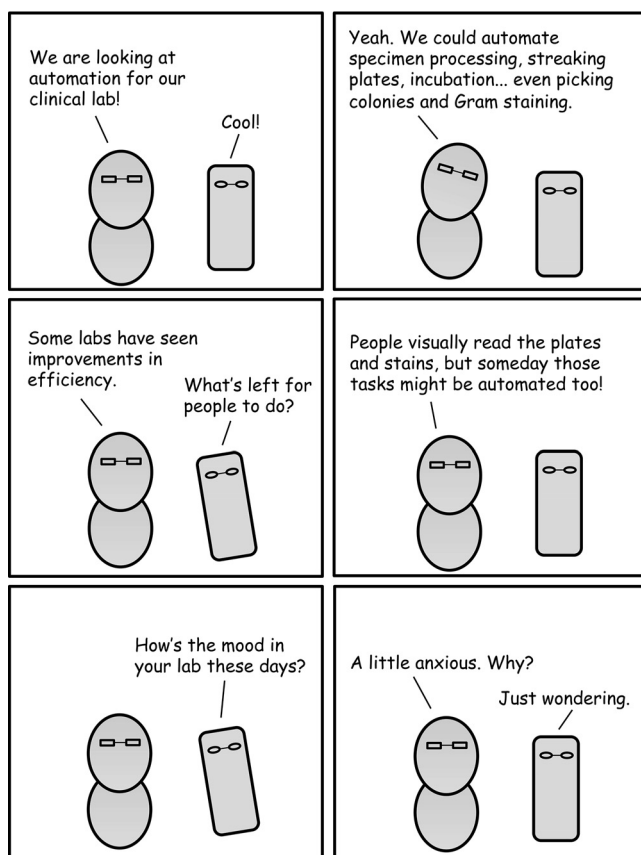Check for updates

Total Laboratory Automation in Clinical Microbiology: a Micro-Comic Strip

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Laboratory automation in clinical microbiology has the potential to revolutionize laboratory operations (1, 2). A number of clinical microbiology laboratories have automated part or most of their work and found that testing can be performed accurately, with reduced turnaround times, improvements in laboratory efficiency, and increased flexibility in the level of skill required to perform work in the laboratory (3–7). Even highly complex tasks such as visual interpretation of Gram stains, of culture results, and of susceptibility tests can be automated (4, 8–14). Use of total laboratory automation has the potential to allow staff to perform more-complex tasks that will take advantage of their expertise (1, 15). It also has the potential to affect laboratory needs for expert technologists. How might clinical technologists view the possible effects of total laboratory automation? Read the comic strip to find out.

REFERENCES

1. Burnham CA, Dunne WM, Jr, Greub G, Novak SM, Patel R. 2013. Automation in the clinical microbiology laboratory. Clin Chem 59:1696–1702. https://doi.org/10.1373/clinchem.2012.201038.
2. Croxatto A, Prod'hom G, Faverjon F, Rochais Y, Greub G. 2016. Laboratory automation in clinical bacteriology: what system to choose? Clin Microbiol Infect 22:217–235. https://doi.org/10.1016/j.cmi.2015.09.030.
3. Da Rin G, Zoppelletto M, Lippi G. 2016. Integration of diagnostic microbiology in a model of total laboratory automation. Lab Med 47:73–82. https://doi.org/10.1093/labmed/lmv007.
4. Heather CS, Maley M. 2018. Automated direct screening for resistance of Gram-negative blood cultures using the BD Kiestra WorkCell. Eur J Clin Microbiol Infect Dis 37:117–125. https://doi.org/10.1007/s10096-017-3109-2.
5. Hombach M, Jetter M, Blochliger N, Kolesnik-Goldmann N, Bottger EC. 2017. Fully automated disc diffusion for rapid antibiotic susceptibility test results: a proof-of-principle study. J Antimicrob Chemother 72:1659–1668. https://doi.org/10.1093/jac/dkx026.
6. Moreno-Camacho JL, Calva-Espinosa DY, Leal-Leyva YY, Elizalde-Olivas DC, Campos-Romero A, Alcantar-Fernandez J. 2017. Transformation from a conventional clinical microbiology laboratory to full automation. Lab Med 49:e1–e8. https://doi.org/10.1093/labmed/lmx079.
7. Theparee T, Das S, Thomson RB, Jr. 2018. Total laboratory automation and matrix-assisted laser desorption ionization–time of flight mass spectrometry improve turnaround times in the clinical microbiology laboratory: a retrospective analysis. J Clin Microbiol 56:e01242-17. https://doi.org/10.1128/JCM.01242-17.
8. Brecher SM. 2017. Waltzing around sacred cows on the way to the future. J Clin Microbiol 56:e01779-17. https://doi.org/10.1128/JCM.01779-17.
9. Faron ML, Buchan BW. 2016. Automated scoring of chromogenic media for detection of methicillin-resistant *Staphylococcus aureus* by use of WASPLab image analysis software. J Clin Microbiol 54:620–624. https://doi.org/10.1128/JCM.02778-15.
10. Faron ML, Buchan BW. 2016. Automatic digital analysis of chromogenic media for vancomycin-resistant-enterococcus screens using Copan WASPLab. J Clin Microbiol 54:2464–2469. https://doi.org/10.1128/JCM.01040-16.
11. Smith KP, Kang AD, Kirby JE. 2017. Automated interpretation of blood culture Gram stains using a deep convolutional neural network. J Clin Microbiol 56:e01521-17. https://doi.org/10.1128/JCM.01521-17.
12. Glasson J, Hill R, Summerford M, Giglio S. 2016. Evaluation of an image analysis device (APAS) for screening urine cultures. J Clin Microbiol 54:300–304. https://doi.org/10.1128/JCM.02365-15.
13. Glasson J, Hill R, Summerford M, Olden D, Papadopoulos F, Young S, Giglio S. 2017. Multicenter evaluation of an image analysis device (APAS): comparison between digital image and traditional plate reading using urine cultures. Ann Lab Med 37:499–504. https://doi.org/10.3343/alm.2017.37.6.499.
14. Kirn TJ. 2016. Automatic digital plate reading for surveillance cultures. J Clin Microbiol 54:2424–2426. https://doi.org/10.1128/JCM.01279-16.
15. Gilligan PH. 2017. The invisible army. J Clin Microbiol 55:2583–2589. https://doi.org/10.1128/JCM.00658-17.