## Course Topics and Reading List

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| *Note: Optional/supplementary readings are denoted by \**. | |
| **Unit 1: Survey Sampling** | *Week 2: Variance*   * Cochran WG, Cox GM. *Experimental Designs*. 2nd edn. New York: John Wiley & Sons, 1957. * MacKay RJ, Oldford RW. Scientific method, statistical method and the speed of light. *Statistical Science*. 2000; 15(3): 254–278. <https://www.jstor.org/stable/2676665>. * \* Seife C. CERN’s gamble shows perils, rewards of playing the odds. *Science*. 2000; 289(5488): 2260–2262. <https://doi.org/10.1126/science.289.5488.2260>. * \* Trang B. Why wastewater data isn’t yet a more mainstream public health tool. *STAT News*. 11 Jan. 2023. * \* Whitaker TB. Sampling foods for mycotoxins. *Food Additives and Contaminants*. 2006; 23(1): 50–61. <https://doi.org/10.1080/02652030500241587>.   *Week 3: Bias*   * Kennedy C, Blumenthal M, Clement S, et al. An evaluation of the 2016 election polls in the United States. *Public Opinion Quarterly*. 2018; 82(1): 1–33. <https://doi.org/10.1093/poq/nfx047>. * Gelman A. Failure and success in political polling and election forecasting. *Statistics and Public Policy*. 2021; 8(1): 67–72. <https://doi.org/10.1080/2330443X.2021.1971126>. * \* Cohn N. How one 19-year-old Illinois man is distorting national polling averages. *The New York Times*. 12 Oct. 2016. <https://www.nytimes.com/2016/10/13/upshot/how-one-19-year-old-illinois-man-is-distorting-national-polling-averages.html>. * \* Graefe A, Armstrong JS, Jones RJ, Cuzán AG. Combining forecasts: an application to elections. *International Journal of Forecasting*. 2014; 30(1): 43–54. <https://doi.org/10.1016/j.ijforecast.2013.02.005>. |
| **Unit 2: Introduction to Randomized Controlled Trials** | *Week 4: Exchangeability*   * Lincoff AM, Brown-Frandsen K, Colhoun HM, et al. Semaglutide and cardiovascular outcomes in obesity without diabetes. *New England Journal of Medicine*. 2023; 389(24): 2221–2232. <http://doi.org/10.1056/NEJMoa2307563>. * Wilding JPH, Batterham RL, Calanna S, et al. Once-weekly semaglutide in adults with overweight or obesity. *New England Journal of Medicine*. 2021; 384(11): 989–1002. <http://doi.org/10.1056/NEJMoa2307563>. * \* Baden LR, El Sahly HM, Essink B, et al. Efficacy and safety of the mRNA-1273 SARS-CoV-2 vaccine. *New England Journal of Medicine*. 2021; 384(5): 403–416. [http://doi.org/10.1056/nejmoa2035389](https://vassar.primo.exlibrisgroup.com/permalink/01VAC_INST/1l1mld2/cdi_gale_infotrac_662131699). * \* Blum D. Wegovy is shown to reduce risk of heart attacks and strokes in some patients. *The New York Times*. 11 Nov. 2023. [https://www.nytimes.com/2023/11/11/well/live/ozempic-wegovy-heart-disease-obesity.html](https://www.nytimes.com/2023/11/11/well/live/ozempic-wegovy-heart-disease-obesity.html?unlocked_article_code=1.R00.xha-.763BvjOYzehu&bgrp=t&smid=url-share). * \* Reis G, Silva EASM, Silva DCM, et al. Effect of early treatment with ivermectin among patients with COVID-19. *New England Journal of Medicine*. 2022; 386(18): 1721–1731. <https://doi.org/10.1056/nejmoa2115869>. * \* Marshall G, Blacklock JWS, Cameron C, et al. for the Medical Research Council Streptomycin in Tuberculosis Trials Committee. Streptomycin treatment of pulmonary tuberculosis. *British Medical Journal*. 1948; 2: 769–782. <https://www.bmj.com/content/2/4582/769>. * \* Senn S. Seven myths of randomisation in clinical trials. *Statistics in Medicine*. 2013; 32(9): 1439–1450. <https://doi.org/10.1002/sim.5713>. * \* Zimmer C, Grady D. Moderna’s Covid vaccine: what you need to know. *The New York Times*. 30 Nov. 2020. [https://www.nytimes.com/live/2020/moderna-covid-19-vaccine](https://www.nytimes.com/live/2020/moderna-covid-19-vaccine?unlocked_article_code=1.R00.Nfrp.YOYgQqdusSPz&bgrp=t&smid=url-share).   *Week 5: Statistical Power*   * James DK, Spencer CJ, Stepsis BW. Fetal learning: a prospective randomized controlled study. *Ultrasound in Obstetrics & Gynecology*. 2002; 20(5): 431–438. <https://doi.org/10.1046/j.1469-0705.2002.00845.x>. * Troller-Renfree SV, Costanzo MA, Duncan GJ, et al. The impact of a poverty reduction intervention on infant brain activity. *Proceedings of the National Academy of Sciences USA*. 2022; 119(5): e2115649119. <https://doi.org/10.1073/pnas.2115649119>. * \* DeParle J. Cash aid to poor mothers increases brain activity in babies, study finds. *The New York Times*. 24 Jan. 2022. [https://www.nytimes.com/2022/01/24/us/politics/child-tax-credit-brain-function.html](https://www.nytimes.com/2022/01/24/us/politics/child-tax-credit-brain-function.html?unlocked_article_code=1.Tk0.M1wx.nYqRTiGRO0JC&bgrp=t&smid=url-share).   *Week 6: Ethics, Feasibility, Consistency*   * Bertrand M, Mullainathan S. Are Emily and Greg more employable than Lakisha and Jamal? A field experiment on labor market discrimination. *The American Economic Review*. 2004; 94(4): 991–1013. <https://doi.org/10.1257/0002828042002561>. * Gay C. Moving to Opportunity: the political effects of a housing mobility experiment. *Urban Affairs Review*. 2012; 48(2): 147–179. [https://doi.org/10.1177/1078087411426399](https://vassar.primo.exlibrisgroup.com/permalink/01VAC_INST/1l1mld2/cdi_proquest_miscellaneous_1019638295). * \* Holm S. Book Review—For the Common Good. *Clinical Trials* 2024; 21(1): 136–137. <https://doi.org/10.1177/17407745231193140>. * \* Wilson A, Kasina F, Nduta I, Ayumbah Akallah J. When economists shut off your water. *Africa Is a Country* (web site). 2023. <https://africasacountry.com/2023/11/when-economists-shut-off-your-water>. * \* Jones CP. Invited commentary: ‘race,’ racism, and the practice of epidemiology. *American Journal of Epidemiology*. 2001; 154(4): 299–304. <https://doi.org/10.1093/aje/154.4.299>.   *Readings on the Tuskegee Syphilis Study:*   * \* Jones JH. *Bad Blood: the Tuskegee Syphilis Experiment*. New and expanded edn. New York: Free Press, 1993. * \* Jones JH, King NMP. *Bad Blood* thirty years later: a Q&A with James H. Jones. *Journal of Law, Medicine & Ethics*. 2012; 40(4): 867–872. <https://doi.org/10.1111/j.1748-720X.2012.00716.x>. * \* Reverby SM, ed. *Tuskegee’s Truths: Rethinking the Tuskegee Syphilis Study*. Chapel Hill, NC: University of North Carolina Press, 2012. |
| **Unit 3: Advanced Topics in Randomized Controlled Trials** | *Week 7: Bias-Variance Tradeoff*   * Kalla JL, Broockman DE. Campaign contributions facilitate access to Congressional officials: a randomized field experiment. *American Journal of Political Science*. 2016; 60(3): 545–558. <https://doi.org/10.1111/ajps.12180>. * \* Muchnik L, Aral S, Taylor SJ. Social influence bias: a randomized experiment. *Science*. 2013; 341(6146): 647–651. <https://doi.org/10.1126/science.1240466>.   *Week 8: Statistical Efficiency*   * Cochran WG, Cox GM. *Experimental Designs*. Ch. 5: Factorial Experiments. 1950. New York: John Wiley & Sons. Pp. 122–153. * Schneider M, Andres C, Trujillo G, et al. Cocoa and total system yields of organic and conventional agroforestry vs. monoculture systems in a long-term field trial in Bolivia. *Experimental Agriculture*. 2017; 53(3): 351–374. <https://doi.org/10.1017/S0014479716000417>. * \* Schmitz J, Hahn M, Brühl CA. Agrochemicals in field margins—an experimental field study to assess the impacts of pesticides and fertilizers on a natural plant community. *Agriculture, Ecosystems and Environment*. 2014; 193: 60–69. <https://doi.org/10.1016/j.agee.2014.04.025>. * \* Wood L, Welch AM. Assessment of interactive effects of elevated salinity and three pesticides on life history and behavior of southern toad (*Anaxyrus terrestris*) tadpoles. *Environmental Toxicology and Chemistry*. 2015; 34(3): 667–676. <https://doi.org/10.1002/etc.2861>.   *Week 9: Estimands and Effects*   * Abaluck J, Kwong LH, Styczynski A. Impact of community masking on COVID-19: a cluster-randomized trial in Bangladesh. *Science*. 2022; 375(6577): eabi9069. <http://doi.org/10.1126/science.abi9069>. * Mitjà O, Corbacho-Monné M, Ubals M, et al. A cluster-randomized trial of hydroxychloroquine for prevention of COVID-19. *New England Journal of Medicine*. 2021; 384(5): 417–427. <https://doi.org/10.1002/etc.2861>. * \* Lipsitch M, Dean NE. Understanding COVID-19 vaccine efficacy. *Science*. 2020; 370(6518): 763–765. <http://doi.org/10.1126/science.abe5938>. * \* Wu A. A study in Bangladesh tripled the rate of mask-wearing. Can it help in the U.S.? *NPR Goats and Soda*. 13 Aug. 2021. <https://www.npr.org/sections/goatsandsoda/2021/08/13/1027218817/what-can-the-u-s-learn-from-bangladesh-s-big-masking-experiment>. |
| **Unit 4: Observational Studies** | *Week 10: Exchangeability and Consistency*   * Willett WC, Stampfer MJ, Manson JE, et al. Intake of *trans* fatty acids and risk of coronary heart disease among women. *The Lancet*. 1993; 341(8845): 581–585. <https://doi.org/10.1016/0140-6736(93)90350-P>. * Curtis CJ, Clapp J, Goldstein G, Angell SY. How the Nurses’ Health Study helped Americans take the trans fat out. *American Journal of Public Health*. 2016; 106(9): 1537–1539. <https://doi.org/10.2105/AJPH.2016.303353>. * D’Agostino McGowan L, Gerke T, Barrett M. Causal inference is not just a statistics problem. *Journal of Statistics and Data Science Education* 2024; 32(2): 150–155. <https://doi.org/10.1080/26939169.2023.2276446>. * \* Liu D, Li ZH, Shen D, et al. Association of sugar-sweetened, artificially sweetened, and unsweetened coffee consumption with all-cause and cause-specific mortality. *Annals of Internal Medicine*. 2022; 175(7): 909–917. <http://doi.org/10.7326/M21-2977>. * \* Blum D. Coffee drinking linked to lower mortality risk, new study finds. *The New York Times*. 1 June 2022. <https://www.nytimes.com/2022/06/01/well/eat/coffee-study-lower-dying-risk.html>.   *Week 11: Internal and External Validity*   * Card D, Krueger AB. Minimum wages and employment: a case study of the fast-food industry in New Jersey and Pennsylvania. A*merican Economic Review*. 1994; 84(4): 772–793. <https://www.jstor.org/stable/2118030>. * Abadie A, Diamond A, Hainmueller J. Synthetic control methods for comparative case studies: estimating the effect of California’s tobacco control program. *Journal of the American Statistical Association*. 2010; 105(490): 493–505. <https://doi.org/10.1198/jasa.2009.ap08746>. * \* Abadie A, Gardeazabal J. The economic costs of conflict: a case study of the Basque Country. *American Economic Review*. 2003; 93(1): 113–132. <http://doi.org/10.1257/000282803321455188>. * \* Coleman T. Causality in the time of cholera: John Snow as a prototype for causal inference. *SSRN* [preprint]. 2019. <https://doi.org/10.2139/ssrn.3262234>. * Cowger TL, et al. Lifting universal masking in schools—COVID-19 incidence among students and staff. *New England Journal of Medicine*. 2022. 387: 1935–1946. <https://doi.org/10.1056/NEJMoa2211029>. * \* Kennedy-Shaffer L. Baseball’s natural experiment. *Significance*. 2022; 19(5): 42–45. <https://doi.org/10.1111/1740-9713.01691>. * \* Royal Swedish Academy of Sciences. Popular science background: natural experiments to help answer important questions. *The Prize in Economic Sciences 2021*. <https://www.nobelprize.org/prizes/economic-sciences/2021/popular-information/>. * \* Turner N. Impact Over Orthodoxy. *Vera Institute* (web site). 2023. ​​<https://www.vera.org/news/impact-over-orthodoxy>.   *Week 12: Communication and Certainty*   * Soderbergh S. (Director). *Erin Brockovich* [Film]. Universal City, CA: Universal Studios, 2000. * Heath D. Cancer-cluster study seeking to debunk “Erin Brockovich” has glaring weaknesses. *The Center for Public Integrity*. 3 June 2013. <https://publicintegrity.org/environment/cancer-cluster-study-seeking-to-debunk-erin-brockovich-has-glaring-weaknesses/>. * Steenland K, Savitz DA, Fletcher T. Class action lawsuits: can they advance epidemiologic research? *Epidemiology*. 2014; 25(2): 167–169. <http://doi.org/10.1097/EDE.0000000000000067>.   *Week 13: Conclusion: Where Do We Go From Here?*   * \* Messeri L, Crockett MJ. Artificial intelligence and illusions of understanding in scientific research. *Nature*. 2024; 627: 49–58. <https://doi.org/10.1038/s41586-024-07146-0>. * \* Stevenson MT. Cause, effect, and the structure of the social world. *Boston University Law Review*. 2023; 103: 2001–2047. [http://doi.org/10.2139/ssrn.4445710](https://doi.org/10.2139/ssrn.4445710). |