

## DAFTAR PUSTAKA

- Abramowicz, L., Gerard, M., Martiny, D., *et al.* 2020. Infections due to carbapenemase-producing bacteria, clinical burden, and impact of screening strategies on outcome. *Med Mal Infect*, 50(8): 658–664.
- Anon. 2018. *Evidence-Based Principles and Practices for Preventing Surgical Site Infections The Preoperative Phase*. <http://www.jointcommissioninternational.org>. 27 January 2021.
- Arias, C.A., Murray, B.E. 2012. The rise of the Enterococcus: Beyond vancomycin resistance. *Nat. Rev. Microbiol.*, 10(4): 266–278.
- Arnold, R.S., Thom, K.A., Sharma, S., Phillips, M., Kristie Johnson, J., Morgan, D.J. 2011. Emergence of Klebsiella pneumoniae carbapenemase-producing bacteria. *South Med J*, 104(1): 40–45.
- Asokan, G. V., Ramadhan, T., Ahmed, E., Sanad, H. 2019. WHO global priority pathogens list: A bibliometric analysis of medline-pubmed for knowledge mobilization to infection prevention and control practices in Bahrain. *Oman Med J*, 34(3): 184–193.
- Van Bambeke, F., Chauvel, M., Reynolds, P.E., Fraimow, H.S., Courvalin, P. 1999. Vancomycin-dependent Enterococcus faecalis clinical isolates and revertant mutants. *Antimicrob Agents Chemother*, 43(1): 41–47.
- Bennett EE, VanBuren J, Holubkov R, Bratton SL. 2018. Presence of Invasive Devices and Risks of Healthcare-Associated Infections and Sepsis. *J Pediatr Intensive Care*, 7(4):188-195.
- Bonomo, R.A., Burd, E.M., Conly, J., Limbago, B.M., Poirel, L., Segre, J.A., *et al.* 2018. Carbapenemase-Producing Organisms: A Global Scourge. *Clin Infect Dis*, 66(8): 1290–1297.
- Bourigault, C., Le Gallou, F., Bodet, N., Musquer, N., Juvin, M.E., Corvec, S., *et al.* 2018. Duodenoscopy: an amplifier of cross-transmission during a carbapenemase-producing Enterobacteriaceae outbreak in a gastroenterology pathway. *J Hosp Infect*, 99(4): 422–426.
- Brink, A.J. 2019. Epidemiology of carbapenem-resistant Gram-negative infections globally. *Curr Opin Infect Dis*, 32: 609–616.
- Campbell, E.A., Korzheva, N., Mustaev, A., Murakami, K., Nair, S., Goldfarb, A., *et al.* 2001. Structural mechanism for rifampicin inhibition of bacterial RNA polymerase. *Cell*, 104(6): 901–912.
- Chen, W.K., Yang, Y., Tan, B.H. 2019. Increased mortality among carbapenemase-producing carbapenem-resistant Enterobacteriaceae carriers who developed clinical isolates of another genotype. *Open Forum Infect Dis*, 6(2): 1–7.
- Chiang, T.T., Yang, Y.S., Yeh, K.M., Chiu, S.K., Wang, N.C., Lin, T.Y., *et al.* 2016. Quantification and comparison of virulence and characteristics of different variants of carbapenemase-producing Klebsiella pneumoniae clinical isolates from Taiwan and the United States. *J Microbiol Immunol Infect*, 49(1): 83–90.
- Cienfuegos-Gallet, A. V., Ocampo De Los Ríos, A.M., Sierra Viana, P., Ramirez



- Brinez, F., Restrepo Castro, C., Roncancio Villamil, G., *et al.* 2019. Risk factors and survival of patients infected with carbapenem-resistant Klebsiella pneumoniae in a KPC endemic setting: A case-control and cohort study. *BMC Infect Dis*, 19(1): 830.
- Codjoe, F.S., Donkor, E.S. 2018. medical sciences Carbapenem Resistance : A Review. *Med. Sci*, 6(1): 1–28.
- Dautzenberg, M.J.D., Wekesa, A.N., Gniadkowski, M., Antoniadou, A., Giamparellou, H., Petrikos, G.L., *et al.* 2015. The Association between Colonization with Carbapenemase-Producing Enterobacteriaceae and Overall ICU Mortality: An Observational Cohort Study. *Crit Care Med*, 43(6): 1170–1177.
- Dcosta, V.M., King, C.E., Kalan, L., Morar, M., Sung, W.W.L., Schwarz, C., *et al.* 2011. Antibiotic resistance is ancient. *Nature*, 477(7365): 457–461.
- Djordjevic, Z.M., Folic, M.M., Folic, N.D., Gajovic, N., Gajovic, O., Jankovic, S.M. 2016. Risk factors for hospital infections caused by carbapanem-resistant Acinetobacter baumannii. *J Infect Dev Ctries*, 10(10): 1073–1080.
- Duin, D. Van, Doi, Y. 2017. The global epidemiology of carbapenemase-producing Enterobacteriaceae. *Virulence*, 8(4): 460–469.
- Edelstein, M. V., Skleenova, E.N., Shevchenko, O. V., D, J.W., Tapalski, D. V., Azizov, I.S., Sukhorukova, M. V., *et al.* 2013. Spread of extensively resistant VIM-2-positive ST235 *Pseudomonas aeruginosa* in Belarus, Kazakhstan, and Russia: a longitudinal epidemiological and clinical study. *The Lancet Infect Dis*, 13: 867–876.
- Esther, J., Edwin, D. 2017. Prevalence of Carbapenem Resistant Non-Fermenting Gram Negative Bacterial Infection and Identification of Carbapenemase Producing NFGNB Isolates by Simple Phenotypic Tests. *J Clin Diagn Res*, 11(3): DC10–DC13.
- European Centre for Disease Prevention and Control. 2011. *Risk assessment on the spread of carbapenemase-producing Enterobacteriaceae (CPE) through patient transfer between healthcare facilities, with special emphasis on cross-border transfer.* Available from: <http://www.ecdc.europa.eu/en/activities/surveillance/EARSNet/Pages/DataBase.aspx>.
- Firdaus, R. 2021. Evaluasi Persepsi Terapi Antibiotika Berbasis Hasil Uji Kepekaan Metode Direk Dan Indirek Pada Pasien Infeksi Aliran Darah Bakteri Gram Positif. Tesis. Universitas Gadjah Mada, Indonesia.
- Freeman, R., Moore, L.S.P., Charlett, A., Donaldson, H., Holmes, A.H. 2015. Exploring the epidemiology of carbapenem-resistant Gram-negative bacteria in west London and the utility of routinely collected hospital microbiology data. *J Antimicrob Chemother*, 70: 1212–1218.
- Garbati, M.A., Sakkijha, H., Abushaheen, A. 2016. Infections due to Carbapenem Resistant Enterobacteriaceae among Saudi Arabian Hospitalized Patients: A Matched Case-Control Study. *BioMed Res Int*: 1–9.
- Girou, E. 2003. Prevention of nosocomial infections in acute respiratory failure



- patients. *Eur Respir J*, 22(42): 72s-76s.
- Goodman, K.E., Simner, P.J., Tamma, P.D., Milstone, A.M. 2016. Infection control implications of heterogeneous resistance mechanisms in carbapenem-resistant Enterobacteriaceae (CRE). *Expert Rev Anti Infect Ther*, 14(1): 95–108.
- Gillings MR. 2013. Evolutionary consequences of antibiotic use for the resistome, mobilome and microbial pangenome. *Front Microbiol*, 22;4:4.
- Hara, G.L., Gould, I., Endimiani, A., Pardo, P.R., Daikos, G., Hsueh, P.R., et al. 2013. Detection, treatment, and prevention of carbapenemase-producing Enterobacteriaceae: Recommendations from an international working group. *J Chemother*, 25(3): 129–140.
- Ho, J., Tambyah, P.A., Paterson, D.L. 2010. Multiresistant Gram-negative infections: a global perspective. *Curr Opin Infect Dis*, 23: 546-553.
- Hrabák, J., Chudáková, E., Papagiannitsis, C.C. 2014. Detection of carbapenemases in Enterobacteriaceae: A challenge for diagnostic microbiological laboratories. *Clin Microbiol Infect*, 20(9): 839–853.
- Karampatakis, T., Tsergouli, K., Iosifidis, E., Antachopoulos, C., Karapanagiotou, A., Karyoti, A., et al. 2018. Impact of active surveillance and infection control measures on carbapenem-resistant Gram-negative bacterial colonization and infections in intensive care. *J Hosp Infect*, 99(4): 396–404.
- Kardos, N. 2017. Overuse of Antibiotics and Antibiotic Resistance in Medical Applications Featuring Carbapenemase Resistant Enterobacteriaceae (CRE). *SOJ Microbiol Infect Dis*, 5(5): 1–21.
- Kassem, A., Raed, A., Michael, T., Sagi, O., Shimoni, O., Borer, A., et al. 2020. Risk factors and outcomes of patients colonized with carbapenemase-producing and non-carbapenemase-producing carbapenem-resistant Enterobacteriaceae. *Infect Control Hosp Epidemiol*, 41(10): 1154–1161.
- Kattan, J.N., Villegas, M. V., Quinn, J.P. 2008. New developments in carbapenems. *Eur J Clin Microbiol Infect Dis*, 14(12): 1102–1111.
- Kaur, M., Gupte, S., Kaur, T. 2016. Detection of carbapenem resistant gram-negative bacteria in clinical isolates from a tertiary care hospital. *J Bacteriol Mycol*, 2(1):1 4.
- Kaye, K.S., Pogue, J.M. 2015. Infections Caused by Resistant Gram-Negative Bacteria: Epidemiology and Management. *Pharmacotherapy*, 35(10): 949–962.
- Khan, A.U., Maryam, L., Zarrilli, R. 2017. Structure, Genetics and Worldwide Spread of New Delhi Metallo- -lactamase (NDM): a threat to public health. *BMC Microbiol*, 17(1): 1–12.
- Kim, Y.A., Lee, S.J., Park, Y.S., Lee, Y.J., Yeon, J.H., Seo, Y.H., et al. 2020. Risk factors for carbapenemase-producing enterobacteriales infection or colonization in a Korean intensive care unit: A case-control study. *Antibiotics*, 9(10): 1–9.
- Kocer, K., Boutin, S., Dalpke, A.H., Heeg, K., Mutters, N.T., Nurjadi, D. 2020. Comparative genomic analysis reveals a high prevalence of inter-species in vivo transfer of carbapenem-resistance plasmids in patients with



- haematological malignancies. *Clin Microbiol Infect*, 26(6): 780.e1-780.e8.
- Kramer A, Schwebke I, Kampf G. 2006. How long do nosocomial pathogens persist on inanimate surfaces? A systematic review. *BMC Infect Dis*, 6:130.
- Labaste, F., Grossac, J., Bounes, F.V., Conil, J.M., Ruiz, S., Seguin, T., et al. 2019. Risk factors for acquisition of carbapenem-resistance during treatment with carbapenem in the intensive care unit: a prospective study. *Eur J Clin Microbiol Infect Dis*, 38(11): 2077–2085.
- Lima, E.M., Cid, P.A., Beck, D.S., Pinheiro, L.H.Z., Tonhá, J.P.S., Alves, M.Z.O., et al. 2020. Predictive factors for sepsis by carbapenem resistant Gram-negative bacilli in adult critical patients in Rio de Janeiro: A case-case-control design in a prospective cohort study. *Antimicrob Resist Infect Control*, 9(1): 132.
- Lusignani, L.S., Elisabeth, P., Beata, Z., Van den Nest, M., Diab-Elschahawi, M. 2016. Infection control and risk factors for acquisition of carbapenemase-producing enterobacteriaceae. A 5 year (2011–2016) case-control study. *Infect Control Hosp Epidemiol*, 37(10): 1219–1225.
- Lutgring, J.D., Limbago, B.M. 2016. The Problem of Carbapenemase-Producing-Carbapenem-Resistant-Enterobacteriaceae Detection. *J Clin Microbiol*, 54(3): 529–534.
- Mariappan, S., Sekar, U., Kamalanathan, A. 2017. Carbapenemase-producing Enterobacteriaceae: Risk factors for infection and impact of resistance on outcomes. *Intl J Appl Basic Med Res*, 7(1): 32.
- Marimuthu, K., Ng, O.T., Cherng, B.P.Z., Fong, R.K.C., Pada, S.K., De, P.P., et al. 2019. Antecedent carbapenem exposure as a risk factor for non-carbapenemase-producing carbapenem-resistant Enterobacteriaceae and carbapenemase-producing Enterobacteriaceae. *Antimicrob Agents Chemother*, 63(10): 1–8.
- Papadimitriou-Olivgeris, M., Marangos, M., Fligou, F., Christofidou, M., Bartzavali, C., Anastassiou, E.D., et al. 2012. Risk factors for KPC-producing *Klebsiella pneumoniae* enteric colonization upon ICU admission. *J Antimicrob Chemother*, 67: 2976–2981.
- Eveillard, M., Quenon, J.L., Rufat, P., Mangeol, A., Fauville, F. 2014. Association Between Hospital-Acquired Infections And Patients' Transfers. *Infect. Control Hosp. Epidemiol*, 22(11): 1–5.
- Madueno, A., Garcia, G.J., Aguirre-Jaime, A., Lecuona, M. 2017. A hospital-based matched case-control study to identify risk factors for clinical infection with OXA-48-producing *Klebsiella pneumoniae* in rectal carriers. *Epidemiol. Infect*, 145(12), 2626-2630.
- Maya, J.J., Ruiz, S.J., Blanco, V.M., Gotuzzo, E., Guzman-Blanco, M., Labarca, J., et al. 2013. Current status of carbapenemases in Latin America. *Expert Rev Anti Infect Ther*, 11(7): 657–667.
- McCann, E., Srinivasan, A., Andrew DeRyke, C., Ye, G., DePestel, D.D., Murray, J., et al. 2018. Carbapenem-nonsusceptible Gram-negative pathogens in ICU and non-ICU settings in US hospitals in 2017: A multicenter study. *Open Forum Infect Dis*, 5(10): 1–7.



- Munita, J.M., Arias, C.A. 2016. Mechanisms of Antibiotic Resistance. *HHS Public Access*, 4(2): 1–37.
- Naas, T., Bonnin, R.A., Cuzon, G., Villegas, M.V., Nordmann, P. 2013. Complete sequence of two KPC-harbouring plasmids from *Pseudomonas aeruginosa*. *J Antimicrob Chemother*, 68(8): 1757–1762.
- Nagalapuram, V., Jayalakshmi, J. 2018. Evaluation of a rapid test to detect carbapenemase production among gram-negative bacilli. *Asian J Pharm Clin Res*, 11(1): 134–135.
- Naumann, M.E., Carroll, K.C., Tammaro, D. 2017. Carbapenemase Detection among Nonfermenting Gram-Negative Bacilli. *Antimicrob Agents and Chemoter*, 55(9): 2858–2864.
- Nicolas-Chanoine, M.H., Vigan, M., Laouenan, C., Robert, J., Laurans, C., Vachée, A., et al. 2019. Risk factors for carbapenem-resistant Enterobacteriaceae infections: a French case-control-control study. *Eur J Clin Microbiol Infect Dis*, 38(2): 383–393.
- Nordmann, P., Gniadkowski, M., Giske, C.G., Poirel, L., Woodford, N., Miriagou, V., et al. 2012. Identification and screening of carbapenemase-producing Enterobacteriaceae. *Clin Microbiol Infect*, 18(5): 432–438.
- Nordmann, P., Poirel, L. 2019. Epidemiology and Diagnostics of Carbapenem Resistance in Gram-negative Bacteria. *Clin Infect Dis*, 69(Suppl 7): S521–S528.
- Nordmann, P., Poirel, L. 2014. The difficult-to-control spread of carbapenemase producers among Enterobacteriaceae worldwide. *Clin Microbiol Infect*, 20(9): 821–830.
- Nouvenne, A., Ticinesi, A., Lauretani, F., Maggio, M., Lippi, G., Guida, L., et al. 2014. Comorbidities and disease severity as risk factors for Carbapenem-Resistant *Klebsiella pneumoniae* colonization: Report of an experience in an internal medicine unit. *PLoS ONE*, 9(10): 1–8.
- Nouvenne, A., Ticinesi, A., Meschi, T. 2015. Carbapenemase-producing *Klebsiella pneumoniae* in elderly frail patients admitted to medical wards. *Ital J Med*, 9(2): 116–119.
- Pagès, J.M., James, C.E., Winterhalter, M. 2008. The porin and the permeating antibiotic: A selective diffusion barrier in Gram-negative bacteria. *Nat Rev Microbiol*, 6(12): 893–903.
- Panawala, L. 2017. Difference Between Gram Positive and Gram Negative Bacteria. *Pediaa*, 13.
- Panitia Pengendalian Resistensi Antimikroba (PPRA), 2019. *Panduan Pengendalian dan Penggunaan Antibiotik (PPAB) RSUP Dr Sardjito Yogyakarta*, Yogyakarta: PPRA RSUP Dr Sardjito.
- Paño-Pardo, J.R., Quintana, B.L., Perona, F.L., Carrascoso, G.R., Romero-Gómez, M.P., Yagüe, B.L., et al. 2016. Community-onset bloodstream and other infections, caused by carbapenemase-producing Enterobacteriaceae: Epidemiological, microbiological, and clinical features. *Open Forum Infect Dis*, 3(3).



- Papazian, L., Klompas, M., Luyt, CE. 2020. Ventilator-associated pneumonia in adults: a narrative review. *Intensive Care Med*, 46: 888–906.
- Piddock, L.J.V. 2006. Clinically relevant chromosomally encoded multidrug resistance efflux pumps in bacteria. *Clin Microbiol Rev*, 19(2): 382–402.
- Potron, A., Poirel, L., Nordmann, P. 2015. Emerging broad-spectrum resistance in *Pseudomonas aeruginosa* and *Acinetobacter baumannii*: Mechanisms and epidemiology. *Int J Antimicrob Agents*, 45(6): 568–585.
- Prasetyawan, M. 2021. Hubungan Kesesuaian Terapi Antibiotik Definitif Berbasis Panduan Penggunaan Antibiotik (PPAB) Dengan Respon Klinis Kasus Infeksi Di RSUP Dr Sardjito Yogyakarta. Tesis. Universitas Gadjah Mada, Indonesia.
- Ramón, J., Pardo, P., Villar, S.S., Carlos, J., Ramos, R., Pintado, V. 2014. Infections caused by carbapenemase-producing Enterobacteriaceae: Risk factors, clinical features and prognosis. *Enferm Infect Microbiol Clin*, 32(Supl 4): 41–48.
- Roberts, M.C. 2008. Update on macrolide-lincosamide-streptogramin, ketolide, and oxazolidinone resistance genes. *FEMS Microbiol Lett*, 282(2): 147–159.
- Ross, J.I., Eady, E.A., Cove, J.H., Cunliffe, W.J., Baumberg, S., Wootten, J.C. 1990. Inducible erythromycin resistance in staphylococci is encoded by a member of the ATP binding transport super gene family. *Mol Microbiol*, 4(7): 1207–1214.
- Saharman, Y.R., Pelegrin, A.C., Karuniawati, A., Sedono, R., Aditianingsih, D., Goessens, W.H.F. 2019. Epidemiology and characterisation of carbapenem-non-susceptible *Pseudomonas aeruginosa* in a large intensive care unit in Jakarta, Indonesia. *Int J Antimicrob Agents*, 54(5): 655–660.
- Soria-Segarra, C., Soria-Segarra, C., Catagua-González, A., Gutiérrez-Fernández, J. 2020. Carbapenemase producing Enterobacteriaceae in intensive care units in Ecuador: Results from a multicenter study. *Journal of Infection and Public Health*, 13(1): 80–88.
- Taggar, G., Rheman, M.A., Boerlin, P., Diarra, M.S. 2020. Molecular epidemiology of carbapenemases in enterobacteriales from humans, animals, food and the environment. *Antibiotics*, 9(10): 1–22.
- Tamma, P.D., Cosgrove, S.E., Maragakis, L.L. 2012. Combination therapy for treatment of infections with gram-negative bacteria. *Clin Microbiol Rev*, 25(3): 450–470.
- Tängdén, T., Giske, C.G. 2015. Global dissemination of extensively drug-resistant carbapenemase-producing Enterobacteriaceae: Clinical perspectives on detection, treatment and infection control. *J Int Med*, 277(5): 501–512.
- Teo, J., Cai, Y., Lim, T.-P., Tan, T., Kwa, A. 2016. Carbapenem Resistance in Gram-Negative Bacteria: The Not-So-Little Problem in the Little Red Dot. *Microorganisms*, 4(1): 13.
- Theuretzbacher, U. 2017. Global antimicrobial resistance in Gram-negative pathogens and clinical need. *Current Opinion in Microbiology*, 39: 106–112.
- Rodríguez, A.M.T., Fernández, R. 2020. Carbapenemase-producing Enterobacteriaceae infections in General Surgery patients: Our experience.



*Enferm Infect Microbiol Clin*, 38(1): 42–43.

- Ting, S.W., Lee, C.H., Liu, J.W. 2018. Risk factors and outcomes for the acquisition of carbapenem-resistant Gram-negative bacillus bacteremia: A retrospective propensity-matched case control study. *J Microbiol Immunol Infect*, 51(5): 621–628.
- Uc-Cachón, A.H., Gracida-Osorno, C., Luna-Chi, I.G., Jiménez-Guillermo, J.G., Molina-Salinas, G.M. 2019. High prevalence of antimicrobial resistance among gram-negative isolated bacilli in intensive care units at a tertiary-care hospital in Yucatán Mexico. *Medicina (Lithuania)*, 55(9).
- Vandepitte, J., Engbaek, K., Rohner, P., Piot, P., Heuck, C. C. 2003. Prosedur Laboratorium Dasar untuk Bakteriologis Klinis. Edisi 2. EGC, Jakarta..
- Vanegas, J.M., Parra, O.L., Jiménez, J.N. 2016. Molecular epidemiology of carbapenem resistant gram-negative bacilli from infected pediatric population in tertiary - care hospitals in Medellín , Colombia : an increasing problem. *BMC Infect Dis*: 1–10.
- Villegas, M.V., Pallares, C.J., Escandón-Vargas, K., Hernández-Gómez, C., Correa, A., Álvarez, C., et al. 2016. Characterization and clinical impact of bloodstream infection caused by carbapenemase-producing enterobacteriaceae in seven Latin American countries. *PLoS ONE*, 11(4): 1–13.
- Warnes, S.L., Highmore, C.J., Keevil, C.W. 2012. Horizontal transfer of antibiotic resistance genes on abiotic touch surfaces: Implications for public health. *mBio*, 3(6).
- Wilson, D.N. 2014. Ribosome-targeting antibiotics and mechanisms of bacterial resistance. *Nat Rev Microbiol*, 12(1): 35–48.
- Wiwing, V., Lumbuun, N., Pratama, N., Lugito, H. 2016. Increased Number of Metallo- or OXA Carbapenemase Producing Acinetobacter baumanii Isolated from Tangerang , Indonesia.iMedPub Journals, 3(16): 1–5.
- Yang, P., Chen, Y., Jiang, S., Shen, P., Lu, X., Xiao, Y. 2018. Association between antibiotic consumption and the rate of carbapenem-resistant Gram-negative bacteria from China based on 153 tertiary hospitals data in 2014. *Antimicrob Resist Infect Control*, 7(1): 137.
- Zhao, S., Perry, M.R., Kennedy, S., Wilson, J., Chase-Topping, M.E., Anderson, E., et al. 2020. Risk factors for carbapenemase-producing organisms among inpatients in Scotland: A national matched case-control study. *Infect Control Hosp Epidemiol*: 1–10.
- Zhou Y, Yu F, Yu Y, Zhang Y, Jiang Y. Clinical significance of MDRO screening and infection risk factor analysis in the ICU. *Am. J. Transl.* 2021 ;13(4):3717-3723.