

Letter to the Editor

Re: Lies, Damned Lies, and Health Inequality Measurements. Understanding the Value Judgments.

Frank Popham

MRC/CSO Social and Public Health Sciences Unit, University of Glasgow, 200 Renfield Street,
Glasgow, UK, G2 3QB.

frank.popham@glasgow.ac.uk

+44(0)141 353 7500

Conflict of interest

None

Funding

FP's post is funded by the Medical Research Council, UK and Chief Scientist Office, Scotland (MC_UU_12017/7). These are the author's views only and not those of any funder.

To the editor:

In their interesting paper Kjellsson and colleagues suggest that relative measures of health inequality for bounded variables may depend on whether the probability of success (attainment) or failure (shortfall) is studied. Thus they argue there is a temptation for researchers studying health inequality trends to select either relative success or relative failure as their relative measure; whichever is more favourable to their position [1]. However, it is worth emphasising that a frequently used relative measure, the odds ratio, like measures of absolute difference, is symmetrical [2, 3]. It does not matter if attainment or shortfall is studied; the odds ratio for one will be the reciprocal of the other, so the trend will be the same whether attainment or shortfall is studied. To illustrate let us take their example of life expectancy, where attainment was life expectancy and shortfall was lost life expectancy (100 years -life expectancy). The table compares their group B to A under their various scenarios: an initial situation and various levels of change in attainment and shortfall to achieve an average life expectancy increase of 25 years. As the authors show, the risk ratios for attainment and shortfall under the various scenarios show a different change in inequality from the initial position. Because life expectancy and short fall life expectancy in group A and B in the change scenarios are mirror opposites these risk ratios are reciprocal, this is not always the case as shown by the initial scenario. The odds ratio on the other hand gives the same result whether attainment or shortfall is studied. Comparing relative trends using odds ratios may be problematic for many other reasons such as the odds ratio only equating to the relative risk when studying a rare event and the non-collapsibility of odds ratios [2, 3] but the trend will be the same whether the outcome is studied as a failure or success.

Frank Popham

1 Kjellsson G, Gerdtham U-G, Petrie D. Lies, Damned Lies, and Health Inequality Measurements: Understanding the Value Judgments. *Epidemiology* 2015; 015;26:673-80

2 Pang M, Kaufman JS, Platt RW. Studying noncollapsibility of the odds ratio with marginal structural and logistic regression models. *Stat Methods Med Res* 2013; doi:10.1177/0962280213505804

3 Cummings P. The relative merits of risk ratios and odds ratios. *Arch Pediatr Adolesc Med* 2009;163:438-45.

Table. Odds ratios and risk ratios for Kjellsson and colleagues' four life expectancy scenarios studied as attainment and shortfall. Shortfall is presented as the inverse for ease of comparison.

Authors' Scenarios	OR attainment	1 / OR shortfall	RR attainment	1/ RR shortfall
Initial	1.71	1.71	1.5	1.14
Red / Yellow (same absolute increase)	1.49	1.49	1.22	1.22
Blue (same proportional increase in attainment)	2.25	2.25	1.5	1.5
Green (same proportional increase in shortfall)	1.31	1.31	1.14	1.14