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Epidemiology, Biostatistics
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Studies of Health and Social Policy at McGill in the 21st Century: In the Service of a Worthy Cause

Jay S. Kaufman, Ph.D
Canada Research Chair in Health Disparities
Department of Epidemiology, Biostatistics,
and Occupational Health
McGill University
email: jay.kaufman@mcgill.ca





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Social Determinants of Health: Central Issues/Problems:

social theory and epidemiologic theory

etiology
(causal inference)

vs

description
(surveillance)

modeling and adjustment

generalizability

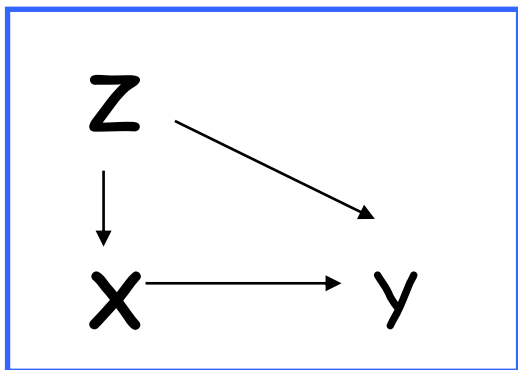
population inference

development of evidenced-based policies



You observe: $\Pr(Y|X=x)$
You want to know: $\Pr(Y|SET[X=x])$

The adjustment tradition in epidemiology and social sciences exists to link these quantities:



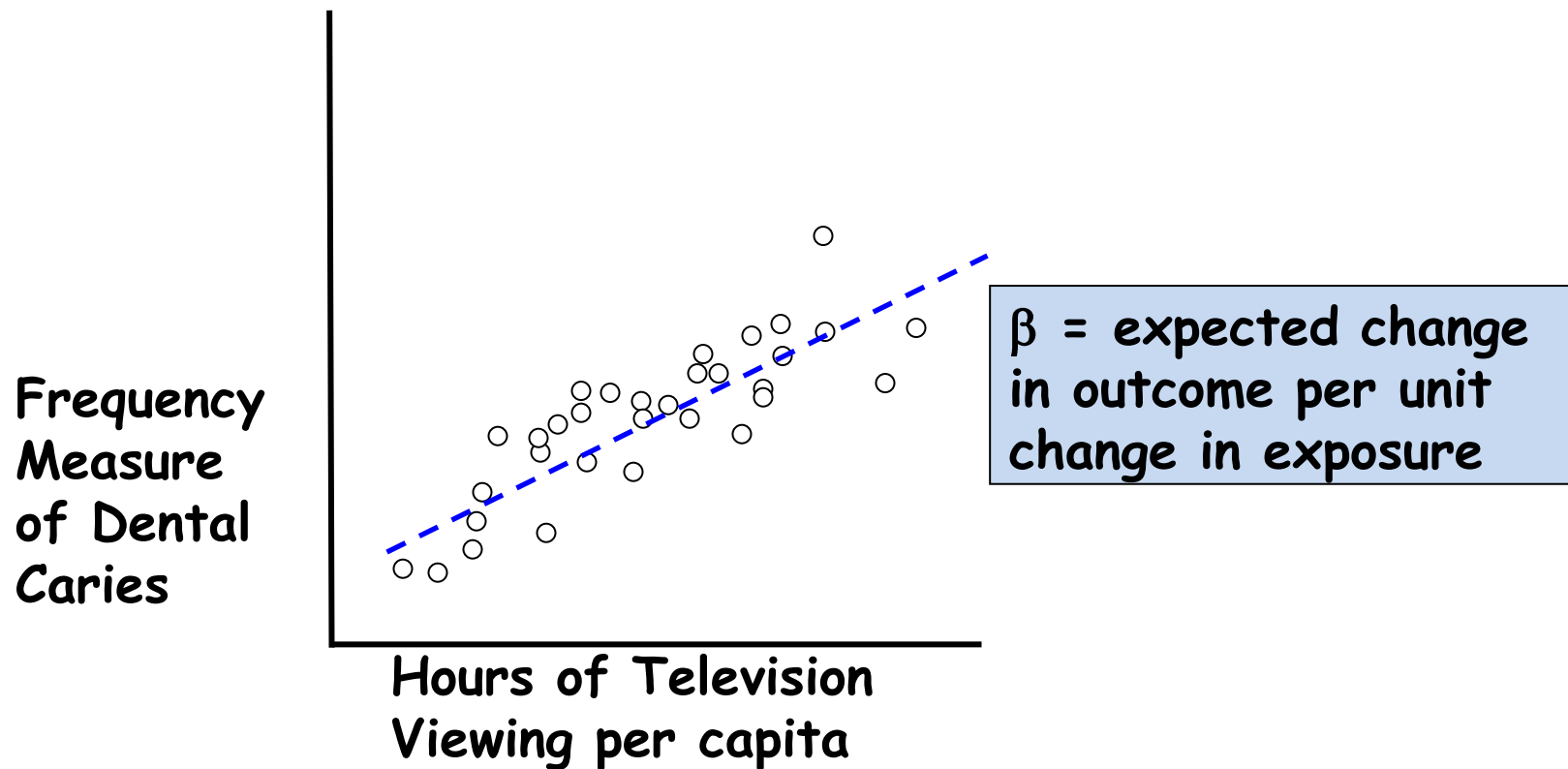
$$\Pr(Y|X=x) \neq \Pr(Y|SET[X=x])$$

BUT!

$$\sum \Pr(Y|X=x, Z=z) \Pr(Z=z) = \Pr(Y|SET[X=x])$$

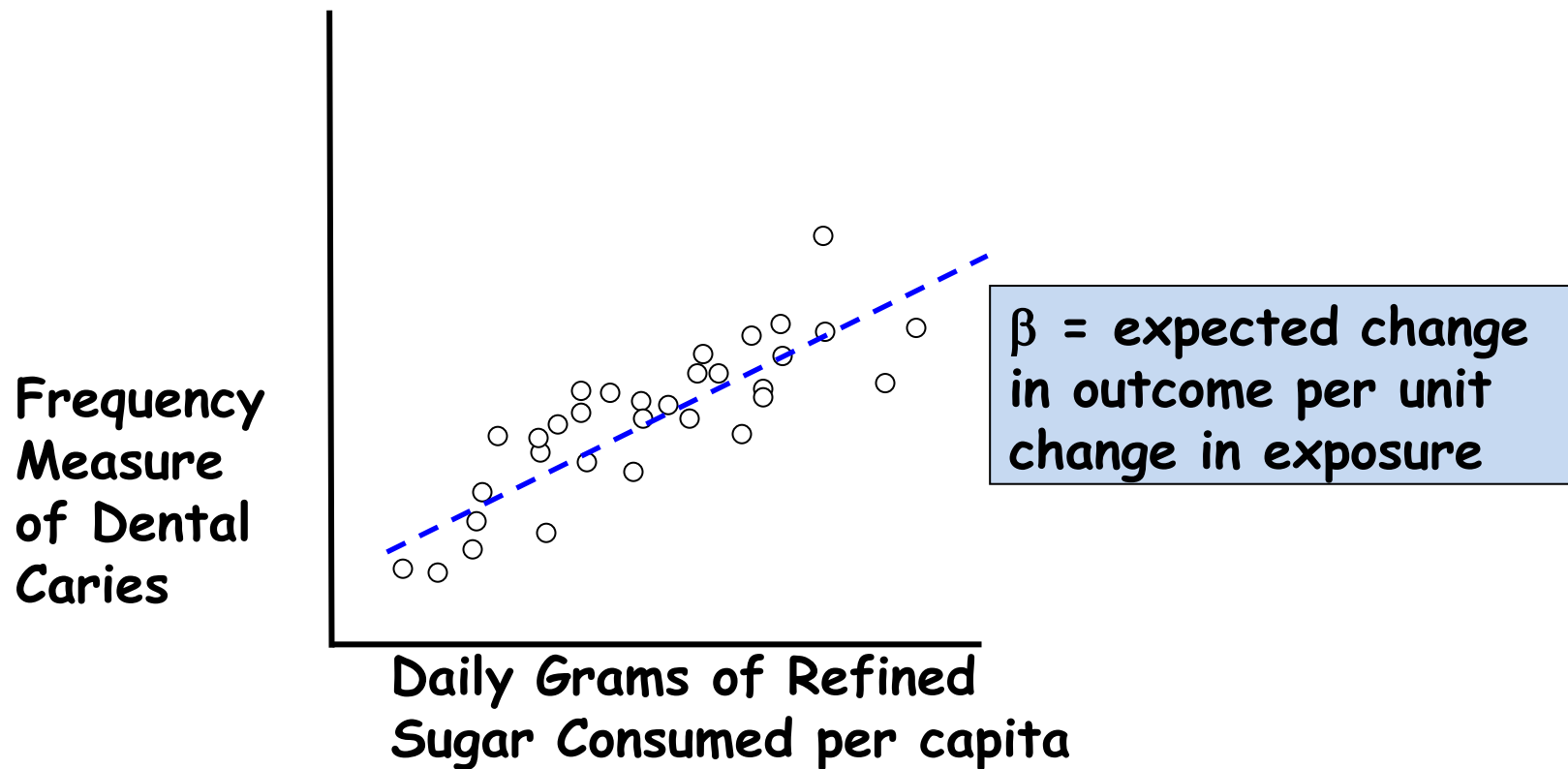
Consider two different bivariate associations:

1) Relation between ecologic levels of TV viewing and ecologic rates of dental caries, by country:



Consider two different bivariate associations:

2) Relation between ecologic levels of refined sugar consumption and ecologic rates of dental caries, by country:



Adjust for level of socioeconomic development, and find that $\Pr(Y|SET[X=x])$ is null in scenario #1, and non-null in scenario #2

Many researchers at many universities around the world study social determinants of health with an aim of informing health-related social policy

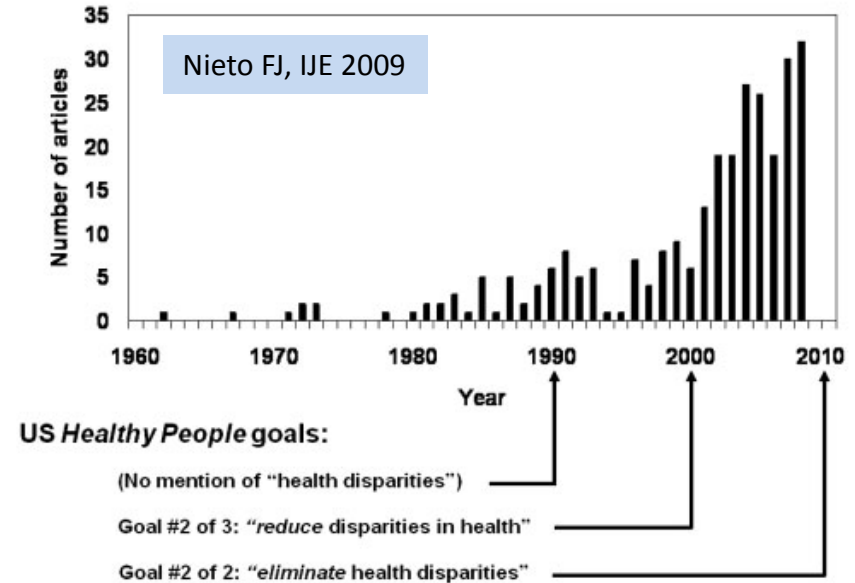


Figure 1 The epidemic of social epidemiology research. The top of the figure graphs the number of articles per year in a PubMed search with 'social epidemiology' as the keyword (1960–2008). The bottom half of the figure shows the chronology of use of the term 'health disparities' in the US 1990 Health Objectives, Healthy People 2000 and Healthy People 2010⁷

But McGill EBOH is SPECIAL....



**We understand that “association is not causation”
and that correlations are not a basis for sound
policy:**

Kaufman JS, Harper S. Health equity: utopian and scientific.
Prev Med. 2013 Dec;57(6):739-40. PMID: 24075815

**and so we seek study designs that can identify causal
effects, which then have direct policy implications:**

Harper S, Strumpf EC. Social epidemiology: questionable answers and
answerable questions. Epidemiology. 2012 Nov;23(6):795-8.
PMID: 23038109

Naimi AI, Kaufman JS. Counterfactual Theory in Social Epidemiology:
Reconciling Analysis and Action for the Social Determinants of Health.
Current Epidemiology Reports 2015; 2(1): 52-60.



We recognize that scale of contrast can arbitrarily changes the appearance of inequalities:

Harper S, Kaufman JS, King NB. Increased risk of coronary heart disease in female smokers. *Lancet*. 2012;379(9818):801-2. PMID: 22386028

King NB, Kaufman JS, Harper S. Relative measures alone tell only part of the story. *Am J Public Health*. 2010 Nov;100(11):2014-5. PMID: 20864691

Harper S, King NB, Meersman SC, Reichman ME, Breen N, Lynch J. Implicit value judgments in the measurement of health inequalities. *Milbank Q*. 2010 Mar;88(1):4-29. PMID: 20377756

King NB, Harper S, Young ME. Use of relative and absolute effect measures in reporting health inequalities: structured review. *BMJ*. 2012 Sep 3;345:e5774. PMID: 22945952

Harper S, King NB, Young ME. Impact of selective evidence presentation on judgments of health inequality trends: an experimental study. *PLoS One*. 2013 May 16;8(5):e63362. PMID: 23696818



We consider the implications of alternate modeling strategies for identifying causal effects:

Harper S, Strumpf EC, Kaufman JS. Do medical marijuana laws increase marijuana use? Replication study and extension. *Ann Epidemiol.* 2012 Mar;22(3):207-12. PMID: 22285867

and we consider the sensitivity of our inferences to unverifiable assumptions of the models:

Nandi A, Glymour MM, Subramanian SV. Association among socioeconomic status, health behaviors, and all-cause mortality in the United States. *Epidemiology.* 2014 Mar;25(2):170-7. PMID: 24487200



We evaluate the effects of social and health policies in real-world settings in Canada:

Smith LM, Kaufman JS, Strumpf EC, Lévesque LE. Effect of human papillomavirus (HPV) vaccination on clinical indicators of sexual behaviour among adolescent girls. *CMAJ*. 2015 Feb 3;187(2):E74-81. PMID: 25487660

King NB, Fraser V, Boikos C, Richardson R, Harper S. Determinants of increased opioid-related mortality in the United States and Canada, 1990-2013: a systematic review. *Am J Public Health*. 2014 Aug;104(8):e32-42. PMID: 24922138

Ionescu-Ittu R, Glymour MM, Kaufman JS. A difference-in-differences approach to estimate the effect of income-supplementation on food insecurity. *Prev Med*. 2015 Jan;70:108-16. PMID: 25475685

Hutcheon J, Harper S, Strumpf E, Lee L, Marquette G. Using inter-institutional practice variation to understand the risks and benefits of routine labour induction at 41+0 weeks. *BJOG*. 2014 Jul 14. [Epub ahead of print] PMID: 25041161



and in the rest of the world:

Quamruzzaman A, Mendoza Rodríguez JM, Heymann J, Kaufman JS, Nandi A. Are tuition-free primary education policies associated with lower infant and neonatal mortality in low- and middle-income countries? *Soc Sci Med*. 2014 Nov;120:153-9. PMID: 25243641

McKinnon B, Harper S, Kaufman JS, Bergevin Y. Removing user fees for facility-based delivery services: a difference-in-differences evaluation from ten sub-Saharan African countries. *Health Policy Plan*. 2015 May;30(4):432-41. PMID: 24816570

Nazif-Munoz JI, Quesnel-Vallée A, van den Berg A. Did Chile's traffic law reform push police enforcement? Understanding Chile's traffic fatalities and injuries reduction. *Inj Prev* 2014 Nov 28 [Epub ahead of print] PMID: 25432938

Atabay E, Moreno G, Nandi A, Kranz G, Vincent I, Assi TM, Winfrey EM, Earle A, Raub A, Heymann SJ. Facilitating working mothers' ability to breastfeed: global trends in guaranteeing breastfeeding breaks at work, 1995-2014. *J Hum Lact*. 2015;31(1):81-8. PMID: 25348674



We distinguish between descriptive work that traces trends and patterns across time, group and place:

Harper S, MacLehose RF, Kaufman JS. Trends in the black-white life expectancy gap among US states, 1990-2009. *Health Aff* 2014; 33(8): 1375-82. PMID: 25092839

Harper S, Rushani D, Kaufman JS. Trends in the black-white life expectancy gap, 2003-2008. *JAMA*. 2012;307(21):2257-9. PMID: 22706828

Elani HW, Harper S, Allison PJ, Bedos C, Kaufman JS. Socio-economic inequalities and oral health in Canada and the United States. *J Dent Res*. 2012 Sep;91(9):865-70. PMID: 22837551

Yang S, Khang YH, Chun H, Harper S, Lynch J. The changing gender differences in life expectancy in Korea 1970-2005. *Soc Sci Med*. 2012 Oct;75(7):1280-7. PMID: 22739261



from etiologic work that identifies mechanisms and pathways:

Nandi A, Charters TJ, Strumpf EC, Heymann J, Harper S. Economic conditions and health behaviours during the 'Great Recession'. *J Epidemiol Comm Health*. 2013;67(12):1038-46. PMID: 23969346

Naimi AI, Moodie EE, Auger N, Kaufman JS. Stochastic mediation contrasts in epidemiologic research: interpregnancy interval and educational disparity in preterm delivery. *Am J Epid* 2014;180(4):436-45. PMID: 25038216

Naimi AI, Kaufman JS, MacLehose RF. Mediation misgivings: ambiguous clinical and public health interpretations of natural direct and indirect effects. *Int J Epidemiol*. 2014 Oct;43(5):1656-61. PMID: 24860122

Kaufman JS, Dolman L, Rushani D, Cooper RS. The contribution of genomic research to explaining racial disparities in cardiovascular disease: a systematic review. *Am J Epid* 2015 Apr 1;181(7):464-72. PMID: 25731887

