

DAFTAR PUSTAKA

- Abbott, I., Cerqueira, G. M., Bhuiyan, S., and Peleg, A. Y. 2013. Carbapenem resistance in *Acinetobacter baumannii*: laboratory challenges, mechanistic insights and therapeutic strategies. *Expert Review of Anti-Infective Therapy*. 11(4): 395–409. doi:10.1586/eri.13.21.
- Al-Zahrani, I. A. 2018. Routine detection of carbapenem-resistant gram-negative bacilli in clinical laboratories. *Saudi Med J*. 39(9):861-872.
- Antunes, L. C. S., Visca, P. and Towner, K. J. 2014. *Acinetobacter baumannii*: evolution of a global pathogen. *Pathogens and Disease*. 71:292–301.
- Asif, M., Alvi, I. A. and Rehman, S. U. 2018. Insight into *Acinetobacter baumannii*: pathogenesis, global resistance, mechanisms of resistance, treatment options, and alternative modalities. *Infection and Drug Resistance*. 11:1249–1260.
- Bali, E. B., Aık, L. and Sultan, N. 2010. Phenotypic and molecular characterization of SHV, produced by *Escherichia coli*, *Acinetobacter baumannii* and *Klebsiella* isolates in a Turkish hospital. *African Journal of Microbiology Research*. 4(8):650–654.
- Bedenic, B., Pleko, V., Sardelić, S., Uzunović S. and Torkar, K. G. 2014. Carbapenemases in Gram-Negative Bacteria: Laboratory Detection and Clinical Significance. *BioMed Research International*. <http://dx.doi.org/10.1155/2014/841951>
- Biedenbach, D., Bouchillon, S., Hackel, M., Hoban, D., Kazmierczak, K., Hawser, S. and Badal, R. 2015. Dissemination of NDM Metallo- β -Lactamase Genes among Clinical Isolates of Enterobacteriaceae Collected during the SMART Global Surveillance Study from 2008 to 2012. *Antimicrobial Agents and Chemotherapy*. 59(2):826-830.
- Bogaerts, P., Naas, T., El Garch, F., Cuzon, G., Deplano, A., Delaire, T., Huang, T. D., Lissour, B., Nordmann, P., and Glupczynski, Y. 2010. GES extended-spectrum β -lactamases in *Acinetobacter baumannii* isolates in Belgium. *Antimicrobial Agents and Chemotherapy*. 54(11): 4872-4878.
- Bonnin, R. A., Rotimi, V. O., Al Hubail, M., Gasiorowski, E., Al Sweih, N., Nordmann, P. and Poirel, L. 2013. Wide Dissemination of GES-Type Carbapenemases in *Acinetobacter baumannii* Isolates in Kuwait. *Antimicrobial Agents and Chemotherapy*. 57(1):183–188.
- Bonomo, R. A. and Szabo, D. 2006. Mechanisms of Multidrug Resistance in *Acinetobacter* Species and *Pseudomonas aeruginosa*. *Clinical Infectious Diseases*. 43:49–56.

- Brooks, G. F., Carroll, K. C., Butel, J. S., Morse, S. A. and Mietzner, T. A. 2013. Jawetz, Melnick, & Adelberg's Medical Microbiology, Twenty-Sixth Edition. The McGraw-Hill Companies, Inc.
- Catel-Ferreira, M., Coadou, G., Molle, V., Mugnier, P., Nordmann, P., Siroy, A., Jouenne, T. and Dé, E. 2011. Structure–function relationships of CarO, the carbapenem resistance-associated outer membrane protein of *Acinetobacter baumannii*. *Journal of Antimicrobial Chemotherapy*. 66(9):2053–2056. <https://doi.org/10.1093/jac/dkr267>.
- Cavalcanti, F. L., Mirones, C. R., Paucar, E. R., Montes, L. Á., Leal-Balbino, T. C., de Moraes, M. M. C., Martínez-Martínez, L. and Ocampo-Sosa, A. A. 2015. Mutational and acquired carbapenem resistance mechanisms in multidrug resistant *Pseudomonas aeruginosa* clinical isolates from Recife, Brazil. *Mem Inst Oswaldo Cruz*. 110(8): 1003-1009.
- CDC. 2013. Vital signs: carbapenem-resistant Enterobacteriaceae. *Morbidity and Mortality Weekly Report*. 62(9):155-170.
- Chen, I., Christie, P. J. and Dubnau, D. 2005. The Ins and Outs of DNA Transfer in Bacteria. *Science*. 310: 1456-1460. DOI: 10.1126/science.1114021.
- Chen, C. M., Ke S. C., Li C. R. and Chang, C. C. 2014. The comparison of genotyping, antibiogram, and antimicrobial resistance genes between carbapenem-susceptible and resistant *Acinetobacter baumannii*. *Comparative. Immunology, Microbiology and Infectious Diseases*. 37:339–346.
- CLSI. 2017. Performance Standards for Antimicrobial Susceptibility Testing CLSI Supplement M100, 27th Edn. Philadelphia: Clinical and Laboratory Standards Institute.
- CLSI. 2018. Performance Standards for Antimicrobial Susceptibility Testing CLSI Supplement M100, 28th Edn. Philadelphia: Clinical and Laboratory Standards Institute.
- CLSI. 2019. Performance Standards for Antimicrobial Susceptibility Testing CLSI Supplement M100, 29th Edn. Philadelphia: Clinical and Laboratory Standards Institute.
- Codjoe, F. S. 2016. Detection and characterisation of carbapenem-resistant gram-negative bacilli infections in Ghana [Thesis]. Doctoral. Sheffield Hallam University. England.
- Codjoe, F. S. and Donkor, E. S. 2018. Carbapenem Resistance: A Review. *Medical Science*. 6(1):1-28.

- Cunha, B. A., Hamid, N. S., Krol, V. and Eisenstein, L. 2008. Safety of meropenem in patients reporting penicillin allergy: lack of allergic cross reactions. *Journal of Chemotherapy (Abstr.)*. 20(2): 233-237.
- D'Costa V. M., King, C. E., Kalan, L., Morar, M., Sung, W. W. L., Schwarz, C., Froese, D., Zazula, G., Calmels, F., Debruyne, R., Golding, G. B., Poinar, H. N. and Wright, G. D. Antibiotic resistance is ancient. *Nature* 2011; 477: 457–461
- del Mar Tomás, M., Beceiro, A., Pérez, A., Velasco, D., Moure, R., Villanueva, R., Martínez-Beltrán, J. and Bou, G. 2005. Cloning and Functional Analysis of the Gene Encoding the 33- to 36-Kilodalton Outer Membrane Protein Associated with Carbapenem Resistance in *Acinetobacter baumannii*. *Antimicrobial Agents and Chemotherapy*. 49(12):5172–5175. doi:10.1128/AAC.49.12.5172–5175.2005.
- DePestel, D. and Paterson, D. 2010. 'Doripenem', in Grayson, M. (ed.) *Kucers' The Use Of Antibiotics*. 6th edn. London: Edward Arnold (Publisher) Ltd. pp. 515–525.
- Diene, S. M. and Rolain, J. M. 2014. Carbapenemase genes and genetic platforms in Gram-negative bacilli: Enterobacteriaceae, Pseudomonas and Acinetobacter species. *Clinical Microbiology and Infection*. 20:831-838.
- Djahmi, N., Dunyach-Remy, C., Pantel, A., Dekhil, M., Sotto, A. and Lavigne, J. 2014. Epidemiology of Carbapenemase-Producing Enterobacteriaceae and *Acinetobacter baumannii* in Mediterranean Countries. *BioMed Research International*. <http://dx.doi.org/10.1155/2014/305784>
- Doumith, M., Ellington, M. J., Livermore, D. M. and Woodford, N. 2009. Molecular mechanisms disrupting porin expression in ertapenem-resistant *Klebsiella* and *Enterobacter* spp. clinical isolates from the UK. *Journal of Antimicrobial Chemotherapy*. 63(4):659–667. <https://doi.org/10.1093/jac/dkp029>.
- Evans, B. A. and Amyes, S. G. B. 2014. OXA β -Lactamases. *Clinical Microbiology Reviews*. 27(2):241–263
- Gallagher, J. C. and MacDougall, C. 2012. *Antibiotics simplified*, 2nd ed. Massachusetts: Jones & Bartlett Learning, LLC.
- Gauthier, L., Bonnin, R. A., Dortet, L. and Naas, T. 2017. Retrospective and Prospective Evaluation of the Carbapenem Inactivation Method for the Detection of Carbapenemase-producing Enterobacteriaceae. *PLoS ONE*. 12(2):e0170769.
- Girlich, D., Poirel, L. and Nordmann, P. 2012. Value of the Modified Hodge Test for Detection of Emerging Carbapenemases in Enterobacteriaceae. *Journal of Clinical Microbiology*. 50(2):477–479.

- Gniadek, T. J., Carroll, K. C. and Simner, P. J. 2016. Carbapenem-Resistant Non-Glucose-Fermenting Gram-Negative Bacilli: the Missing Piece to the Puzzle. *J Clin Microbiol.* 54:1700–1710.
- Gonçalves, I. R., Dantas, R. C. C., Ferreira, M. L., Batistão, D. W. F., Gontijo-Filho, P. P., and Ribas, R. M. 2017. Carbapenem-resistant *Pseudomonas aeruginosa*: association with virulence genes and biofilm formation. *Brazilian Journal of Microbiology.* 48:211-217.
- Hammond, M. L. 2004. ‘Ertapenem: A group 1 carbapenem with distinct antibacterial and pharmacological properties’, *Journal of Antimicrobial Chemotherapy.* 53(SUPPL. 2):7–10.
- Hauser, A. R. 2013. *Antibiotic basics for clinicians : the ABCs of choosing the right antibacterial agent.* Second Edition. Philadelphia: Lippincott Williams & Wilkins, a Wolters Kluwer business.
- Hayashi, Y. and Paterson, D. 2010. ‘Carbapenem’, in Grayson, M. (ed.) *Kucers’ The Use Of Antibiotics.* 6th edn. London: Edward Arnold Ltd. 471–492.
- Héritier C., Poirel L., Nordman P. 2006. Cephalosporinase over-expression resulting from insertion of ISAbal in *Acinetobacter baumannii*. *Clinical Microbiology and Infection.* 12(2):123-130.
- Howard, J. C., Creighton, J., Ikram, R. and Werno, A.M. 2019. Comparison of the performance of three variations of the Carbapenem Inactivation Method (CIM, modified CIM [mCIM] and in-house method (iCIM)) for the detection of carbapenemase-producing Enterobacterales and non-fermenters. *J Global Antimicrob Resist.* <https://doi.org/10.1016/j.jgar.2020.03.021>.
- Hrabák, J., Chudáčková, E. and Papagiannitsis, C. C. 2014. Detection of carbapenemases in Enterobacteriaceae: a challenge for diagnostic microbiological laboratories. *Clinical Microbiology and Infection.* 20(9):839-853.
- Hsu L., Apisarnthanarak, A., Khan, E., Suwantararat, N., Ghafur, A. and Tambyah P. A. 2017. Carbapenem-Resistant *Acinetobacter baumannii* and Enterobacteriaceae in South and Southeast Asia. *Clinical Microbiology Reviews.* 30(1):1-22.
- Jacoby, G. A. 2009. AmpC β -Lactamases. *Clinical Microbiology Reviews.* 22(1):161–182.
- Jing, X., Zhou, H., Min, X., Zhang, X., Yang, Q., Du, S., Li, Y., Yu, F., Jia, M., Zhan, Y., Zeng, Y., Yang, B., Pan, Y., Lu, B., Liu, R. and Zeng, J. 2018. The Simplified Carbapenem Inactivation Method (sCIM) for Simple and Accurate Detection of Carbapenemase-Producing Gram-Negative Bacilli. *Front. Microbiol.* 9:2391.

- Jeon, J. H., Lee, J. H., Lee, J. J., Park, K. S., Karim, A. M., Lee, C., Jeong, B. C. and Lee, S.H. 2015. Structural basis for carbapenem hydrolyzing mechanisms of carbapenemases conferring antibiotic resistance. *International Journal of Molecular Sciences*, 16(5):9654–9692. doi: 10.3390/ijms16059654.
- Koh, T. H., Cao, D., Shan, Q. Y., Bacon, A., Hsu, L.-Y., and Ooi, E. E. 2013. Acquired carbapenemases in Enterobacteriaceae in Singapore, 1996-2012. *Pathology*. 45(6): 600–603. doi:10.1097/pat.0b013e3283650b1e.
- Latif, A. S. 2016. Design and Evaluation of Antibacterial Activity (In silico, In vitro and In vivo) of New Quinoline-2-one Derivatives against clinical *Pseudomonas aeruginosa* [Thesis]. Doctoral. Iraq: Al Farabi univesity College.
- Leber, A. L. 2016. *Clinical microbiology procedures handbook*, 4th edition. Washington: American Society for Microbiology.
- Lee, C. R., Lee, J. H., Park, K. S., Kim, Y. B., Jeon, B. C. and Lee, S. H. 2016. Global Dissemination of Carbapenemase-Producing *Klebsiella pneumoniae*: Epidemiology, Genetic Context, Treatment Options, and Detection Methods. *Front. Microbiol.* 7:895.
- Li, X-Z., Plésiat, P. and Nikaido, H. 2015. The challenge of efflux-mediated antibiotic resistance in Gram-negative bacteria. *Clin Microbiol Rev.* 28(2):337-418. doi:10.1128/CMR.00117-14.
- Livermore, D. M., Andrews, J. M., Hawkey, P. M., Ho, P.L., Keness, Y., Doi, Y., Peterson, D. and Woodford, N. 2012. Are susceptibility tests enough, or should laboratories still seek ESBLs and carbapenemases directly? *J Antimicrob Chemother.* 67(7):1569-1577.
- Logan, L. K. and Weinstein, R. A. 2017. The Epidemiology of Carbapenem-Resistant Enterobacteriaceae: The Impact and Evolution of a Global Menace. *The Journal of Infectious Disease.* 215(S1):S28–36.
- Lutgring, J. D. and Limbago, B. M. 2016. The Problem of Carbapenemase-Producing-Carbapenem-Resistant-Enterobacteriaceae Detection. *Journal of Clinical Microbiology.* 54(3):529-534.
- Mahon, C. R., Lehman D. C., and Manuselis, G. 2015. *Textbook of Diagnostic Microbiology*, Fifth edition. Missouri: Elsevier, Inc.
- McConnell, M. J., Actis, L. and Pachon, J.. 2013. *Acinetobacter baumannii*: human infections, factors contributing to pathogenesis and animal models. *FEMS Microbiol.* 37:130–155.
- McMullen, A. R., Yarbrough, M. L., Wallace, M. A., Shupe, A. and Burnham, C. D. 2017. Evaluation of Genotypic and Phenotypic Methods to Detect

- Carbapenemase Production in Gram-Negative Bacilli. *Clinical Chemistry*. 63(3):723-730.
- Medina, M. and Castillo-Pino, E. 2019. An introduction to the epidemiology and burden of urinary tract infections. *Ther Adv Urol*. 11:1756287219832172. Published 2019 May 2. doi:10.1177/1756287219832172
- Meletis, G. 2016. Carbapenem resistance: overview of the problem and future perspectives. *Ther Adv Infect Dis*. 3(1):15-21.
- Meletis, G., Exindari, M., Vavatsi, N., Sofianou, D. and Diza, E. 2012. Mechanisms responsible for the emergence of carbapenem resistance in *Pseudomonas aeruginosa*. *Hippokratia*. 16:303-307.
- Miriagou, V., Cornaglia, G., Edelstein, M., Galani, I., Giske, C. G., Gniadkowski, M., Malamou-Lada, E., Martinez-Martinez, L., Navarro, F., Nordmann, P., Peixe, L., Pournaras, S., Rossolini, G. M., Tsakris, A., Vatopoulos, A. and Cantón, R. 2010. Acquired carbapenemases in Gram-negative bacterial pathogens: detection and surveillance issues. *Clin Microbiol Infect*. 16: 112–122. 10.1111/j.1469-0691.2009.03116.x
- Moubareck, C., Brémont, S., Conroy, M. C., Courvalin P. and Lambert, T. (2009). GES-11, a novel integron-associated GES variant in *Acinetobacter baumannii*. *Antimicrobial Agents and Chemotherapy*, 53(8), 3579-3581.
- Muntean, M. M., Muntean, A. A., Gauthier, L., Creton, E., Cotellon, G., Popa, M. I., Bonnin, R. A. and Naas, T. 2018. Evaluation of the rapid carbapenem inactivation method (rCIM): a phenotypic screening test for carbapenemase-producing Enterobacteriaceae. *J Antimicrob Chemother*. 73: 900–908
- Noël, A., T. D. Huang, C. Berhin, M. Hoebeke, W. Bouchahrouf, S. Yunus, P. Bogaerts, and Y. Glupczynski. 2017. Comparative Evaluation of Four Phenotypic Tests for Detection of Carbapenemase-Producing Gram-Negative Bacteria. *Journal of Clinical Microbiology*. 55(2):510-518.
- Munoz-Price, S., Poirel, L., Bonomo, R. A., Schwaber, M. J., Daikos, G. L., Cormican, M., Cornaglia, G., Garau, J., Gniadkowski, M., Hayden, M. K., Kumarasamy, K., Livermore, D. M., Maya, J. J., Nordmann, P., Patel, J. B., Paterson, D. L., Pitout, J., Villegas, M. V., Wang, H., Woodford, N., and Quinn, J. P. 2013. Clinical epidemiology of the global expansion of *Klebsiella pneumoniae* carbapenemases. *Lancet Infect Dis*. 13(9): 785–796. doi:10.1016/S1473-3099(13)70190-7.
- Murray, P. R., Rosenthal, K. S. and Pfaller, M. A.. 2015. *Medical Microbiology*, Eighth Edition. Philadelphia: Elsevier.
- Nataliani, D. 2017. Identifikasi Gen bla_{NDM} pada Carbapenem-Resistant Enterobacteriaceae yang Diisolasi dari Pasien Infeksi yang Dirawat di RSUP Dr. Mohammad Hoesin Palembang. Skripsi. Fakultas Kedokteran Universitas Sriwijaya.

- Netikul, T., Sidjabat, H., Paterson, D., and Kiratisin, P. 2014. Emergence of novel blaKPC-13 among carbapenem-resistant Enterobacteriaceae in Thailand. *International Journal of Antimicrobial Agents*, 44(6): 568–569. doi:10.1016/j.ijantimicag.2014.08.005.
- Noël, A., Huang, T., Berhin, C., Hoebeke, M., Bouchahrouf, W., Yunus, S., Bogaerts, P. and Glupczynski, Y. 2017. Comparative Evaluation of Four Phenotypic Tests for Detection of Carbapenemase-Producing Gram-Negative Bacteria. *Journal of Clinical Microbiology*. 55(2):510-518.
- Nordmann, P. and Poirel, L. 2019. Epidemiology and Diagnostics of Carbapenem Resistance in Gram-negative Bacteria. *Clin Infect Dis*. 69(S7):S521–8.
- Nordmann, P., Cuzon, G., and Naas, T. 2009. The real threat of *Klebsiella pneumoniae* carbapenemase-producing bacteria. *The Lancet Infectious Diseases*. 9(4): 228–236. doi:10.1016/s1473-3099(09)70054-4.
- Nordmann, P., Poirel, L. and Dortet, L. 2012a. Rapid Detection of Carbapenemase-producing Enterobacteriaceae. *Emerging Infectious Diseases*. 18(9):1503-1507.
- Nordmann P., Gniadkowski, M., Giske, C. G., Poirel, L., Woodford, N. and Miriagou, V. 2012b. European Network on Carbapenemases: Identification and screening of carbapenemase-producing Enterobacteriaceae. *Clin Microbiol Infect*. 18:432–438.
- Nowak, P. and Paluchowska, P. 2016. *Acinetobacter baumannii*: biology and drug resistance – role of carbapenemases. *Folia Histochem Cytobiol*. 54(2):61-74
- Pagès, J.-M., James, C. E. and Winterhalter, M. 2008. The porin and the permeating antibiotic: a selective diffusion barrier in Gram-negative bacteria. *Nature Reviews Microbiology*. 6(12):893–903. doi:10.1038/nrmicro1994.
- Papp-Wallace, K. M., Endimiani, A., Taracila, M. A. and Bonomo, R. A. 2011. Carbapenems: Past, present, and future. *Antimicrob. Agents Chemother*. 55:4943–4960.
- Partridge, S. R., Kwong, S. M., Firth, N., and Jensen, S. O. 2018. Mobile Genetic Elements Associated with Antimicrobial Resistance. *Clin Microbiol Rev*. 31(4): e00088-17. <https://doi.org/10.1128/CMR.00088-17>
- Peleg, Y. A. and Hooper, D. C. 2010. Hospital-Acquired Infections Due to Gram-Negative Bacteria. *N Engl J Med*. 362(19): 1804–1813.
- Peleg, Y. A. and Salmon, M. 2010. ‘Meropenem’, in Grayson, M. (ed.) *Kucers’ The Use Of Antibiotics*. 6th edn. London: Edward Arnold Ltd. 500–510.
- Pierce, V. M., Simner, P. J., Lonsway, D. R., Roe-Carpenter, D. E., Johnson, J. K. and Brasso, W. B. 2017. The modified carbapenem inactivation Method

- (mCIM) for phenotypic detection of carbapenemase production among Enterobacteriaceae. *J. Clin. Microbiol.* 55:2321–2333.
- Poirel, L., Pitout, J. and Nordmann, P. 2007. Carbapenemases: molecular diversity and clinical consequences. *Future Microbiol (Abstr)*. 2: 501-512.
- Queenan, A. M. and Bush, K. 2007. Carbapenemases: The Versatile β -Lactamases. *Clinical Microbiology Reviews*. 20(3):440-458
- Ramadan, R. A., Gebriel, M. G., Kadry, H. M. and Mosallem, A. 2018. Carbapenem-resistant *Acinetobacter baumannii* and *Pseudomonas aeruginosa*: characterization of carbapenemase genes and E-test evaluation of colistin-based combinations. *Infection and Drug Resistance*. 11:1261–1269
- Reddy, T., Chopra, T., Marchaim, D., Pogue, J. M., Alangaden, G., Salimnia, H., Boikov, D., Navon-Venezia, S., Akins, R., Selman, P., Dhar, S. and Kaye, K. S. 2010. Trends in Antimicrobial Resistance of *Acinetobacter baumannii* Isolates from a Metropolitan Detroit Health System. *Antimicrobial Agents and Chemotherapy*. 54(5):2235–2238.
- Retamar, P. 2010. ‘Ertapenem’, in Grayson, M. (ed.) *Kucers’ The Use Of Antibiotics*. 6th edn. London: Edward Arnold Ltd. 527.
- Riera, E., Cabot, G., Mulet, X., García-Castillo, M., del Campo, R., Juan, C., Cantón R. and Oliver, A. 2011. *Pseudomonas aeruginosa* carbapenem resistance mechanisms in Spain: impact on the activity of imipenem, meropenem and doripenem. *J Antimicrob Chemother*. 66:2022–2027.
- Rizek, C., Fu, L., dos Santos, L. C., Leite, G., Ramos, J., Rossi, F., Guimaraes, T., Levin, A. S. and Costa, S. F. 2014. Characterization of carbapenem-resistant *Pseudomonas aeruginosa* clinical isolates, carrying multiple genes coding for this antibiotic resistance. *Annals of Clinical Microbiology and Antimicrobials*. 13(43):1-5.
- Rodríguez-Martínez, J., Poirel, L. and Nordmann, P. 2009. Molecular Epidemiology and Mechanisms of Carbapenem Resistance in *Pseudomonas aeruginosa*. *Antimicrobial Agents and Chemotherapy*. 53(11):4783–4788.
- Rolain, J.M., Canton, R. and Cornaglia, G. 2012. Emergence of antibiotic resistance: need for a new paradigm. *Clin Microbiol Infect*. 18: 615–616.
- Sambrook, J.F. and Russell, D.W. 2001. *Molecular Cloning: A Laboratory Manual*, 3rd ed. New York: Cold Spring Harbor Laboratory Press.
- Schweizer, H. 2003. Efflux as a mechanism of resistance to antimicrobials in *Pseudomonas aeruginosa* and related bacteria: unanswered questions. *Genet Mol Res*. 2: 48-62.

- Schweppe, D. K., Harding, C., Chavez, J. D., Wu, X., Ramage, E., Singh, P. K., Manoil, C. and Bruce, J. E. 2015. Host-microbe protein interactions during bacterial infection. *Chem Biol.* 22(11):1521–1530.
- Simner, P. J., B. N. A. Opene, K. K. Chambers, M. E. Naumann, K. C. Carroll and P. D. Tamma. 2017. Carbapenemase Detection among Carbapenem-Resistant Glucose- Nonfermenting Gram-Negative Bacilli. *Journal of Clinical Microbiology.* 55(9):2858-2864.
- Simner, P. J., Johnson, J. K., Brasso, W. B., Anderson, K., Lonsway, D. R., Pierce, V. M., Bobenchik, A. M., Lockett, Z. C., Charnot-Katsikas, A., Westblade, L. F., Yoo, B. B., Jenkins, S. G., Limbago, B. M., Das, S. and Roe-Carpenter, D. E. 2018. Multicenter Evaluation of the Modified Carbapenem Inactivation Method and the Carba NP for Detection of Carbapenemase-Producing *Pseudomonas aeruginosa* and *Acinetobacter baumannii*. *Journal of Clinical Microbiology.* 56 (1) e01369-17. DOI: 10.1128/JCM.01369-17.
- Suwantarat, N. and Carroll, K.C. 2016. Epidemiology and molecular characterization of multidrug-resistant Gram-negative bacteria in Southeast Asia. *Antimicrobial Resistance and Infection Control.* 5(15). DOI 10.1186/s13756-016-0115-6.
- Tamma, P. D. and Simner, P. J. 2018. Phenotypic detection of carbapenemase-producing organisms from clinical isolates. *J Clin Microbiol* 56:e01140-18. <https://doi.org/10.1128/JCM.01140-18>.
- Tamma, P. D., Goodman, K. E., Harris, A. D., Tekle, T., Roberts, A., Taiwo, A. and Simner, P. J. 2017. Comparing the Outcomes of Patients with Carbapenemase-Producing and Non-Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae Bacteremia. *Clinical Infectious Diseases.* 64(3):257–264.
- Tan, C. W. and Chlebicki, M. P. 2016. Urinary tract infections in adults. *Singapore Med J.* 57(9):485-490. doi:10.11622/smedj.2016153.
- Tijet, N., Boyd, D., Patel, S. N., Mulvey, M. R. and Melano, R. G. 2013. Evaluation of The Carba NP Test for Rapid Detection of Carbapenemase-Producing *Enterobacteriaceae* and *Pseudomonas aeruginosa*. *Antimicrobial Agents and Chemotherapy.* 57(9):4578-4580.
- Tille, P. M. 2017. *Bailey & Scott's Diagnostic Microbiology, Fourteenth Edition.* Missouri: Elsevier, Inc.
- Uechi, K., Tada T., Shimada, K., Kuwahara-Arai, K., Arakaki, M., Tome, T., Nakasone, I., Maeda, S., Kirikae, T. and Fujita, J. 2017. A Modified Carbapenem Inactivation Method, CIMTris, for Carbapenemase Production in *Acinetobacter* and *Pseudomonas* Species. *Journal of Clinical Microbiology.* 55(12):3405-3410.

- Van der Zwaluw, K., de Haan, A., Pluister, G. N., Bootsma, H. J., de Neeling, A. J. and Schouls, L. M. 2015. The Carbapenem Inactivation Method (CIM), a Simple and Low-Cost Alternative for the Carba NP Test to Assess Phenotypic Carbapenemase Activity in Gram-Negative Rods. *PLoS ONE*. 10(3): e0123690.
- Viau, R., Frank, K. M., Jacobs, M. R., Wilson, B., Kaye, K., Donskey, C. J., Perez, F., Endimiani, A. and Bonomo, R. A. 2016. Intestinal Carriage of Carbapenemase-Producing Organisms: Current Status of Surveillance Methods. *Clinical Microbiology Reviews*. 29(1):1-27.
- Viehman, V. A., Nguyen, M. H. and Doi, Y. 2014. Treatment Options for Carbapenem-Resistant and Extensively Drug-Resistant *Acinetobacter baumannii* Infections. *Drugs*. 74(12):1315–1333
- Walsh, T. R. 2010. Emerging carbapenemases: a global perspective. *Int J Antimicrob Agents*. 36(3):8-14.
- Watkins, R. R. and Bonomo, R. A. 2013. Increasing prevalence of carbapenem-resistant Enterobacteriaceae and strategies to avert a looming crisis. *Expert Rev. Anti-Infect. Ther*. 11 (Abstr.):543–545.
- WHO. 2014. Antimicrobial Resistance: Global Report on Surveillance. WHO Press. Geneva, Switzerland. Available online: http://apps.who.int/iris/bitstream/10665/112642/1/9789241564748_eng.pdf
- Workneb, M., Yee, R. and Simner, P. J. 2019. Phenotypic Methods for Detection of Carbapenemase Production in Carbapenem-Resistant Organisms: What Method Should Your Laboratory Choose? *CMN*. 41(2):11-22.
- Wozniak, A., Villagra, N. A., Undabarrena, A., Gallardo, N., Keller, N., Moraga, M., Román, J. C., Mora, G. C. and García, P. 2012. Porin alterations present in non-carbapenemase-producing Enterobacteriaceae with high and intermediate levels of carbapenem resistance in Chile. *Journal of Medical Microbiology*. 61: 1270–1279. DOI 10.1099/jmm.0.045799-0.
- Yamane, K. 2010. ‘Biapenem’, in Grayson, M. (ed.) *Kucers’ The Use Of Antibiotics*. 6th edn. London: Edward Arnold Ltd. 543.
- Yang, F.C., Yan, J.J., Hung, K.H. and Wu, J.J. 2012. Characterization of ertapenem-resistant *Enterobacter cloacae* in a Taiwanese university hospital. *J Clin Microbiol*. 50(2):223-226. doi:10.1128/JCM.01263-11
- Ye, Y., Xu, L., Han, Y., Chen, Z., Liu, C and Ming, L. Mechanism for carbapenem resistance of clinical Enterobacteriaceae isolates. *Experimental and Therapeutic Medicine*. 15: 1143-1149.

Zhanel, G. G., Wiebe, R., Dilay, L., Thomson, K., Rubinstein, E., Hoban, D. J., Noreddin, A. M. and Karlowsky, J. A. 2007. Comparative review of the carbapenems. *Drugs*. 67 (Abstr.):1027-52.