Development of an Individualized Quality Control Plan (IQCP) for MGIT Pyrazinamide (PZA) Drug Susceptibility Testing (DST)

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Background

IQCP is a 3-step process to identify the specific quality control requirements for a particular test.

1. **Risk Assessment (RA)**
2. **Quality Control (QC) plan**
3. **Quality Assessment (Assurance) (QA) monitoring**

Our laboratory developed an IQCP for MGIT PZA DST based on manufacturer's instructions—weekly QC (vs. each run) and only one control (susceptible to PZA)

Methods – How We Looked for Possible Risks

CMS requires that all 3 phases of testing be included in RA:

- ✓ Pre-analytical
- ✓ Analytical
- ✓ Post-analytical

CMS requires that these 5 test components be included in RA:

- ✓ Specimen
- ✓ Test System
- ✓ Reagents
- ✓ Environment
- ✓ Testing Personnel

Methods – Where We Looked for Possible Risks (or: What could *possibly* go wrong today - or tomorrow?!)

Where we looked for risks:

- ✓ PZA testing Process Map
- ✓ Procedures (both PZA & PZA QC procedures)
- ✓ Any associated forms and documents
- ✓ The MGIT 960 System User's Manual
- ✓ Manufacturer's package inserts
- ✓ Personal experiences

Methods – Evaluating Possible Risks by Determining Probability of Occurrence

Our Laboratory's Definitions for Probability of Occurrence	
Improbable	Once in the life of the system
Remote	< 1% of testing
Occasional	Between 1% - 10%
Probable	Between 10% - 50%
Frequent	> 50% of testing

Methods – Evaluating Possible Risks by Determining Severity of Harm

Definitions for Severity of Harm Used In Our Laboratory Were Based On:
✓ Potential for Material Cost
✓ Scope of Impact (Team, Branch, Outside Branch, Outside CDC)
✓ Potential for Injury or Impairment to Patient or Personnel

Methods – Our Laboratory's Risk Acceptability Matrix

Probability of Occurrence	Severity of Harm				
	Negligible	Minor	Serious	Critical	Catastrophic
Frequent	Unacceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable
Probable	Acceptable	Unacceptable	Unacceptable	Unacceptable	Unacceptable
Occasional	Acceptable	Acceptable	Unacceptable	Unacceptable	Unacceptable
Remote	Acceptable	Acceptable	Acceptable	Unacceptable	Unacceptable
Improbable	Acceptable	Acceptable	Acceptable	Acceptable	Unacceptable

Methods – Creating the Risk Assessment

- On our spreadsheet we had columns filled in for each risk, its control(s), the phase of testing and the test component affected, and supporting documentation.
- We then estimated each risk's Probability of Occurrence and Severity of Harm using our laboratory's definitions .
- The acceptability of each risk was then determined using our laboratory's Risk Acceptability Matrix.
- If any risks were found to be unacceptable, additional controls were identified to reduce the probability of occurrence or severity of harm.
- If additional controls are identified, existing procedures may need to be modified.

Results – Examples from our Laboratory's Risk Assessment Table*

Risk	Testing Phase	Probability (with controls in place)	Severity	Risk Acceptable?
Incorrect or incomplete information for specimen entered on submission form	Pre-analytic	Occasional	Minor	Yes
Use of expired calibrator tubes resulting in erroneous results	Pre-analytic	Improbable	Serious	Yes
Contamination introduced during set up of MGIT seed tubes / MGIT PZA media tubes	Analytic	Remote	Minor	Yes
MGIT drawer fails to maintain correct temperature range	Analytic	Improbable	Serious	Yes
Improper seating of inoculated MGIT tube in instrument resulting in spill	Analytic	Improbable	Critical	Yes
Printer malfunctions while printing reports	Post-analytic	Occasional	Minor	Yes

*Probability, Severity, and Acceptability Determined After Thorough Documentation of Controls

Results – Examples of Control Documentation:

Incorrect or Incomplete Information Entered on Submission Form

Controls (established or proposed)

- ✓ CDC's new submission forms w/ 2D barcode technology and new ELIMS software will reduce errors in transcription. The barcodes created by the submitter's input will be scanned into CDC's new ELIMS software when received at CDC.
- ✓ Procedures will be established to check patient demographics, specimen, transport medium, and submitter information against the submission form to prevent mismatched or missing information.
- ✓ An accessioning sticker will be placed on the submission form to indicate if the identifiers on the specimen and submission form agree.
- ✓ The submitting lab will be called to clarify conflicting information or to obtain missing information.

Known Limitations (Residual Risk)

- ✓ Transcription errors may still occur when data is entered manually
- ✓ Error could occur at submitting lab and not be apparent on form or sample

Results

- Our Risk Assessment identified >25 risks.
- Controls were already in place for the majority.
- No unacceptable residual risk was identified.
- A QC Plan has been developed, along with QA Monitoring to periodically review the QC Plan for effectiveness.
- Actively refining our IQCP

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