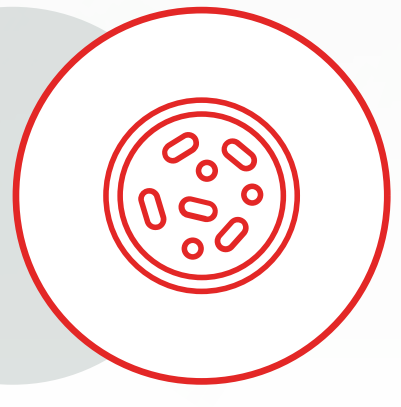


RES-A01

A Review of Common Sources of Error in Bacteriology External Quality Assessment Programs



Melanie Otormin¹, Menuk Jayawardena¹, Katherine Ryan¹, Torsten Theis¹ and Juliet Elvy²

¹ The Royal College of Pathologists of Australasia Quality Assurance Programs (RCPAQAP), St Leonards, NSW, Australia
² Clinical Microbiology, Awanui Labs, Dunedin, New Zealand

Introduction

The Royal College of Pathologists of Australasia Quality Assurance Programs (RCPAQAP) delivers External Quality Assessment (EQA) services to laboratories worldwide, supporting the reliability of diagnostic methods and promoting excellence in laboratory practice. Participants partake in various types of surveys, including (but not limited to) molecular, bacteriology, and parasitology, and return results that are then graded accordingly.

Objective

This study explored the root causes of discordant results in the eight core bacteriology programs in 2024 and reviewed how laboratories responded to these outcomes.

Method

The RCPAQAP Microbiology offers eight core bacteriology programs to laboratories worldwide. In 2024, between 146 and 227 laboratories were enrolled in these programs. Lyophilised specimens with confirmed homogeneity were distributed to laboratories, together with relevant clinical notes and handling instructions. Once the material reached the laboratory, it was reconstituted and tested in accordance with each laboratory's standard operating procedure. Laboratories submitted all test results via the RCPAQAP myQAP portal and were assessed based on pre-testing results, in-house testing (stability and week three viability), and overall consensus. Results were classified into four main categories: Concordant, Discordant, Minor Discordance, and Not Assessed.

Table 1 The RCPAQAP Microbiology Core Bacteriology Programs

Program	Frequency	Measurands
Blood Culture Isolates	4 surveys / 1 case per survey	Culture Identification
Faecal Pathogens	4 surveys / 2 cases per survey	Culture Identification
Genital Swabs	4 surveys / 1 case per survey	Culture Identification
Nose/Throat Pathogens	4 surveys / 1 case per survey	Culture Identification
Respiratory Pathogens	4 surveys / 2 cases per survey	Culture Identification & Antimicrobial susceptibility testing
Skin/Eye/Ear Pathogens	4 surveys / 1 case per survey	Culture Identification & Antimicrobial susceptibility testing
Urine	4 surveys / 2 cases per survey	Culture Identification & Antimicrobial susceptibility testing
Wound Anaerobes	4 surveys / 1 case per survey	Culture Identification & Antimicrobial susceptibility testing (aerobes only)

Results

- Overall rate of discordant and minor discordance results: 4.1%
- Highest discordance rate: Skin/Eye/Ear Program at 5.1% (Figure 1).
- Lowest discordance rate: Genital Swabs Program at 0.7% discordant and 0.1% minor discordance results (Figure 1).
- All minor discordances observed were due to reporting the incorrect species of an organism (Figure 2).
- Highest minor discordance rate: Blood Culture Isolates Program at 4.3% (Figure 1).
- Most common source of discordance: Incorrect genus ID at 73% (Figure 2).
- Least common source of discordance: Inability to culture the organism at 5% (Figure 2).
- Follow-up from laboratories (Figure 3a):
 - 55.4% completed an internal investigation (documented in myQAP)
 - 43.2% did not complete a documented follow-up action in myQAP
 - 1.4% submitted a request to the myQAP portal to investigate results
- Highest rate of follow-up action: Wound/Anaerobe Program at 76.5% (Figure 3b).

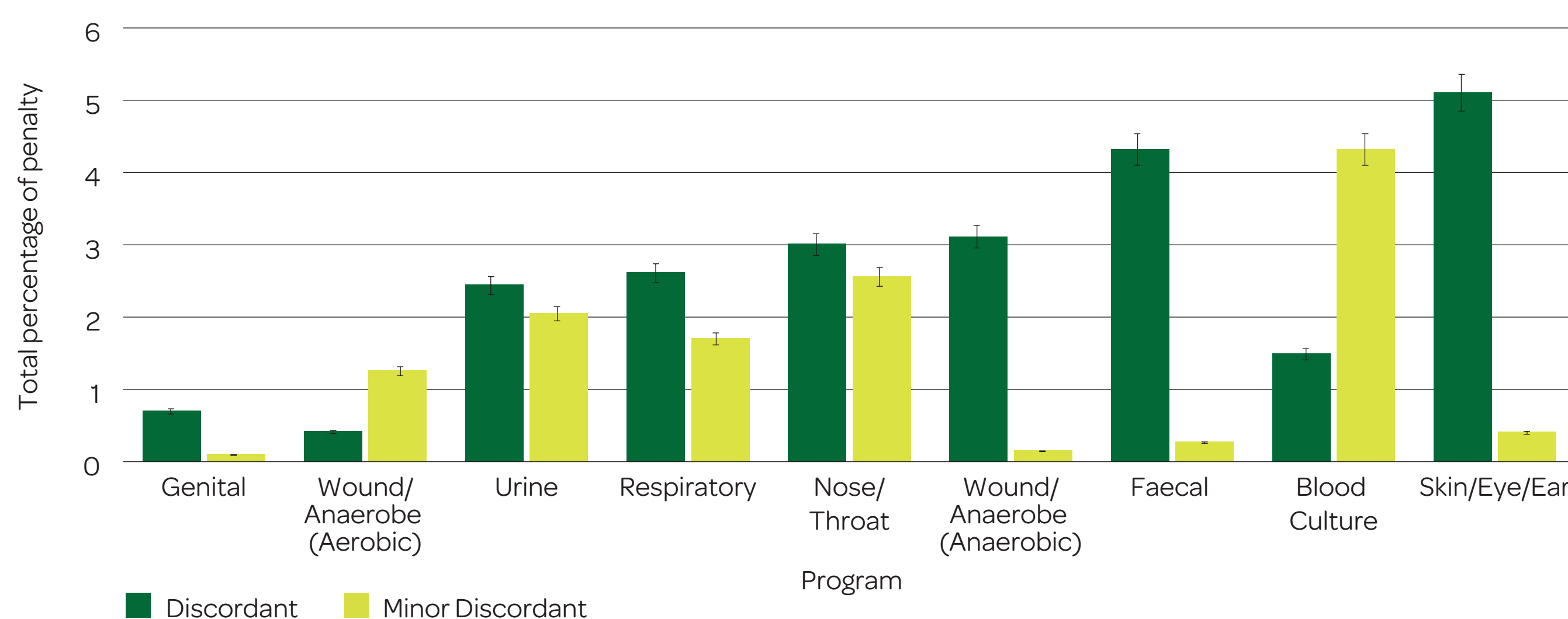


Figure 1 Percentage of 2024 Discordant and Minor Discordance Bacteriology Results

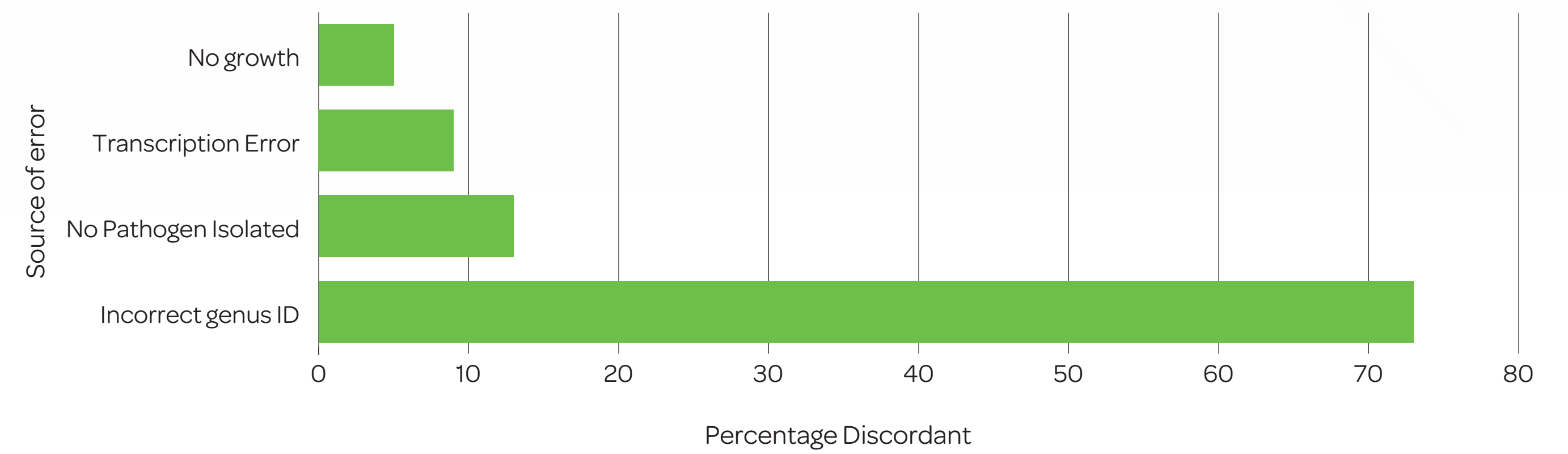


Figure 2 Most Common Sources of Error in 2024 Bacteriology Programs

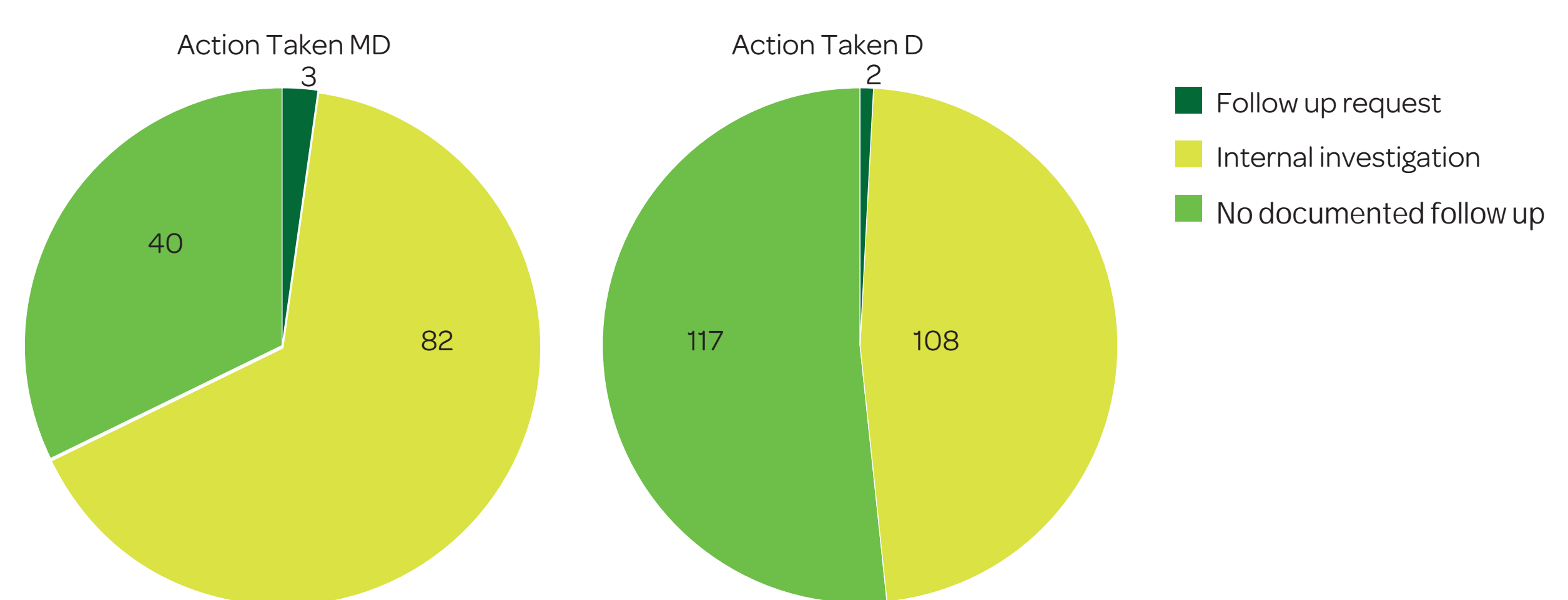


Figure 3a Follow-up Taken in Response to Laboratory Outcomes

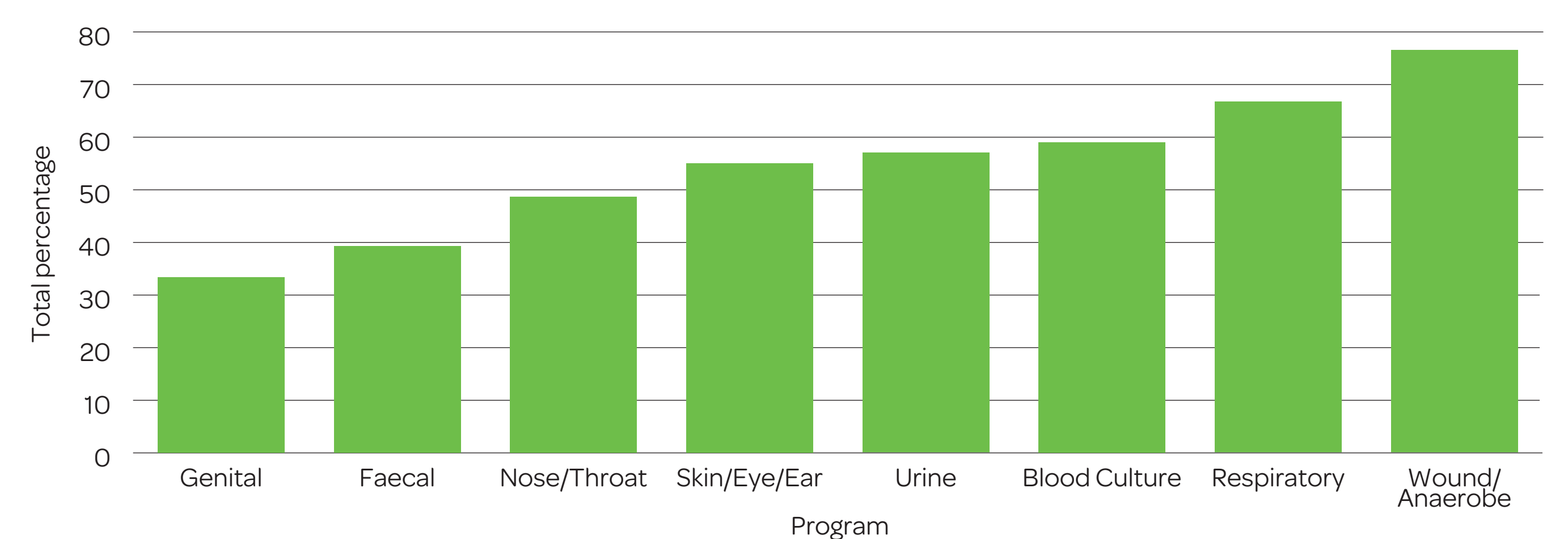


Figure 3b Follow-up Taken in Response to Laboratory Outcomes – Program Breakdown

Discussion

- Overall, participants performed very well, with only 4% combined discordance or minor discordance over 2024.
- EQA for bacteriology effectively identified common errors in the laboratory, which have the potential to put patients at risk.
- Incorrect genus identifications or species misidentification were key issues in laboratories receiving a penalty.
- Transcription errors or inconsistent data entry were identified as another source for discordant results. Consequently, a higher rate of transcription error was observed for modules containing two items per survey (i.e. urine and respiratory samples). Additional checks by competent staff members during processing and reporting may be a helpful tool for reducing discordant and minor discordance rates.
- Interestingly, the program with the highest number of discordant or minor discordance results (Skin/Eye/Ear) experienced a 55% follow-up rate, compared with the Wound/Anaerobe module, which, while having an overall lower penalty, had a follow-up rate of over 75%.
- Documented follow-up records indicate that 43% of laboratories graded discordant or minor discordance did not conduct any documented internal investigations in the myQAP portal following receiving their results. It is not possible to determine from this data if a laboratory performed a correct action outside the myQAP portal.
- A follow-up investigation may benefit laboratories in determining the root cause of errors. Therefore, lodging a request to clarify a result, requesting a repeat sample, or repeating testing on the original sample, is encouraged for traceability and reproducibility of investigations.

Conclusion

These findings underscore the critical role of EQA in detecting systemic issues in laboratory diagnostics and guiding targeted improvements. By highlighting common pitfalls and follow-up practices, this analysis provides actionable insights to help laboratories enhance diagnostic accuracy and overall quality.