test result in 15–30 min, it still requires up to 2 h of incubation for some isolates and to confirm a negative test result. The rCIM(-A) may already give a positive result at 2 h (30 min of incubation and 1.5 h of growth monitoring of the *Escherichia coli* ATCC 25922 indicator strain) using standard routine equipment and reagents (carbapenem discs, Trypticase soy broth, a tabletop centrifuge, a vortex and a nephelometer). We agree that the rCIM requires extra hands-on time, thus making it less attractive for high-throughput laboratories, but it may be appropriate for low-throughput and low-resource settings.[2,3] Finally, both assays have similar turnaround times, as both require overnight bacterial cultures, and the longer detection time of the rCIM is only a small fraction of total reporting time. Moreover, for initiating appropriate antibiotic treatments in critically ill patients, rapid susceptibility testing using techniques that have been developed and endorsed by EUCAST are crucial, even in low- and middle-income countries.[11]

Transparency declarations

None to declare.

References

1 Nordmann P, Poirel L. Comment on: Optimization of the rapid carbapenem inactivation method for use with AmpC hyperproducers. *J Antimicrob Chemother* 2022; **77**: 1207.

2 Muntean MM, Muntean A-A, Guerin F *et al*. Optimization of the rapid carbapenem inactivation method for use with AmpC hyperproducers. *J Antimicrob Chemother* 2021; **76**: 2294–301.

3 Muntean M-M, Muntean A-A, Gauthier L *et al*. Evaluation of the rapid carbapenem inactivation method (rCIM): a phenotypic screening test for carbapenemase-producing Enterobacteriaceae. *J Antimicrob Chemother* 2018; **73**: 900–8.

4 Jousset AB, Oueslati S, Bernabeu S *et al*. False-positive carbapenem-hydrolyzing confirmatory tests due to ACT-28, a chromosomally encoded AmpC with weak carbapenemase activity from *Enterobacter kobei*. *Antimicrob Agents Chemother* 2019; **63**: e02388-18.

5 Tijet N, Boyd D, Patel SN *et al*. Evaluation of the Carba NP test for rapid detection of carbapenemase-producing Enterobacteriaceae and *Pseudomonas aeruginosa*. *Antimicrob Agents Chemother* 2013; **57**: 4578–80.

6 Kumudunie WGM, Wijesooriya LI, Wijayasinghe YS. Comparison of four low-cost carbapenemase detection tests and a proposal of an algorithm for early detection of carbapenemase-producing Enterobacteriaceae in resource-limited settings. *PLoS One* 2021; **16**: e0245290.

7 Emeraud C, Biez L, Girlich D *et al*. Screening of OXA-244 producers, a difficult-to-detect and emerging OXA-48 variant? *J Antimicrob Chemother* 2020; **75**: 2120–3.

8 Falgenhauer L, Nordmann P, Imirzalioglu C *et al*. Cross-border emergence of clonal lineages of ST38 *Escherichia coli* producing the OXA-48-like carbapenemase OXA-244 in Germany and Switzerland. *Int J Antimicrob Agents* 2020; **56**: 106157.

9 Nordmann P, Poirel L, Dortet L. Rapid detection of carbapenemase-producing Enterobacteriaceae. *Emerg Infect Dis* 2012; **18**: 1503–7.

10 Lombes A, Bonnin RA, Laurent F *et al*. High prevalence of OXA-23 carbapenemase-producing *Proteus mirabilis* among amoxicillin-clavulanate resistant isolates in France. *Antimicrob Agents Chemother* 2021; **66**: e0198321.

11 Åkerlund A, Jonasson E, Matuschek E *et al*. EUCAST rapid antimicrobial susceptibility testing (RAST) in blood cultures: validation in 55 European laboratories. *J Antimicrob Chemother* 2020; **75**: 3230–8.

J Antimicrob Chemother 2022; **77**: 1209–1210
https://doi.org/10.1093/jac/dkac004
Advance Access publication 24 January 2022

Comment on: Multicentre validation of a EUCAST method for the antifungal susceptibility testing of microconidia-forming dermatophytes

Maiken Cavling Arendrup [1–3]*, Karin Meinike Jørgensen[1], Jesus Guinea [4,5], Katrien Lagrou[6,7], Erja Chryssanthou[8], Marie-Pierre Hayette[9], Francesco Barchiesi[10,11], Cornelia Lass-Flörl[12], Petr Hamal[13], Eric Dannaoui[14], Anuradha Chowdhary[15,16], Rasmus Krøger Hare [1] and Joseph Meletiadis [17]

[1]Unit for Mycology, Statens Serum Institut, Copenhagen, Denmark; [2]Department of Clinical Microbiology, Rigshospitalet, Copenhagen, Denmark; [3]Department of Clinical Medicine, Copenhagen University, Copenhagen, Denmark; [4]Clinical Microbiology and Infectious Diseases, Hospital General Universitario Gregorio Marañón, Madrid, Spain; [5]Instituto de Investigación Sanitaria Gregorio Marañón, Madrid, Spain; [6]Department of Microbiology, Immunology and Transplantation, KU Leuven, Leuven, Belgium; [7]Department of Laboratory Medicine and National Reference Centre for Mycosis, University Hospitals Leuven, Leuven, Belgium; [8]Department of Clinical Microbiology, Karolinska University Hospital, Stockholm, Sweden; [9]Department of Clinical Microbiology, Centre for Interdisciplinary Research on Medicines, University of Liège, Liège, Belgium; [10]Dipartimento di Scienze Biomediche e Sanità Pubblica, Università Politecnica delle Marche, Ancona, Italy; [11]Malattie Infettive, Ospedali Riuniti Marche Nord, Pesaro, Italy; [12]Institute of Hygiene and Medical Microbiology, Medical University of Innsbruck, Innsbruck, Austria; [13]Department of Microbiology, University Hospital, Olomouc, Czech Republic; [14]Parasitology-Mycology Unit, Microbiology Department, Georges Pompidou European Hospital, University of Paris, Paris, France; [15]Medical Mycology Unit, Department of Microbiology, Vallabhbhai Patel Chest Institute, University of Delhi, Delhi, India; [16]National Reference laboratory for Antimicrobial Resistance in Fungal Pathogens, Vallabhbhai Patel Chest Institute, University of Delhi, Delhi, India; [17]Clinical Microbiology Laboratory, Attikon University Hospital, Medical School, National and Kapodistrian University of Athens, Athens, Greece

*Corresponding author. E-mail: maca@ssi.dk

© The Author(s) 2022. Published by Oxford University Press on behalf of British Society for Antimicrobial Chemotherapy. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com

Downloaded from https://academic.oup.com/jac/article/77/4/1209/6514461 by University of Liege user on 21 October 2022

In 2020, we published a multicentre study validating a new EUCAST method for the antifungal susceptibility testing of microconidia-forming dermatophytes.[1] We included molecularly confirmed terbinafine-resistant and -susceptible *Trichophyton rubrum* and *Trichophyton interdigitale* isolates and established wild-type upper MIC limits (WT-UL) for both species. Since then, the taxonomy for the *Trichophyton mentagrophytes/T. interdigitale* complex has been revised and a new species *Trichophyton indotineae* proposed for the highly terbinafine-resistant Indian isolates.[2,3] These species cannot be distinguished by phenotypic tests although *T. indotineae* isolates are most often lighter in colour and less often positive in Tween-80 opacity, urea hydrolysis and hair perforation tests than *T. mentagrophytes* and *T. interdigitale*.[3] Consequently, *T. indotineae* has been reported in the literature under all three species names and susceptibility data reported for the species complex cannot be reliably linked to the individual species unless identification to the *sensu stricto* level has been performed molecularly according to the new taxonomy. Of note, both the susceptible and the resistant *T. interdigitale* isolates included in our study derived from India, and all have been reclassified as *T. indotineae* by DNA sequencing of ITS and the SQLE gene and comparison with the primary strain NUBS19006[2] Genbank ITS: LC508024 and Genbank squalene epoxidase: LC510258 (F397L) sequences.

Two recent studies suggest that there may be a 1–2 two-fold dilution difference between the susceptibility of the wild-type populations of *T. interdigitale* and *T. indotineae* and thus also between future ECOFFs for the two species. Siopi *et al.*[4] used the E.Def. 11.0 and found that the modal MICs of molecularly identified *T. interdigitale* isolates were one 2-fold dilution lower than the modal MICs of the susceptible *T. indotineae* in our multicentre study while QC isolates were on their target MICs. Moreover, Kong *et al.*[5] used the EUCAST 9.3 mould method with complete growth inhibition endpoint read visually and compared the susceptibility of molecularly identified isolates of *T. interdigitale*, *T. mentagrophytes* and *T. indotineae*. In that study, the terbinafine modal MICs/geometric mean MICs (mg/L) of the *T. interdigitale*, *T. mentagrophytes* and *T. indotineae* wild-type populations were 0.016/0.02, 0.03/0.03 and 0.06/ND.

Therefore, the data and established WT-UL values (terbinafine 0.125 mg/L, voriconazole 1 mg/L, itraconazole 0.25 mg/L and amorolfine 0.5 mg/L) in our multicentre study apply to *T. indotineae* and not *T. interdigitale*. WT-UL values for *T. interdigitale* are not available and they will have to be set when additional susceptibility studies including this species have been performed.

Funding

This study was supported by internal funding.

Transparency declarations

The authors have no conflicts with respect to the current study. Outside of the current work M.C.A. has, over the past 5 years, received research grants/contract work (paid to the SSI) from Amplyx, Basilea, Cidara, F2G, Gilead, Novabiotics and Scynexis, and speaker honoraria (personal fee) from Astellas, Chiesi, Gilead, MSD, and SEGES. She is the current chairman of the EUCAST-AFST. K.M.J. has received a meeting grant from MSD and travel grants from Amplyx and F2G. J.G. has received fees for participating at educational activities organized on behalf of Astellas, Gilead, MSD, Scynexis, and Biotoscana-United Medical, and research funds from FIS, Gilead, Scynexis, and Cidara. K.L. received consultancy fees from MSD, SMB Laboratoires Brussels and Gilead, travel support from Pfizer and MSD and speaker fees from Gilead, MSD, FUJIFILM WAKO and Pfizer. C.L.F. has received financial support (travel/accommodations/meeting expenses/payment for lectures, consultancies) from Gilead Sciences, Astellas Pharma, Pfizer, Merck Sharp and Dohme, Basilea. E.D. has received research grants from MSD and Gilead; travel grants from Gilead, MSD, Pfizer, and Astellas, and speaker's fee from Gilead, MSD, and Astellas. All other authors report nothing to declare.

References

1 Arendrup MC, Jørgensen KM, Guinea J *et al.* Multicentre validation of a EUCAST method for the antifungal susceptibility testing of microconidia-forming dermatophytes. *J Antimicrob Chemother* 2020; **75**: 1807–19.

2 Kano R, Kimura U, Kakurai M *et al.* Trichophyton indotineae sp. nov.: A new highly terbinafine-resistant anthropophilic dermatophyte species. *Mycopathologia* 2020; **185**: 947–58.

3 Tang C, Kong X, Ahmed SA *et al.* Taxonomy of the Trichophyton mentagrophytes/T. interdigitale species complex harboring the highly virulent, multiresistant genotype T. indotineae. *Mycopathologia* 2021; **186**: 315–26.

4 Siopi M, Efstathiou I, Theodoropoulos K *et al.* Molecular epidemiology and antifungal susceptibility of Trichophyton isolates in Greece: Emergence of terbinafine-resistant Trichophyton mentagrophytes type VIII locally and globally. *J Fungi* 2021; **7**: 419.

5 Kong X, Tang C, Singh A *et al.* Antifungal susceptibility and mutations in the squalene epoxidase gene in dermatophytes of the Trichophyton mentagrophytes species complex. *Antimicrob Agents Chemother* 2021; **65**: e0005621.

J Antimicrob Chemother 2022; **77**: 1210–1212
https://doi.org/10.1093/jac/dkab493
Advance Access publication 12 January 2022

Comment on: Measuring the impacts of the *Using Antibiotics Wisely* campaign on Canadian community utilization of oral antibiotics for respiratory tract infections: a time-series analysis from 2015 to 2019

Karen B. Born[1]*, Jerome A. Leis[2,3] and Wendy Levinson[4]

[1]Institute of Health Policy, Management & Evaluation, Dalla Lana School of Public Health, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada; [2]Division of Infectious Diseases and General Internal Medicine, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada; [3]Department of Medicine and Centre for Quality Improvement and Patient Safety, University of Toronto, Toronto, Ontario, Canada; [4]Department of Medicine, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada

*Corresponding author. E-mail: karen.born@utoronto.ca

© The Author(s) 2022. Published by Oxford University Press on behalf of British Society for Antimicrobial Chemotherapy. All rights reserved. For permissions, please e-mail: journals.permissions@oup.com

Downloaded from https://academic.oup.com/jac/article/77/4/1209/6514461 by University of Liege user on 21 October 2022