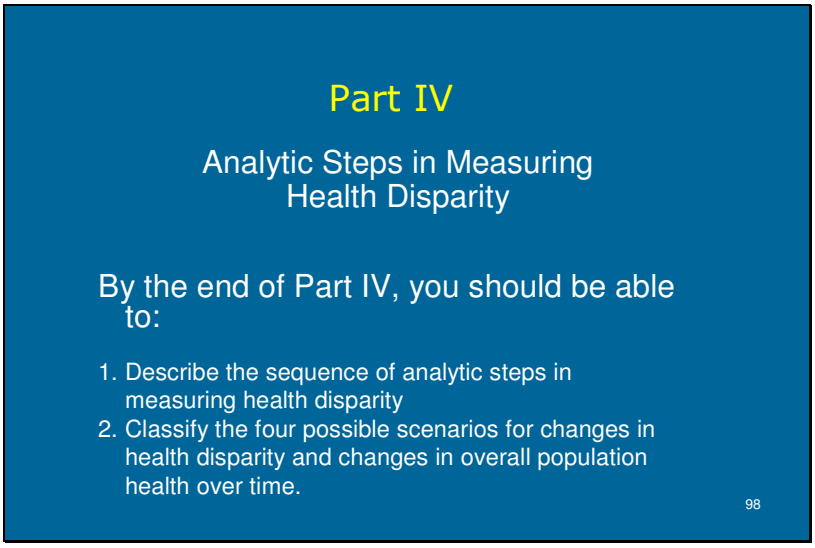
Part IV – Analytic Steps in Measuring Health Disparity
Introduction

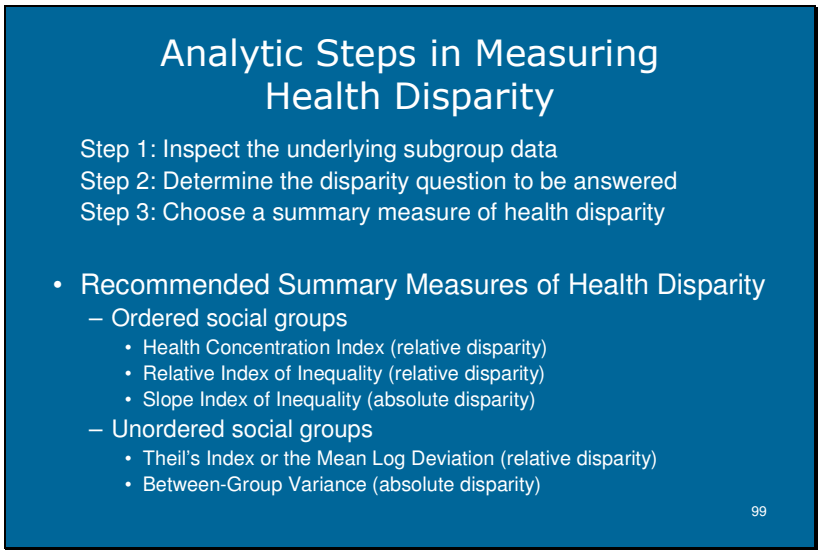


In Part IV, we will outline a set of analytic steps and recommendations in approaching measurement of health disparities. By the end of Part IV, you should be able to:

Describe the sequence of analytic steps in measuring health disparity, and

Classify the four possible scenarios for changes in health disparity and changes in overall population health over time.

Analytic steps - summary



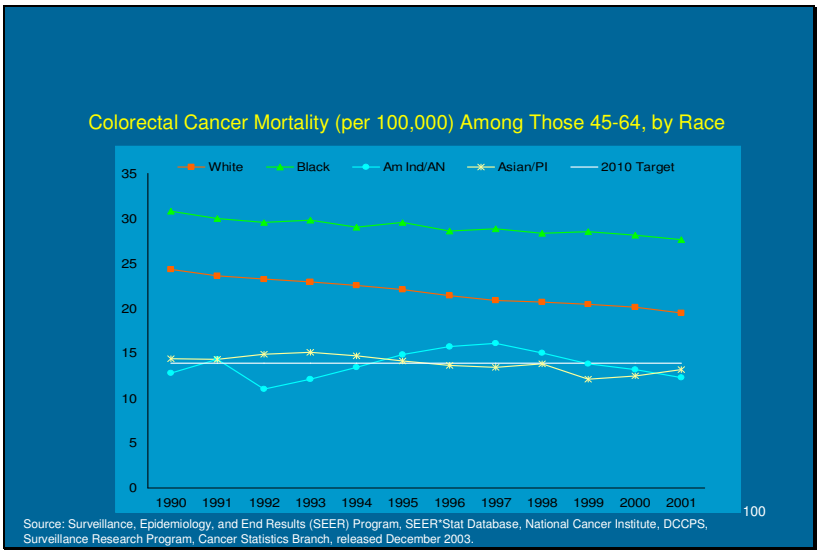
How does one get started using given data to characterize health disparity?

The first step is to inspect the underlying subgroup data. Look at the actual numbers that are going to be used in whatever measure will be chosen and graph them as we did before in the examples used in Part III. The purpose of this is to get a graphical feel for what you think the outcome will be.

The second step is to articulate the disparity question to be answered. Are you interested in comparing two groups? If that's all you're interested in doing, then a simple relative and absolute disparity comparison might be sufficient. It's not always necessary to use the most complicated measures. However, if your goal is to come up with a number that summarizes changes over time, including *all* social groups over time, then a summary measure is appropriate and you should choose the summary measure that is most suited to your data and your needs. For example, if you have data on ordered social groups, then you might use a relative disparity summary measure, like the Relative Index of Inequality or the Health Concentration Index. For a measure of absolute disparity, you would probably choose the Slope Index of Inequality.

For unordered social groups, use Theil's Index or the Mean Log Deviation as a measure of relative disparity or use the Between-Group Variance as a measure of absolute disparity.

Example. Racial disparity in colorectal cancer mortality



Let's use another example, one that involves a non-ordered social group like race to further explain these analytic steps. Specifically, we will look at racial disparities in colorectal cancer mortality from 1990 to 2001.

In the Theil's Index / Mean Log Deviation examples, we already showed you the cross-sectional 2001 data for colorectal cancer mortality per 100,000 among those ages 45-64 by race. In this graph, we can see what the colorectal cancer mortality rates look like in different race/ethnic groups over time, from 1990 to 2001. The white line is the target rate identified by Healthy People 2010.

How do we express the change in disparity among these groups?

Notice again, the first thing we did was plot the data. After reviewing the plotted data, our intuition is that not very much has changed, even though rates seem to be going down among whites and blacks. Note that rates are lower for other race/ethnic groups, like American Indians / Alaska Natives and Asian / Pacific Islanders, and these rates appear stable over time.

Example. Racial disparity in colorectal cancer mortality

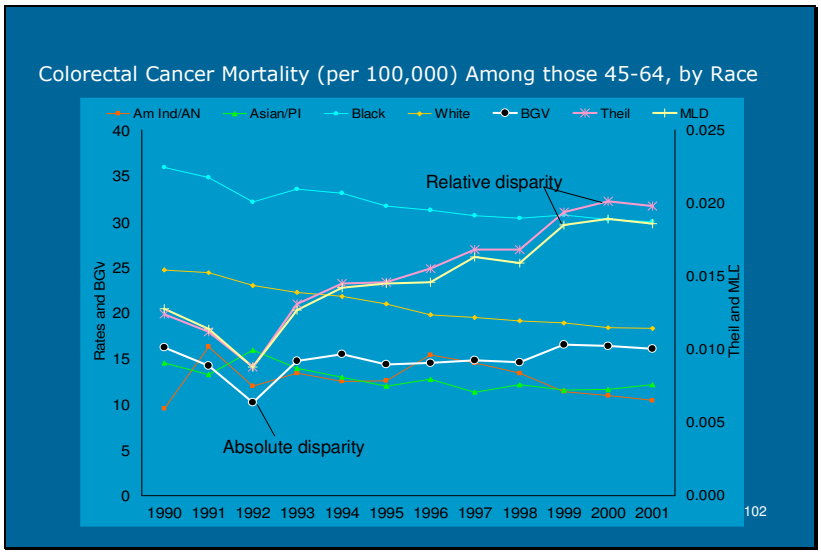
Table A2: Example of Theil Index and the Between Group Variance Applied to the Change in Racial Disparity in Colorectal Cancer Mortality (1990 and 2001)

Education	Rate per 100,000 [μ_i]	Population share [p_i]	Rate relative to Total [r_i]	T [$p_i \times r_i \times \ln(r_i)$]	MLD [$p_i \times -\ln(r_i)$]	BGV $p_i\,[(\mu_i - \sum \mu_i)^2]$
1990						
Am Ind / AN	9.5	0.006	0.375	–0.0023	0.0062	1.607
Asian / PI	14.5	0.026	0.570	–0.0084	0.0147	3.130
Black	35.9	0.100	1.412	0.0486	–0.0344	10.979
White	24.7	0.868	0.970	–0.0255	0.0263	0.502
Total	25.5			***0.0124***	***0.0128***	***16.219***
2001						
Am Ind / AN	10.4	0.009	0.541	–0.0029	0.0053	0.672
Asian / PI	12.1	0.040	0.629	–0.0116	0.0184	2.018
Black	30.0	0.109	1.559	0.0751	–0.0482	12.561
White	18.3	0.843	0.950	–0.0410	0.0431	0.776
Total	19.2			***0.0198***	***0.0186***	***16.027***

How is this disparity quantified? Can we calculate a single number to summarize this?

Here is the data we showed earlier when describing Theil's Index and the Mean Log Deviation. We have also included an absolute measure, the Between-Group Variance. We've done the calculations for these measures for 1990 and 2001. Once the calculations are completed, we plot the measures over time along with the underlying rates, just like we did previously for the Health Concentration Index of educational disparities in mammography screening.

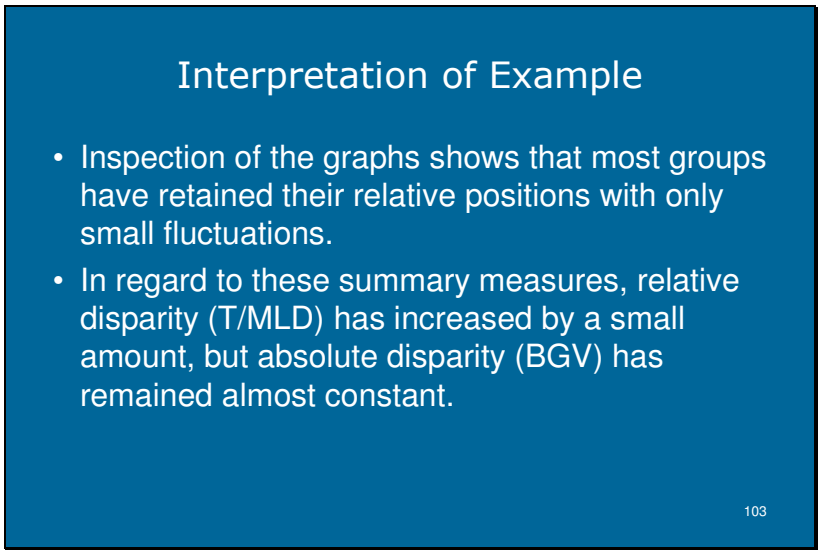
Example. Racial disparity in colorectal cancer mortality



Looking at the Between-Group Variance over time, you don't see very much change in terms of absolute disparity.

However, for both measures of relative disparity, Theil's Index and the Mean Log Deviation, there is an increase from 1992 to 2001.

Example. Racial disparity in colorectal cancer mortality

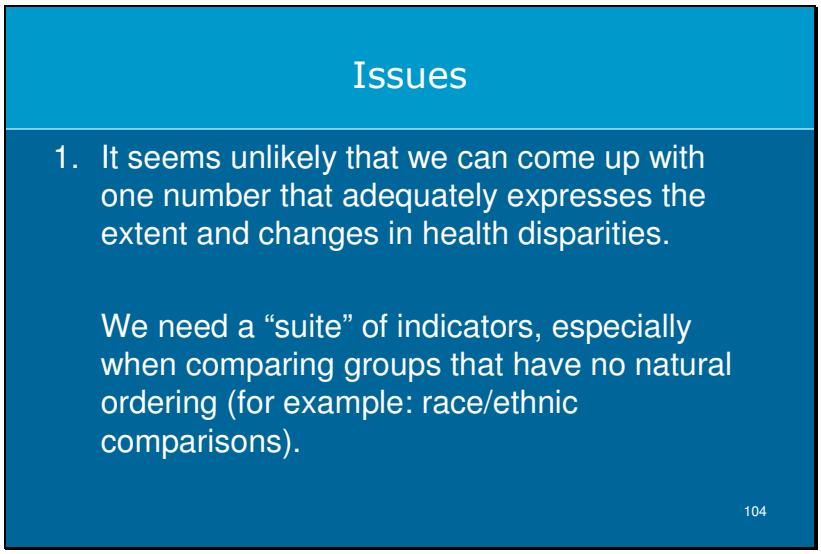


What is the interpretation of the increase in relative disparity?

Recognizing that it is somewhat difficult to interpret these changes in relative disparity because of the way the diagram is scaled, it looks like the relative disparity goes up enormously. Looking at the scale, we're talking about a change from .01 to .02. It's difficult to know how large that is in terms of a change in Theil's Index and the Mean Log Deviation. This rise in relative disparity is likely due to the rate for blacks, which is not decreasing as fast as it is in other groups. The rate for blacks is somewhat stagnated.

The interpretation of this colorectal cancer example would be that inspecting the graph shows most groups have retained their relative positions with only small fluctuations. With regard to these summary measures, relative disparity (as measured by Theil's Index or the Mean Log Deviation) has increased by a small amount, but the absolute disparity (as measured by the Between-Group Variance) has remained almost constant.

Integrating overall population health and health disparity



Please be aware that it is unlikely that we can come up with one single number that adequately expresses the extent and changes in health disparities.

In most cases we need a full "suite" of indicators, especially when comparing groups that have no natural ordering, such as race/ ethnic comparisons. Be creative in using different measures to give you different perspectives of the data.

At a minimum, you should usually take an absolute and a relative approach. In monitoring health disparities, the goal frequently is to be able to easily identify successes, failures, and trends in whatever the range of public health approaches we take. In so doing, it is important to involve an understanding of both the relative and absolute differences between groups and the overall population levels.

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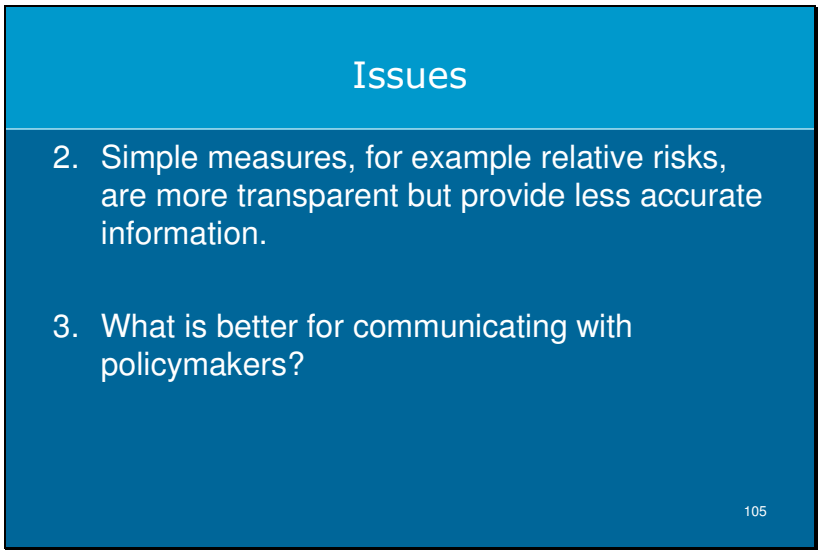
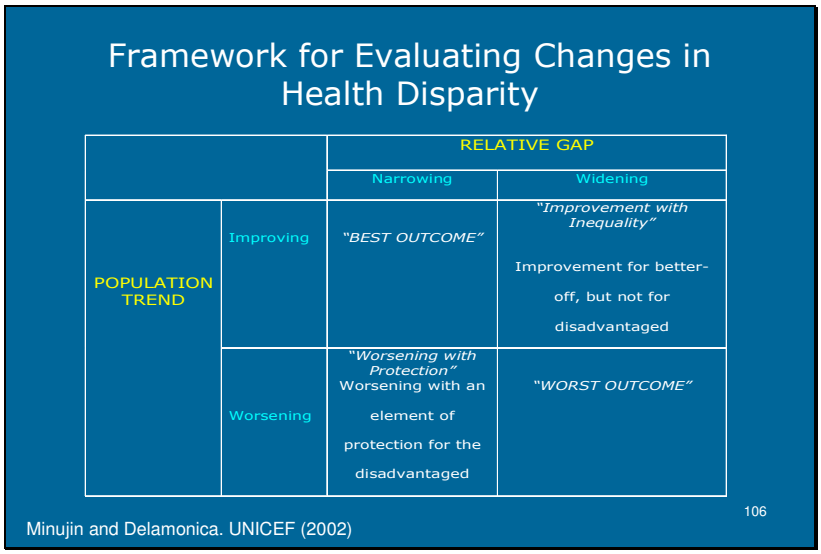
Integrating overall population health and health disparity



Simple measures, like relative risks, are much more transparent, but they can provide less accurate information. On the other hand, measures like the Health Concentration Index include more information about all socioeconomic groups and the size of them.

You should also consider which measure is easier for communicating with the public and with policymakers. We recognize that many of these less commonly used indices are not as easily understood and, in the short term, may not be as useful in facilitating communication.

Integrating overall population health and health disparity



We started with the idea that Healthy People 2010 has two goals: Improving the average level of health in the population and reducing disparity. These two aims need to be put together within a framework.

In one of the examples we used earlier that examined educational disparities in obesity, we saw that the disparity between the educational groups decreased, but they did at the expense of the entire population becoming more overweight. Clearly, that is not a desirable goal.

Here is a framework for thinking about the kinds of outcomes we would like to see in public health that relate to overall population trends, and also to gaps or disparity between groups.

The best outcome cell of the table shows that the relative gap between social groups narrows, and the overall trend in the population improves.

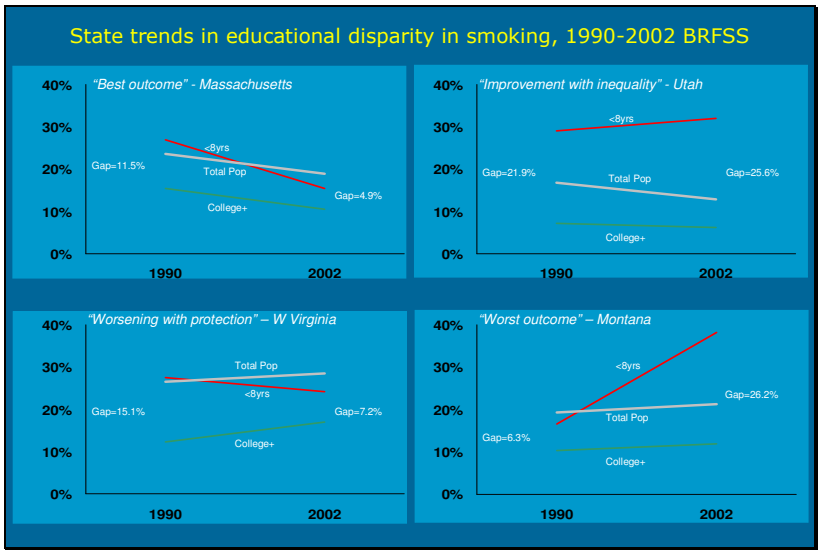
It is also possible to see a widening of the relative gap, with an improving overall population trend. You would expect this when the more advantaged groups are

improving faster than the disadvantaged groups. The relative gap would be widening, but overall the trend is improving. This situation might be expected with educational differences in smoking for instance.

In the third quadrant, there is an element of protection for the disadvantaged such that there is a worsening population trend, yet a narrowing of the relative gap. An example of this is the educational changes we saw in obesity where the overall population trend is worsening, but there is also a decrease in the relative disparity between social groups.

The worst outcome of all, of course, is that we have widening social group differences, widening of the relative gap, and a worsening population trend.

Integrating overall population health and health disparity



We will now show graphical examples of the four kinds of outcomes described by the framework for evaluating changes in health disparity. We will look at different states in the U.S. in terms of educational disparity in smoking from 1990 to 2002.

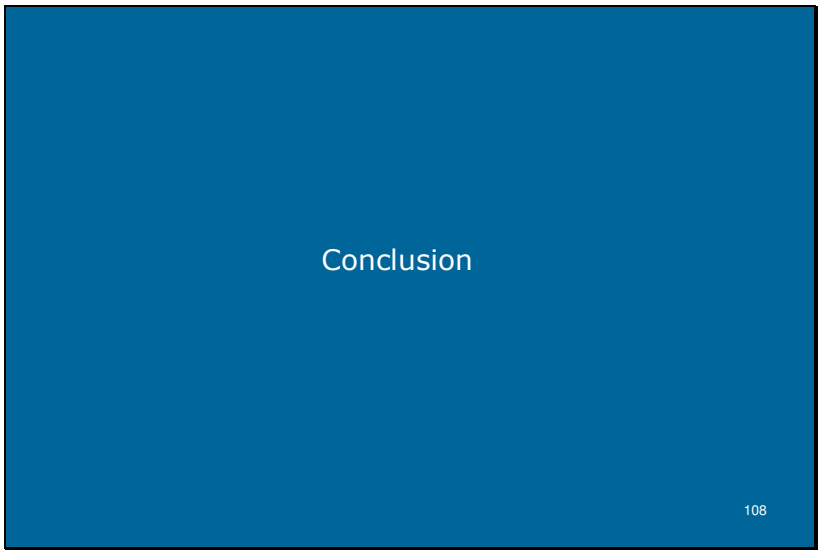
From a population health perspective, the optimal, or best, outcome occurs in a state like Massachusetts. The absolute educational gap in smoking from 1990 to 2002 got smaller, as shown by the red and green lines. The gap in smoking between the least and most educated was 11.5%, and decreased to less than 5% in 2002. Additionally, in the population overall, the rate of smoking is going down. That is the kind of picture we would like to see to be able to say we're achieving both Healthy People 2010 goals.

In Utah, we see "improvement with inequality." Here, the disparity widened, but the overall population rate went down. That probably reflects the small number of people in the least- educated group and its change over time. Nevertheless, there is something about being in the least-educated group in Utah that has worsened its relative position in terms of smoking during the period from 1990 to 2002.

In West Virginia, we actually see “worsening with protection.” There is a decline in the relative gap because of an *increase* in smoking among the college-educated, but a *decline* among the least educated. This may be explained by the changing population distributions within educational groups over time. Also, we see an actual increase in smoking prevalence in the population as a whole.

In Montana, we see the worst outcome. In this situation the population smoking rate is going up and it is going up severely among the least-educated. The overall population health trend is poor and the situation among the least advantaged group is worsening over time.

Conclusion



This concludes “Measuring Health Disparities.” We have examined the language of health disparity in an attempt to come to a common understanding of what the term means. We have also shown how to calculate different measures of health disparity and have highlighted how different measures implicitly reflect different perspectives on what it is about health disparity that is important to measure. We hope that this material provides a durable tool that will be useful to you in your daily activities.

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