

Universidade do Estado do Rio de Janeiro – UERJ
Instituto de Medicina Social
Programa de Pós-graduação em Saúde Coletiva

ÁREA DE CONCENTRAÇÃO: EPIDEMIOLOGIA		PROFESSOR: Guilherme Loureiro Werneck	
ANO/ SEMESTRE:	2021/1	CÓDIGO:	IMS017151 (ME) IMS018168 (DO)
TURMA:	30	CARGA HORÁRIA / CRÉDITOS:	30h / 2 créditos
INÍCIO (dia/mês):	11/05	DIA DA SEMANA / HORÁRIO	Terça-feira / 14h-17h
TÉRMINO (dia/mês):	27/07		

DISCIPLINA

Tópicos Especiais em Epidemiologia
Epidemiologia de doenças infecciosas I - 2021/1

EMENTA E PROGRAMA DETALHADOS:

Objetivo: Apresentar e discutir temas básicos de epidemiologia das doenças infecciosas, enfatizando questões e problemas relativos à concepção, desenho, implementação, análise e interpretação de estudos epidemiológicos sobre o tema.

Conteúdo: Bases teóricas, Inferência causal e desenhos de estudo, Imunidade de grupo, tempo de incubação, Avaliação de vacinas, Heterogeneidades na transmissão de agentes infecciosos, Padrões de contato e disseminação de doenças infecciosas, Surtos e epidemias, o conceito de reservatório, Evolução, Doenças emergentes, Bioterrorismo.

Dinâmica: Leitura e discussão dos textos

BIBLIOGRAFIA INDICADA:

* - INDICA LEITURA OBRIGATÓRIA

Tema 1: Introdução à epidemiologia das doenças infecciosas

- Ribeiro JC, Struchiner CJ, Werneck GL, 2008. Dinâmica de doenças infecciosas. In: RA Medronho (ed.). Epidemiologia. Rio de Janeiro, Atheneu.
- Halloran ME, 1998. Concepts of Infectious Disease Epidemiology. In: KJ Rothman & S Greenland (eds.). Modern Epidemiology. 2nd ed., Philadelphia, Lippincott-Raven. (pp 529-554).
- Anderson RM, May RM, 1992. Infectious Diseases in Humans. Oxford, Oxford University Press. Cap. 1, 2 e 3 (p. 1 – 65)
- Anderson RM, 1993. Epidemiology. In: FEG Cox (ed.).Modern Parasitology. 2nd ed., Oxford, Blackwell Sci. (pp. 75- 116).
- Nelson KE, 2001. Epidemiology of infectious diseases: general principles.In: KE Nelson, CM Williams & NMH Graham (eds.). Infectious disease epidemiology: theory and practice. Maryland, Aspen (pp. 17-49).
- Nelson KE, 2001. Early history of infectious disease: epidemiology and control of infectious diseases. In: KE Nelson, CM Williams & NMH Graham (eds.). Infectious disease epidemiology: theory and practice. Maryland, Aspen (pp. 3-15).
- Mishra S, Fisman DN, Boily MC. The ABC of terms used in mathematical models of infectious diseases. J Epidemiol Community Health. 2011 Jan;65(1):87-94.
- Barreto ML, Teixeira MG, Carmo EH. Infectious diseases epidemiology. J Epidemiol Community Health. 2006 Mar;60(3):192-5.

Tema 2: Modelos matemáticos em doenças infecciosas

- Grassly NC, Fraser C, 2008. Mathematical models of infectious disease transmission. Nat Rev Microbiol. 2008;6:477–487.
- Russell TW, Wu JT, Clifford S, Edmunds WJ, Kucharski AJ, Jit M; Centre for the Mathematical Modelling of Infectious Diseases COVID-19 working group, 2021. Effect of internationally imported cases on internal spread of COVID-19: a mathematical modelling study. Lancet Public Health. 2021 Jan;6(1):e12-e20.
- May RM, 2004. Uses and abuses of mathematics in biology. Science. 2004;303:790–793.
- Lipsitch, M. et al, 2003. Transmission dynamics and control of severe acute respiratory syndrome. Science 300, 1966–1970.
- Lee BY, Bartsch SM. How to determine if a model is right for neglected tropical disease decision making. PLoS Negl Trop Dis. 2017 Apr 20;11(4):e0005457.

Tema 3: Imunidade de grupo, tempo de incubação e intervalo serial

- John TJ, Samuel R, 2000. Herd immunity and herd effect: new insights and definitions. European Journal of Epidemiology 16: 601-606.
- Huillard d'Aignaux JN, Cousens SN, Maccario J, Costagliola D, Alpers MP, Smith PG, Alpérovitch A, 2002. The incubation period of kuru. Epidemiology. 13(4):402-8.

- Fine PEM, 1993. Herd immunity: history, theory, practice. *Epidemiologic reviews*, 15:265-302.
- Anderson RM, May RM, 1985. Vaccination and herd immunity to infectious diseases. *Nature*. 318:323-329.
- Sartwell PE, 1950. Am J. Hyg. The distribution of incubation periods of infectious disease. 51:310-318. (Republicado AJE, 1995, 141:386-394)
- Alene M, Yismaw L, Assemie MA, Ketema DB, Gietaneh W, Birhan TY, 2021. Serial interval and incubation period of COVID-19: a systematic review and meta-analysis. *BMC Infect Dis*;21(1):257.

Tema 4: Avaliação de vacinas

- Halloran ME, Struchiner CJ, Longini IM Jr, 1997. Study designs for evaluating different efficacy and effectiveness aspects of vaccines. *Am J Epidemiol*, 146:789-803.
- Moulton LH, Chung S, Croll J, Reid R, Weatherholtz RC, Santosh M, 2000. Estimation of the indirect effect of Haemophilus influenzae type b conjugate vaccine in an American Indian population. *Int J Epidemiol*, 29:753-6.
- Halloran ME, Struchiner CJ, 1991. Study designs for dependent happenings. *Epidemiology*. 2:331-338.
- Halloran ME, Longini JR, IM, Struchiner CJ, 1999. Design and interpretation of vaccine field studies. *Epidemiologic Reviews*. 21:73-88
- Edmunds WJ, Medley GF, Nokes DJ, 1999. Evaluating the cost-effectiveness of vaccination programmes: a dynamic perspective. *Statistics in Medicine*, 18:3263-3282.
- Sartori AM, de Soárez PC, Novaes HM, 2012. Cost-effectiveness of introducing the 10-valent pneumococcal conjugate vaccine into the universal immunisation of infants in Brazil. *J Epidemiol Community Health*, 66:210-7.
- Bubar KM, Reinholt K, Kissler SM, Lipsitch M, Cobey S, Grad YH, Larremore DB. Model-informed COVID-19 vaccine prioritization strategies by age and serostatus. *Science*. 2021 Feb 26;371(6532):916-921.

Tema 5: Padrões de contato, redes sociais e disseminação de doenças infecciosas

- Cauchemez S, Bhattarai A, Marchbanks TL, Fagan RP, Ostroff S, Ferguson NM, Swerdlow D; Pennsylvania H1N1 working group, 2011. Role of social networks in shaping disease transmission during a community outbreak of 2009 H1N1 pandemic influenza. *Proc Natl Acad Sci U S A*, 108:2825-30.
- Edmunds WJ, O'Callaghan CJ, Nokes DJ, 1997. Who mixes with whom? a method to determine the contact patterns of adults that may lead to the spread of airborne infections. *Proceedings of the Royal Society of London, Series B*, 264:949-57.
- Conlan AJ, Eames KT, Gage JA, von Kirchbach JC, Ross JV, Saenz RA, Gog JR, 2011. Measuring social networks in British primary schools through scientific engagement. *Proc Biol Sci*, 278:1467-75.
- Wallinga J, Edmunds WJ, Kretzschmar M, 1999. Perspective: human contact patterns and the spread of airborne infectious diseases. *Trends in Microbiology*, 7:372-7.
- Codeço CT, Coelho FC, 2008. Redes: um olhar sistêmico para a epidemiologia de doenças transmissíveis. *Cien Saude Colet*. 13(6):1767-74.
- Friedman SR, Aral, 2001. Social networks, risk-potential networks, health, and disease. *J Urban Health*. 78(3):411-8.
- Coletti P, Wambua J, Gimma A, Willem L, Vercruyse S, Vanhoutte B, Jarvis CI, Van Zandvoort K, Edmunds J, Beutels P, Hens N, 2020. CoMix: comparing mixing patterns in the Belgian population during and after lockdown. *Sci Rep*. 2020 Dec 14;10(1):21885.

Tema 6: Heterogeneidades na transmissão de agentes infecciosos

- Woolhouse MEJ, Dye C, Etard JF, Smith T, Charlwood JD, Garnett GP, Hagan P, Hii JLK, Ndhlovu PD, Quinnell RJ, Watts CH, Chandiwana SK, Anderson RM, 1997. Heterogeneities in the transmission of infectious agents: implications for the design of control programs. *Proceedings of the National Academy of Sciences of the United States of America*. 94:338-342.
- Koopman JS, Simon CP, Riolo CP, 2005. When to control endemic infections by focusing on high-risk groups. *Epidemiology*, 16:621-7.
- Smith DL, Dushoff J, McKenzie FE, 2004. The risk of a mosquito-borne infection in a heterogeneous environment. *PLoS Biol*. 2(11):e368.
- Bolzoni L, Real L, De Leo G, 2007. Transmission heterogeneity and control strategies for infectious disease emergence. *PLoS One*, 2:e747.
- House T, Keeling MJ, 2008. Household structure and infectious disease transmission. *Epidemiol Infect*. 8:1-8.
- Filion GJ, Paul RE, Robert V., 2006. Transmission and immunity: the importance of heterogeneity in the fight against malaria. *Trends Parasitol*. 22(8):345-8.
- Thomas LJ, Huang P, Yin F, Luo XI, Almquist ZW, Hipp JR, Butts CT, 2020. Spatial heterogeneity can lead to substantial local variations in COVID-19 timing and severity. *Proc Natl Acad Sci U S A*. 117(39):24180-24187.

Tema 7: Fundamentos do controle de vetores

- Klempner MS, Unnasch TR, Hu LT, 2007. Taking a bite out of vector-transmitted infectious diseases. *N Engl J Med*. 356(25):2567-9.
- Alexander B, Maroli M, 2003. Control of phlebotomine sandflies. *Medical and Veterinary Entomology*. 17:1-18.
- Fillinger U, Ndenga B, Githeko A, Lindsay SW., 2009 Integrated malaria vector control with microbial larvicides and insecticide-treated nets in western Kenya: a controlled trial. *Bull World Health Organ*, 87:655-65.
- Townson H, et al., 2005. Exploiting the potential of vector control for disease Prevention. *Bulletin of the World Health Organization* 83:942-947.
- Thomas D, Weedermann M, Billings L, Hoffacker J, Washington-Allen RA, 2009. When to Spray: a Time-Scale Calculus Approach to Controlling the Impact of West Nile Virus. *Ecology and Society* 14(2): 21.
- Chitnis N, Schapira A, Smith T, Steketee R, 2010. Comparing the effectiveness of malaria vector-control interventions through a mathematical model. *Am J Trop Med Hyg*, 83:230-40.
- Luz PM, Codeço CT, Massad E, Struchiner CJ, 2003. Uncertainties regarding dengue modeling in Rio de Janeiro, Brazil. *Mem Inst Oswaldo*

Cruz. 98:871–878.

- Luz PM, Struchiner CJ, Galvani AP, 2010. Modeling transmission dynamics and control of vector-borne neglected tropical diseases. PLoS Negl Trop Dis. 2010 Oct 26;4(10):e761.

Tema 8: Fundamentos do controle de reservatórios

- Brunner JL, LoGiudice K, Ostfeld RS, 2008. Estimating reservoir competence of *Borrelia burgdorferi* hosts: prevalence and infectivity, sensitivity, and specificity. J Med Entomol. 45(1):139-47.
- Ceballos LA, Cardinal MV, Vazquez-Prokope GM, Lauricella MA, Orozco MM, Cortinas R, Schijman AG, Levin MJ, Kitron U, Görtler RE., 2006. Long-term reduction of *Trypanosoma cruzi* infection in sylvatic mammals following deforestation and sustained vector surveillance in northwestern Argentina. Acta Trop. 98(3):286-96.
- Haydon DT, Cleaveland S, Taylor LH, Laurenson MK, 2002. Identifying reservoirs of infection: a conceptual and practical challenge. Emerg Infect Dis. 8(12):1468-73.
- Courtenay O, Quinnell RJ, Garcez LM, Shaw JJ, Dye C, 2002. Infectiousness in a cohort of brazilian dogs: why culling fails to control visceral leishmaniasis in areas of high transmission. J Infect Dis. 186(9):1314-20.
- Ellis BA, Regnery RL, Beati L, Bacellar F, Rood M, Glass GG, Marston E, Ksiazek TG, Jones D, Childs JE, 1999. Rats of the genus *Rattus* are reservoir hosts for pathogenic *Bartonella* species: an Old World origin for a New World disease? J Infect Dis. 180:220-4.

Tema 9: Investigação de surtos e epidemias

- Smith PF, Grabau JC, Werzberger A, Gunn RA, Rolka HR, Kondracki SF, Gallo RJ, Morse DL, 1997. The role of young children in a community-wide outbreak of hepatitis A. Epidemiology and Infection. 118:243-252.
- Bell BP et al., 1994. A multistate outbreak of *Escherichia coli* O157:H7- associated bloody diarrhea and hemolytic uremic syndrome from hamburgers. JAMA. 272:1349- 1353.
- Ko AI et al., 1999. Urban epidemic of severe leptospirosis in Brazil. Lancet. 354:820- 825.
- Braz, RM et al., 2006. Detecção precoce de epidemias de malária no Brasil: uma proposta de automação. Epidemiol. serv. saúde;15(2):21- 33.
- Rosa ES et al, 2006. Bat-transmitted human rabies outbreaks, Brazilian Amazon. Emerg Infect Dis. 12(8):1197-202.
- Moura L et al., 2006. Waterborne toxoplasmosis, Brazil, from field to gene. Emerg Infect Dis. 12(2):326-9.
- Nishiura H, 2020. Backcalculating the incidence of infection with COVID-19 on the diamond princess. Journal of Clinical Medicine. 9:657.
- Mizumoto K, Kagaya K, Zarebski A, Chowell G, 2020. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the diamond princess cruise ship, Yokohama, Japan, 2020. Eurosurveillance 25:180.

Tema 10: Evolução e doenças infecciosas

- Davies CM et al, 2001. Trade-offs in the evolution of virulence in an indirectly transmitted macroparasite. Proc. R. Soc. Lond. B. 268, 251- 257
- Coutinho F et al., 1999. A theoretical model of the evolution of virulence in sexually transmitted HIV/AIDS. Rev. Saúde Pública, Aug 1999, vol.33, no.4, p.329-333
- Ewald PW, 2004. Evolution of virulence. Infect Dis Clin N Am, 18:1–15.
- Struchiner CJ, Luz PM, Codeço CT, Massad E, 2008. The many faces of epidemiology: evolutionary epidemiology. Cien Saude Colet. 13(6):1743-52.
- Restif O, 2008. Evolutionary epidemiology 20 years on: Challenges and prospects. Infect Genet Evol. 2008 Oct 14.
- Galvani AP, 2003. Epidemiology meets evolutionary ecology. Trends in Ecology and Evolution, 18:132-138.
- Sironi M, Hasnain SE, Rosenthal B, Phan T, Luciani F, Shaw MA, Sallum MA, Mirhashemi ME, Morand S, González-Candelas F; Editors of Infection, Genetics and Evolution, 2020. SARS-CoV-2 and COVID-19: A genetic, epidemiological, and evolutionary perspective. Infect Genet Evol. 2020 Oct;84:104384
- Saad-Roy CM, Morris SE, Metcalf CJE, Mina MJ, Baker RE, Farrar J, Holmes EC, Pybus OG, Graham AL, Levin SA, Grenfell BT, Wagner CE, 2021. Epidemiological and evolutionary considerations of SARS-CoV-2 vaccine dosing regimes. Science. 2021 Mar 9:eabg8663

Tema 11: Doenças emergentes e reemergentes / Bioterrorismo

- Morse SS, 1995. Factors in the emergence of infectious diseases. Emerg Infect Dis, 1:7- 15.
- Daszak P, Cunningham AA, Hyatt AD, 2000. Emerging infectious diseases of wildlife-- threats to biodiversity and human health. Science, 287:443-9.
- Mayer JD, 2000. Geography, ecology and emerging infectious diseases. Soc Sci Med. 50:937-952.
- McMichael AJ, 2004. Environmental and social influences on emerging infectious diseases: past, present and future. Philos Trans R Soc Lond B Biol Sci. 359(1447):1049- 58.
- Morens DM, Folkers GK, Fauci AS, 2004. The challenge of emerging and re-emerging infectious diseases. Nature. 430(6996):242-9.
- Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL, Daszak P, 2008. Global trends in emerging infectious diseases. Nature. 451(7181):990-3.
- Woolhouse ME, Gowtage-Sequeria S, 2005. Host range and emerging and reemerging pathogens. Emerg Infect Dis, 11:1842-7.
- Woolhouse M, Gaunt E, 2007. Ecological origins of novel human pathogens. Crit Rev Microbiol, 33:231-42.
- Meselson M, Guillemin J, Hugh-Jones M, Langmuir A, Popova I, Shelokov A, Yampolskaya O, 1994. The Sverdlovsk Anthrax outbreak of 1979. Science. 266:1202- 1208.
- Danzig R, 2012. A decade of countering bioterrorism: incremental progress, fundamental failings. Biosecur Bioterror, 10:49-54.

- Longini IM Jr, Halloran ME, Nizam A, Yang Y, Xu S, Burke DS, Cummings DA, Epstein JM, 2007. Containing a large bioterrorist smallpox attack: a computer simulation approach. *Int J Infect Dis*, 11:98-108.
- Silva LJ, 2001. Guerra biológica, bioterrorismo e saúde pública. *Cadernos de Saúde Pública*, 17:1519-1523.
- Cardoso DR, Cardoso TAO, 2011. Bioterrorismo: dados de uma história recente de riscos e incertezas. *Ciência & Saúde Coletiva*, 16(Supl. 1):821-830.
- Nordin JD, Kasimov S, Levitt MJ, Goodman MJ, 2008. Bioterrorism Surveillance and Privacy: Intersection of HIPAA, the Common Rule, and Public Health Law. *American Journal of Public Health*, 98: 802-807.

TIPO DE AVALIAÇÃO: Apresentação de seminários durante o curso e elaboração de uma resenha sobre uma questão relacionada aos temas do curso (entre 1500 e 2000 palavras, excluindo resumo e referências bibliográficas).