How Modern is your Microbiology Laboratory? Results of the 2017 Institute for Quality Management in Healthcare (IQMH) Patterns of Practice Survey

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ABSTRACT

Background: New technologies in the microbiology laboratory have the potential to reduce turn-around-time and improve accuracy, antimicrobial stewardship and patient outcomes. However, there is a paucity of data on their adoption by Canadian laboratories. The objective of our study was to investigate the patterns of practice of adopting new technologies amongst the Institute for Quality Management in Healthcare (IQMH) participating laboratories and to summarize post-implementation quality indicators.

Methods: In June 2017, a web-based patterns of practice qualitative survey on the adoption of novel technologies was conducted by the IQMH across all 73 microbiology laboratories that participate in the IQMH Bacteriology Proficiency Testing program.

Results: 69 of the 73 (94.5%) laboratories responded. Of the four non-respondents, only two provided a reason for non-participation.

Figure 1: Types of participating laboratories. 69 of the 73 laboratories participated in the study of novel technologies.

Figure 2: Laboratories with dedicated methods evaluation staff. Laboratories from all three groups reported having personnel dedicated to methods evaluation, the percentage was notably higher in the non-hospital laboratories compared to either university hospital or community hospital laboratories.

Figure 3: Adoption of Novel Technologies

A. Adoption of MALDI-TOF by laboratories. The percentages of laboratories that have adopted MALDI-TOF, and the intended usage, 30% of all laboratories reported implementing MALDI-TOF (100% university hospital, 18% community hospital, 18% non-hospital laboratories), but only 4% of all laboratories had implemented total laboratory automation (12.5% university hospital, 9% community hospital, 9% non-hospital laboratories) with post-implementation reduction in turn-around-time, error rate, and costs cited as benefits. (b) MALDI-TOF is being used primarily for routine bacterial and yeast identification.

B. Adoption of automated specimen processing and total laboratory automation. 4% of laboratories adopted automated specimen processors (37.5% university hospital, 10% community hospital, 18% non-hospital laboratories), but only 4% of all laboratories had implemented total laboratory automation (12.5% university hospital, 9% community hospital, 9% non-hospital laboratories) with post-implementation reduction in turn-around-time, error rate, and costs cited as benefits.

C. Adoption of syndromic multiplex testing. 7% of laboratories implemented syndromic (either respiratory, gastrointestinal, or meningococcal/pneumococcal) multiplex testing (25% university hospital, 5% community hospital) with improved turn-around-time and diagnostic yield and post-implementation.

DISCUSSION & CONCLUSIONS

Our findings highlight that there is a wide range of adoption of new technologies varying between university hospital laboratories, community hospital laboratories and non-hospital laboratories.

The discrepancy between non-hospital based laboratories versus community and hospital laboratories with regard to having dedicated methods evaluation is significant and has the potential to limit the uptake of new assays and technologies which may be partly responsible for the varying degree of uptake of novel technologies.

The discrepancy between non-hospital based laboratories versus hospital laboratories regarding full evening service is also notable which may limit the full benefit of adopting novel technologies with rapid turn-around-times. Similarly, the discrepancy between community versus university hospital laboratories with regard to full weekend service is notable. Laboratories should reflect on these differences and consider increasing service. When considering hours of operations, laboratories should consult key stakeholders and assure they are considering collection times and not delivery times.

These data provide markers that laboratories can use for self-assessment in order to gauge where they stand within the larger Canadian microbiology community. Additionally, it provides rationale (e.g. improved TAT, reduced errors and other cited post-implementation quality indicator data) that can be used by laboratories for generating future business cases.

As implementing new methods should be based on an evaluation of local need, epidemiology and characteristics of the relevant population served by the laboratory, and no “one size fits all” model can be applied broadly.

Follow-up evaluations would be helpful to determine how/if the landscape of adopting new technologies and increasing hours of operation is changing. Additionally, nationally collected data would be valuable in providing a more comprehensive picture.

METHODS

In June 2017, a web-based patterns of practice qualitative survey on the adoption of novel technologies was conducted by the IQMH across all 73 microbiology laboratories that participate in the IQMH Bacteriology Proficiency Testing program. No effort was made to verify laboratory responses.

References: