day (IQR 0.5 – 3.5)	Same day (IQR 0.5 – 2.5)
Median time from sample collection to processing	Same day (IQR 0.5 – 1.5)	Same day (IQR 0.5 – 0.5)
Median time from processing to issuing of results to caregiver	Same day (IQR 0.5 – 2)	Same day (IQR 0.5 – 1)

CONCLUSIONS

- Similar IQC failure rates and TAT between nurses and lab-tech-operators suggest that non-specialized laboratory trained personnel can perform POC EID equally well as specialized laboratory personnel.
- Nurse-operated POC EID testing will ensure decentralization and timely return of test results without compromising the quality of testing.
- Continuous mentoring/support and refresher trainings remain equally important for both nurses and lab-techs to reduce end-user IQC failures and ensure timely return of test results.

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