



TURNING CANCER DATA
INTO DISCOVERY

Health Disparities Calculator – HD*Calc

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Webinar Agenda



- Introduction and Background of the Health Disparities Calculator, HD*Calc
- Types of measures of disparities in the HD*Calc Tool
 - Absolute measures
 - Relative measures
- Consideration of issues for choosing a disparity measure
- Examples using SEER incidence data and HD*Calc version 2.0
- Questions and Answers

HD*Calc Reference Materials



- Two monographs available for download at seer.cancer.gov
 - Methods for Measuring Cancer Disparities, NCI Surveillance Monograph Series, No. 6
 - Selected Comparisons of Measures of Health Disparities, No. 7
- HD*Calc website: <https://seer.cancer.gov/hdcalc/>
- Broad consensus on eliminating disparities in health
- Somewhat less consensus on how to measure and monitor progress towards eliminating health disparities

Background



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- HD*Calc tool includes 11 disparity measures
 - 4 measures of absolute disparity
 - 7 measures of relative disparity
- Prior to using the HD*Calc tool:
 - Explore the raw data in either tabular or graphical form
 - Explore population proportions in variables of interest
 - Consider whether HD variable of interest is ranked or not

Measures of Absolute Disparity



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- Rate Difference (RD) – *difference in rates, $r_1 - r_2$, r_2 is reference rate*
 - Absolute disparity between two health status indicators is the simple arithmetic difference
- Between-Group Variance (BGV) – *rates by race*
 - The variance is a commonly used statistic that summarizes all squared deviations from a population average or variance that would exist in the population if each individual had the mean health of their social group (no within social group variation)

Measures of Absolute Disparity



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- Extended Absolute Concentration Index (eACI) – *contribution of rurality to mean level of health in the population*
 - Suggested for use with natural ordering, including income or education, and measures the covariance between social rank and health. Displays the cumulative contribution of each ranked subgroup to the mean level of health in the population.
- Slope Index of Inequality (SII) – *mean cancer rates modeled using urban-rural gradient as independent variables*
 - Obtained from the regression of the mean of the health or outcome variable on the mean relative rank variable from ordered social groups.
 - Cancer rate means are the outcome or dependent variable in a regression model using average relative ranking of social groups as independent variables
 - Result reported as single slope measure, can be positive or negative

Measures of Relative Disparity



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- Rate Ratio (RR) – *ratio of two rates, reference rate in the denominator*
 - Suggested for use with natural ordering, including income or education, and measures the covariance between social rank and health. Displays the cumulative contribution of each ranked subgroup to the mean level of health in the population.
- Index of Disparity (IDisp) – *summed differences of the disparity (income, education, or race) compared at two different years*
 - summarizes difference between several group rates and reference rate; expresses the summed differences as a proportion of reference rate.

Measures of Relative Disparity



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- Extended Relative Concentration Index (eRCI) – *compare ranked education, social group, or rurality at two different years*
 - Measures the extent that health or illness is concentrated among particular social groups. Is summed product of population share, group's mean health, and rank of social group. Use with social groups that have inherent ranking, income or education.
- Relative Index of Inequality (RII) – *evaluate positive or negative change in disparity between high and low socioeconomic groups*
 - Is the estimated Slope Index of Inequality (SII) divided by the mean population health. Measures proportionate increase or decrease in health between highest and lowest socioeconomic group.

Measures of Relative Disparity



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- Theil Index (T) and Mean Log Deviation (MLD) – *compare ordered social groups (rurality, education) and unordered social groups (race/ethnicity) at two different points*
 - Both are measures of general disproportionality and summarize the difference between the natural logarithm of shares of health and shares of population.
 - Are population-weighted and sensitive to differences further from average rate.

Measures of Relative Disparity



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- Kunst Mackenbach Relative Index (KMI) *use with ranked variables, like education or rurality*
 - Is a modification of the Relative Index of Inequality (RII).
 - KMI is the estimated health of the hypothetical person at the bottom of the socio-economic group distribution divided by the estimated health of the hypothetical person at the top of the socio-economic group distribution.

Review of Considerations for Using HD*Calc Measures



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- Visually inspect tables and graphs of raw data for rates, year, population percentages, proportion of inequality over time.
- If comparing specific groups, use pairwise absolute and relative comparisons. If summarizing across groups, use summary measures of health disparities.

Review of Considerations for Using HD*Calc Measures: Unranked vs. Ranked (natural order)



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Unranked		Ranked ONLY		Unranked and Ranked	
1	Between Group Variance (BGV)	1	Extended Relative Concentration Index (eRCI)	1	Between Group Variance (BGV)
2	Index of Disparity (IDisp)	2	Relative Index of Inequality (RII)	2	Index of Disparity (IDisp)
		3	Kunst Mackenbach Relative Index (KMI)	3	Mean Log Deviation (MLD)
		4	Extended Absolute Concentration Index (eACI)	4	Theil Index (T)
		5	Slope Index of Inequality (SII)		

Note: Rate Difference (RD) and Rate Ratio (RR) are not included in the table because they inherently deal with two levels.

Review of Considerations for Using HD*Calc Measures: Population Share



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Measures that do not consider population share		Measures sensitive to choice of population share	
1	Rate Difference (RD)	1	Between Group Variance (BGV)
2	Rate Ratio (RR)	2	Extended Absolute Concentration Index (eACI)
		3	Slope Index of Inequality (SII)
		4	Index of Disparity (IDisp)
		5	Mean Log Deviation (MLD)
		6	Extended Relative Concentration Index (eRCI)
		7	Theil Index (T)
		8	Relative Index of Inequality (RII)
		9	Kunst Mackenbach Relative Index (KMI)

HD*Calc Examples



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- Data used are SEER cancer data initially generated using SEER*Stat for the HD*Calc input file
- Colon and rectum cancer (CRC) incidence rates from 2000 to 2020 and two race groups (unranked), data are Incidence SEER Research Plus Data, 17 Registries (plus AZ), November 2022 submission (1990-2020 varying)
- Lung cancer incidence rates from 2000 to 2020 and rural-urban continuum code (ranked), data are Incidence SEER Research Limited-Field Data, 22 Registries, November 2022 submission (2000-2020)

Additional Insights to Using HD*Calc



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- Additional examples with multiple categories, race/ethnicity
- Applicable to survey data and survival data
- Future directions for HD*Calc



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