Intro to DAGs/causal inference reading list for general clinical/public health audience

Most certainly not a comprehensive list, but some interesting readings for a more or less gentle introduction to DAGs for the clinical and public health practitioner audience. Articles roughly grouped by topic and in no particular order… Thanks to #epitwitter for many helpful suggestions. Please comment if you have any others to add to the list or send me (@JLRohmann) a direct message.

Why should we care?

Miguel A. Hernán, "The C-Word: Scientific Euphemisms Do Not Improve Causal Inference From Observational Data", American Journal of Public Health 108, no. 5 (May 1, 2018): pp. 616-619.

a. https://www.ncbi.nlm.nih.gov/pubmed/?term=29565659
b. A great article to cite when a reviewer asks why you are using casual language and insists you should instead talk about 'associations'.

Hernán MA. A definition of causal effect for epidemiological research. J Epidemiol Community Health. 2004 Apr;58(4):265–71.

c. https://www.ncbi.nlm.nih.gov/pubmed/15026432

Books/Book chapters

1. Hernán MA, Robins JM (2018). Causal Inference. Boca Raton: Chapman & Hall/CRC, forthcoming.
    d. Free online! https://www.hsph.harvard.edu/miguel-hernan/causal-inference-book/
    e. This is a great introduction and is a must-read for those interested in conducting research on causal questions.
2. Pearl, Glymour, Jewell: Causal Inference in Statistics: A Primer
    a. http://bayes.cs.ucla.edu/PRIMER/
    b. Solution manual can be requested for self-study: kaoru@cs.ucla.edu
    c. Many questions also answered via Dagitty (R package): http://dagitty.net/primer/
3. Pearl & Greenland. Causal Diagrams (chapter). 2014.
    a. https://ftp.cs.ucla.edu/pub/stat_ser/r361.pdf
4. Glymour MM. Using causal diagrams to understand common problems in social epidemiology. Methods in social epidemiology [Internet]. 2006
    a. http://publicifsv.sund.ku.dk/~nk/epiF14/Glymour_DAGs.pdf
5. There is also a nice chapter by Maria Glymour & Sander Greenland in Modern Epidemiology (3rd Ed.)
6. Stephen L. Morgan & Christopher Winship. Counterfactuals and Causal Inference: Methods and Principles for Social Research (2nd Ed.)

Free online courses/Videos

1. 'Draw your assumptions before your conclusions' with Miguel Hernan on edX
    a. https://www.edx.org/course/causal-diagrams-draw-your-assumptions-before-your-conclusions
2. Intro lecture- Peter Tennant
    a. https://www.youtube.com/watch?v=SbrX3YEMj_0&feature=youtu.be

Accessible introductions to DAGs, good (clinical) examples & websites/tools

1. Lederer DJ, Bell SC, Branson RD, Chalmers JD, Marshall R, Maslove DM, et al. Control of Confounding and Reporting of Results in Causal Inference Studies: Guidance for Authors from Editors of Respiratory, Sleep, and Critical Care Journals. Ann Am Thorac Soc [Internet].
    a. Gentle intro and examples from respiratory research
    b. http://dx.doi.org/10.1513/AnnalsATS.201808-564PS
2. Suttorp MM, Siegerink B, Jager KJ, Zoccali C, Dekker FW. Graphical presentation of confounding in directed acyclic graphs. Nephrol Dial Transplant. 2015 Sep;30(9):1418–23.
    a. Intro to DAGs with examples from the field of nephrology
    b. https://academic.oup.com/ndt/article-lookup/doi/10.1093/ndt/gfu325
3. Rohrer JM. Thinking Clearly About Correlations and Causation: Graphical Causal Models for Observational Data. Advances in Methods and Practices in Psychological Science. 2018 Mar 1;1(1):27–42.
    a. Intro to DAGs with examples from psychology
    b. https://doi.org/10.1177/2515245917745629
4. Cole SR, Platt RW, Schisterman EF, Chu H, Westreich D, Richardson D, et al. Illustrating bias due to conditioning on a collider. Int J Epidemiol. 2010 Apr;39(2):417–20.
    a. Two hypothetical worked examples to convey concepts underlying bias due to conditioning on a collider, goes more in depth than the others
    b. http://dx.doi.org/10.1093/ije/dyp334
5. Bandoli G, Palmsten K, Flores KF, Chambers CD. Constructing Causal Diagrams for Common Perinatal Outcomes: Benefits, Limitations and Motivating Examples with Maternal Antidepressant Use in Pregnancy. Paediatr Perinat Epidemiol. 2016 Sep;30(5):521–8.
    a. Examples from perinatal epi
    b. https://dx.doi.org/10.1111%2Fppe.12302
6. Howards PP, Schisterman EF, Poole C, Kaufman JS, Weinberg CR. “Toward a clearer definition of confounding” revisited with directed acyclic graphs. Am J Epidemiol. 2012 Sep 15;176(6):506–11.
    a. A bit more advanced than the others; authors revisit Weinberg's 1993 Epidemiology paper using DAGs to represent scenarios that arise from her original assumptions.
    b. https://www.ncbi.nlm.nih.gov/pubmed/22904203
7. “Colliders in Epidemiology: an educational interactive web application”
    a. Fun shiny app to explore colliders
    b. http://watzilei.com/shiny/collider/
    c. Paper: Luque-Fernandez MA, Schomaker M, Redondo-Sanchez D, Jose Sanchez Perez M, Vaidya A, Schnitzer ME. Educational Note: Paradoxical collider effect in the analysis of non-communicable disease epidemiological data: a reproducible illustration and web application. Int J Epidemiol [Internet]. 2018 Dec 14
        i. Available from: http://dx.doi.org/10.1093/ije/dyy275

8. Catalog of Bias
    a. https://catalogofbias.org/biases/confounding/

Potpourri of other important articles on confounding in causal framework

1. Greenland, S. and H. Morgenstern (2001). "Confounding in health research." Annual review of public health 22(1): 189-212.
    a. https://www.ncbi.nlm.nih.gov/pubmed/11274518
    b. A bit older, but nice article reviewing design and analysis approaches to controlling for confounding. They also discuss confounding vs collapsibility
2. McCulloch CE. Editorial: observational studies, time-dependent confounding, and marginal structural models. Arthritis Rheumatol. 2015 Mar; 67(3):609-11.
    a. https://www.ncbi.nlm.nih.gov/pubmed/25371384
    b. More advanced topic, but a very clearly written article on time-varying confounding and marginal structural models.
3. Morabia, A. (2011). "History of the modern epidemiological concept of confounding." Journal of Epidemiology & Community Health 65(4): 297-300.
    a. https://www.ncbi.nlm.nih.gov/pubmed/20696848
    b. A brief history lesson…
4. Greenland, S., (2003). Quantifying biases in causal models: classical confounding vs collider-stratification bias. Epidemiology, 14(3), pp.300-306.
    a. Which mistake is worse? adjusting for a collider or failing to adjust for a confounder?
    b. http://journals.lww.com/epidem/abstract/2003/05000/quantifying_biases_in_causal_models__classical.9.aspx
5. Greenland S, Robins JM. Identifiability, exchangeability, and epidemiological confounding. Int J Epidemiol. 1986 Sep;15(3):413–9.
    a. Introduces potential outcomes framework for epi
    b. http://www.ncbi.nlm.nih.gov/pubmed/3771081
6. VanderWeele TJ, Hernán MA, Robins JM. Causal directed acyclic graphs and the direction of unmeasured confounding bias. Epidemiology. 2008 Sep;19(5):720–8.
    a. https://www.ncbi.nlm.nih.gov/pubmed/18633331
7. Hernán MA, Hsu J, Healy B. A Second Chance to Get Causal Inference Right: A Classification of Data Science Tasks. CHANCE. 2019; 32:1, 42-49, DOI: 10.1080/09332480.2019.1579578
    a. https://amstat.tandfonline.com/doi/full/10.1080/09332480.2019.1579578#.XM9Pi45LiPp