Summary of Commonly Used Health Disparity Measures

COMMONLY USED HEALTH DISPARITY MEASURES

MEASURE	TYPE OF MEASURE (RELATIVE/ABSOLUTE)	DESCRIPTION	FORMULA	ADVANTAGES	DISADVANTAGES

Range Measures
   Relative Risk (RR)
 	
   Excess Risk (ER)
	RR = Relative
	
	ER = Absolute
		Range measures typically compare the two extreme categories.	RR = [Minimum] ÷ [Maximum]
			ER = [Minimum] - [Maximum]
				1. Easy to calculate and interpret	1. Interpretation depends on choice of referent group
					2. Insensitive to group size
					3. Ignores information in the middle groups

Unweighted regression-based measures	Relative	If it is reasonable to assume that the relationship between health and socioeconomic position is linear, a convenient way to compare all socioeconomic groups is to calculate a regression-based effect.	$y = \beta_0 + \beta_1 x_1 + \varepsilon$ Where: Y = The outcome β_0 = The intercept of the regression line and the Y-axis x_1 = The independent variable ε = Error β_1 = The slope of this regression line. β_1 summarizes information contained in all data points in a single number. β_1 can be interpreted as a relative risk.	1. Considers all socioeconomic groups 2. Relatively easy to calculate and interpret	1. Requires social groups to be ordered 2. Must assume a linear relationship between X (social groups) and Y (the outcome) 3. Insensitive to group size when using grouped data

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Population-weighted regression-based measures Slope Index of Inequality (SII) Relative Index of Inequality (RII)	SII = Absolute RII = Relative	Defined as the slope of the regression line showing the relationship between a group's health and its relative socioeconomic rank Weighted by social group proportions Interpreted as the effect on health of moving from the lowest to the highest socioeconomic group Absolute Effect: Slope Index of Inequality (SII) Relative Effect: Relative Index of Inequality (RII)	Regress the health outcome on the midpoint of socioeconomic categories, weighted by proportion in the population: $y = \beta_0 + \beta_1(\text{SEP midpoint}) + \varepsilon$ Slope Index of Inequality (SII) $= -\beta_1$ Relative Index of Inequality (RII) $= (-\beta_1) / \bar{y}$	1. Easy to calculate, straightforward interpretation 2. Uses information on all socioeconomic groups 3. Incorporates information on the size of socioeconomic groups 4. Can be used to monitor disparities over time 5. Reflects the socioeconomic dimension to health disparities	1. Requires social groups to be ordered 2. Must assume a linear relationship between response variable and independent variables

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MEASURE	TYPE OF MEASURE (RELATIVE/ABSOLUTE)	DESCRIPTION	FORMULA	ADVANTAGES	DISADVANTAGES
Index of disparity	Relative	Measures the mean deviation of the group rates from some reference point (usually the best group rate) as a proportion of that reference point	$$\left(\sum_{i=1}^{n} \left| r_i - r_{rp} \right| / n \right) / r_{rp}$$ Where: r_i is the rate in group i r_{rp} is the rate for the reference point n is the number of groups or the number of groups minus 1 if one of the groups is the reference point	1. Sensitive to health differences between all groups	1. Does not account for the relative sizes of groups
Between-group variance (BGV)	Absolute	Measures the deviation of each group's rate from the population average and weights each group by its population size	$$\sum_{j=1}^{J} p_j \left(y_j - \mu \right)^2$$ Where: y_j is the rate in group j μ is the population average rate p_j is the group's share of the total population	1. Relatively easy to calculate, straightforward interpretation 2. Uses information on all social groups 3. Doesn't require ordering of social groups 4. Weighted by social group size 5. More sensitive to deviations further from the population average	1. Requires setting referent value at the population total rate 2. Is insensitive to changes in the socioeconomic distribution in health disparities

Summary of Commonly Used Health Disparity Measures

COMMONLY USED DISPROPORTIONALITY MEASURES

COMMONLY USED DISPROPORTIONALITY MEASURES	TYPE OF MEASURE (RELATIVE/ABSOLUTE)	GENERAL FORMULA	ADVANTAGES	DISADVANTAGES
	Relative	$$\sum_{j}^{J} p_j f(r_j)$$ where pj is pct of population in group j rj is the rate in group j relative to the total population rate, and f(rj) is the disproportionality function	1. Uses information from all social groups	1. Requires setting referent rate as the total population rate

INDEX NAME	TYPE OF MEASURE (RELATIVE/ABSOLUTE)	DISPROPORTIONALITY FUNCTION f(rj)	ADVANTAGES	DISADVANTAGES
Gini Index or Coefficient (G)	Relative	Individual-level data: $\mid r_i - r_j \mid / 2$ Grouped data: $r_j(q_j - Q_j)$, where q_j is the proportion of the total population in groups less healthy than Group j, and Q_j is the proportion of the total population in groups healthier than Group j (i.e., $p_j + q_j + Q_j = 1$)	1. Uses information on all groups 2. Graphical analogue	1. Insensitive to the direction of the socioeconomic gradient
Health Concentration Index (HCI)	Relative	Same as for G, but groups are ranked by social group position instead of by health, so that q_j is the proportion of the total population in groups less advantaged than Group j, and Q_j is the proportion of the total population in groups more advantaged than Group j (i.e., $p_j + q_j + Q_j = 1$)	1. Sensitive to the direction of the socioeconomic gradient 2. Uses information on all groups 3. Graphical analogue	1. May register no disparity when middle socioeconomic groups are disproportionately affected.

Summary of Commonly Used Health Disparity Measures

INDEX NAME	TYPE OF MEASURE (RELATIVE/ABSOLUTE)	DISPROPORTIONALITY FUNCTION $f(r_j)$	ADVANTAGES	DISADVANTAGES
Theil Index (T)	Relative	$r_j \ln(r_j)$	1. Uses information from all social groups 2. Can be decomposed into between group and within group components	1. Requires setting referent value at the population total rate 2. Is insensitive to changes in the socioeconomic distribution in health disparities
Mean Logarithmic Deviation (MLD)	Relative	$\ln(1/r_j) = -\ln(r_j)$	1. Uses information from all social groups 2. Can be decomposed into between group and within group components	1. Requires setting referent value at the population total rate 2. Is insensitive to changes in the socioeconomic distribution in health disparities
Adapted from Firebaugh, 2003.				