

# Statistical Literacy at Augsburg

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## What is it?

### MILO SCHIELD

Augsburg College Department of Business Administration

*Director, W. M. Keck Statistical Literacy Project*

*March 31, 2003*

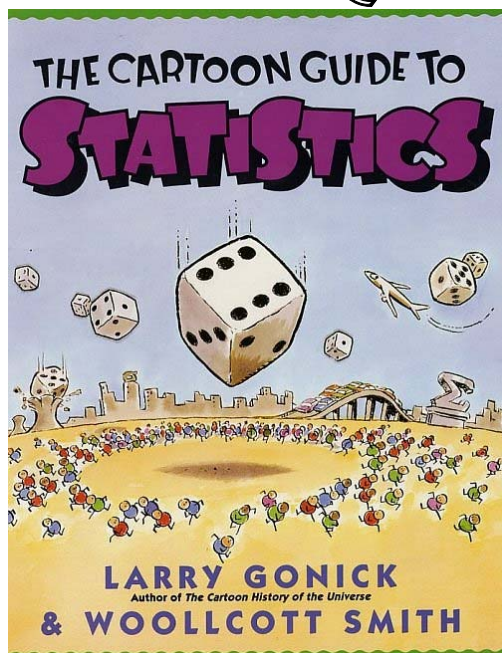
# Statistical LITERACY

## studies inductive arguments

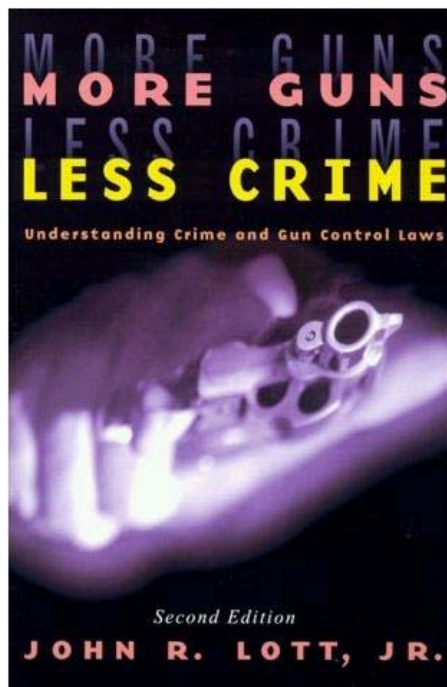
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### Stat Lit

ASA QL

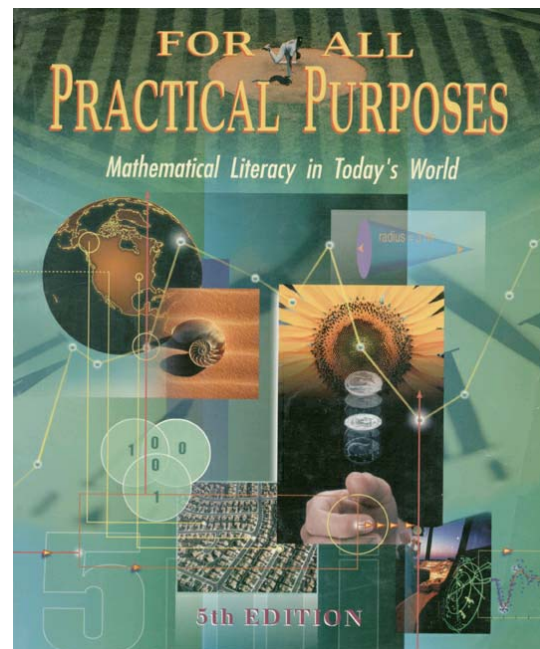


Deductive



Inductive

MAA QL

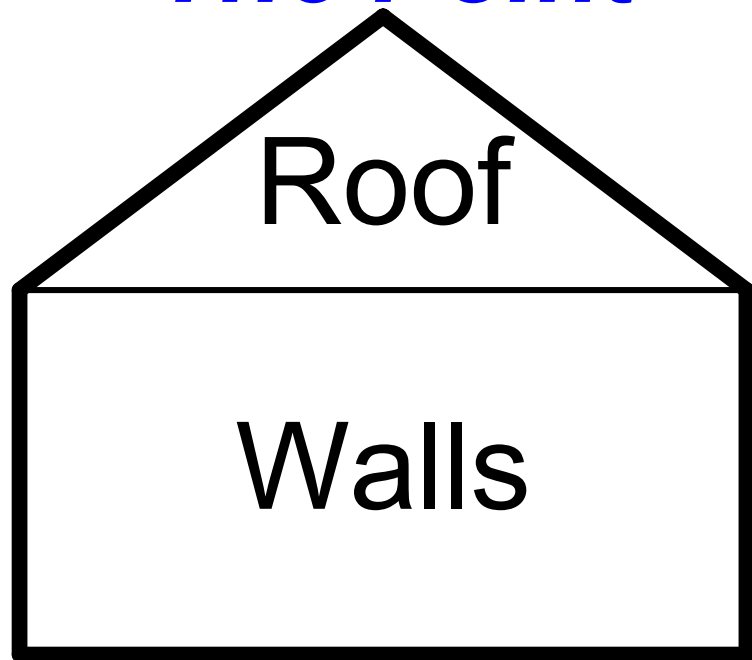


Deductive

# 1. Studies Arguments using Statistics as Evidence

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*The Point*



Foundation

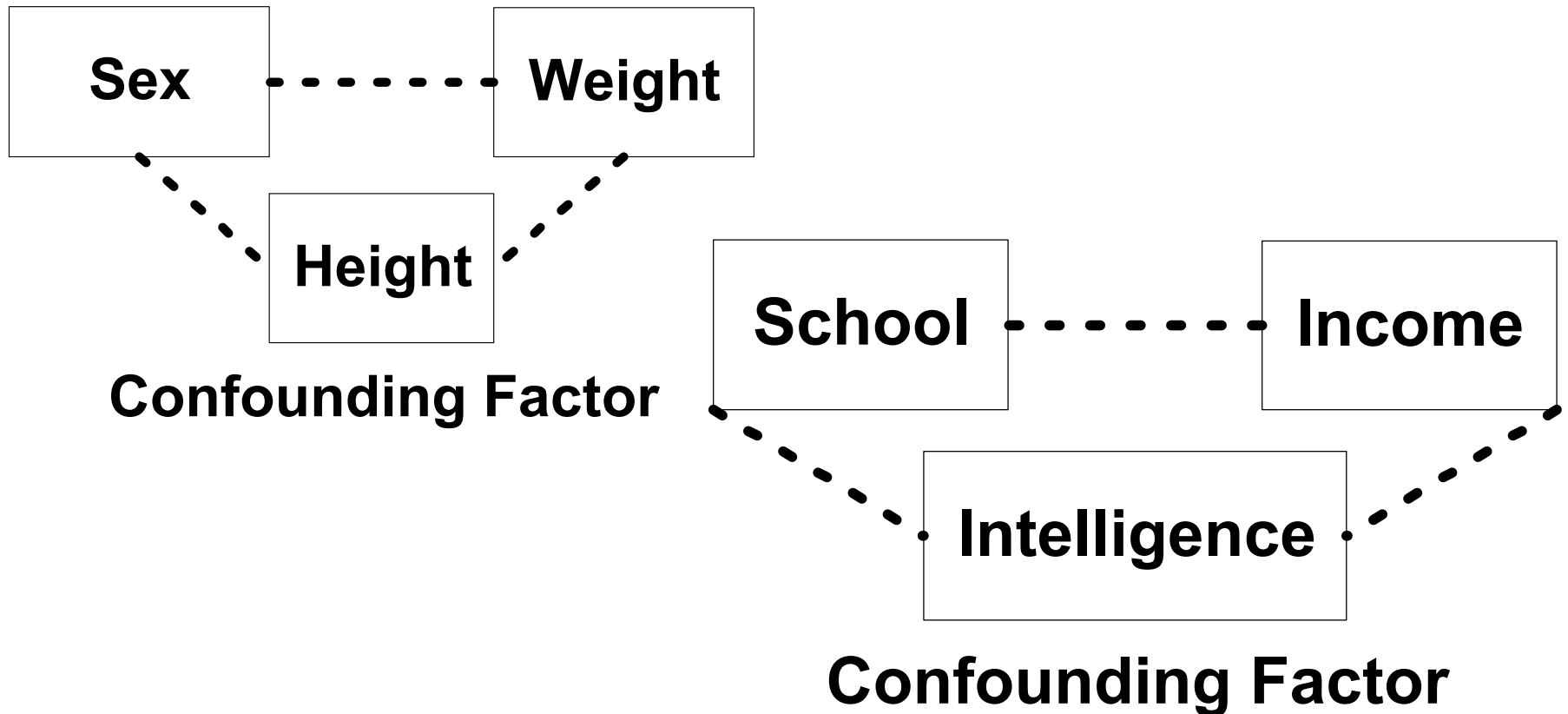
*Strength of Statistic  
in supporting the Point  
assuming statistic is true*

*Truth of the statistic*

## 2. Focuses on Statistics from Observational Studies

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In observational studies, associations can be *confounded (tangled up)*.



## 3. Reading Tables Describing Ratios

Per ratios (rates and percentages) standardize counts.

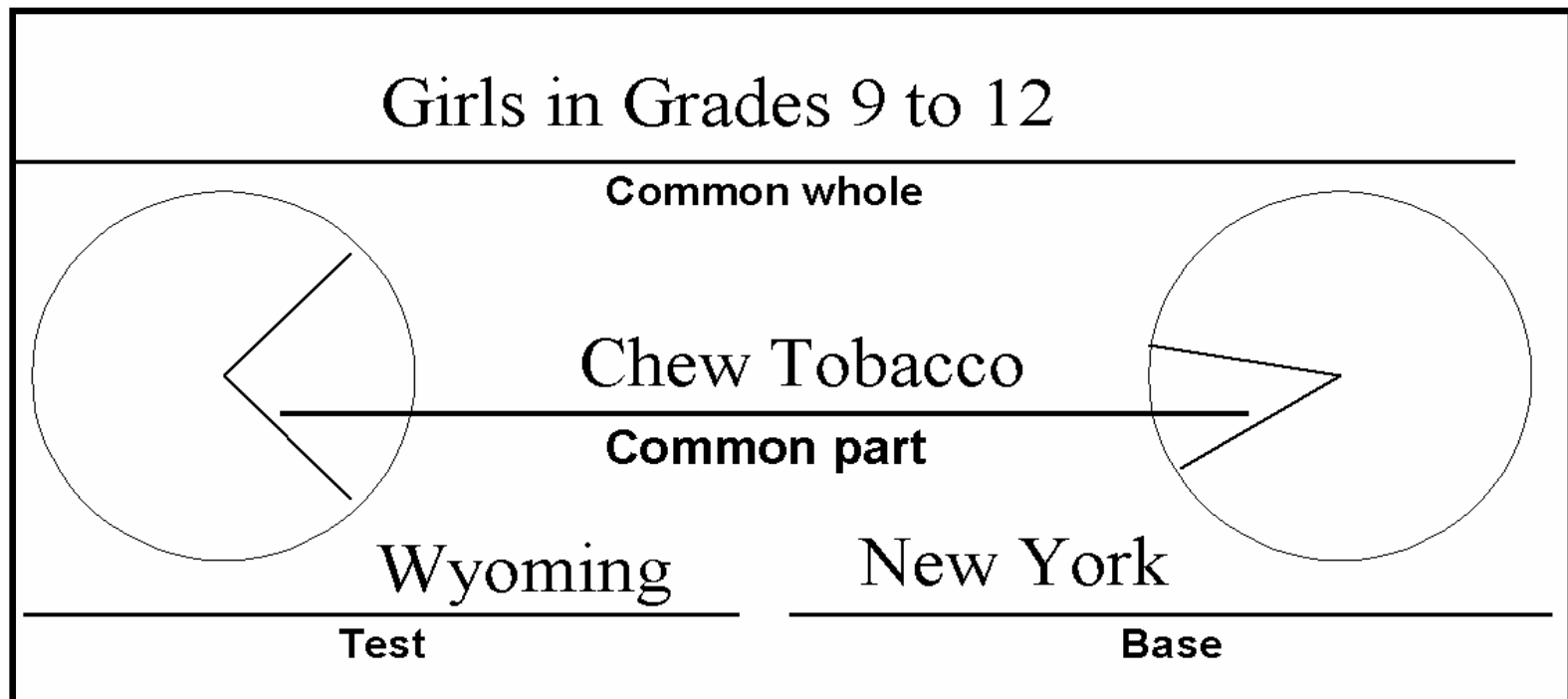
<b>Percentage of infants with low birth weights</b>				
<b>MOTHERS</b>	<b>All</b>	<b>&lt; 15</b>	<b>15-17</b>	<b>18-19</b>
<b>All</b>	7.6	14.2	10.6	9.1
<b>Smoker</b>	12.2	15.2	12.0	10.9
<b>Nonsmoker</b>	6.8	14.1	10.3	8.7

Among moms who smoke and have low birth-weight babies,  
10.9% are ages 18-19.

Among moms who smoke and are ages 18-19,  
10.9% of their babies are low birth-weight.

## 4. Comparing Ratios

Girls grades 9-12 in Wyoming are 10 times as likely to chew tobacco as those in New York.



**Comparisons of ratios standardize two ways**

# 5a. Interpreting Ratios

## Choice of Base

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Deaths due to birth defects can be

- *decreasing* (per 1,000 births) AND
- *increasing* (per 1,000 infant deaths)

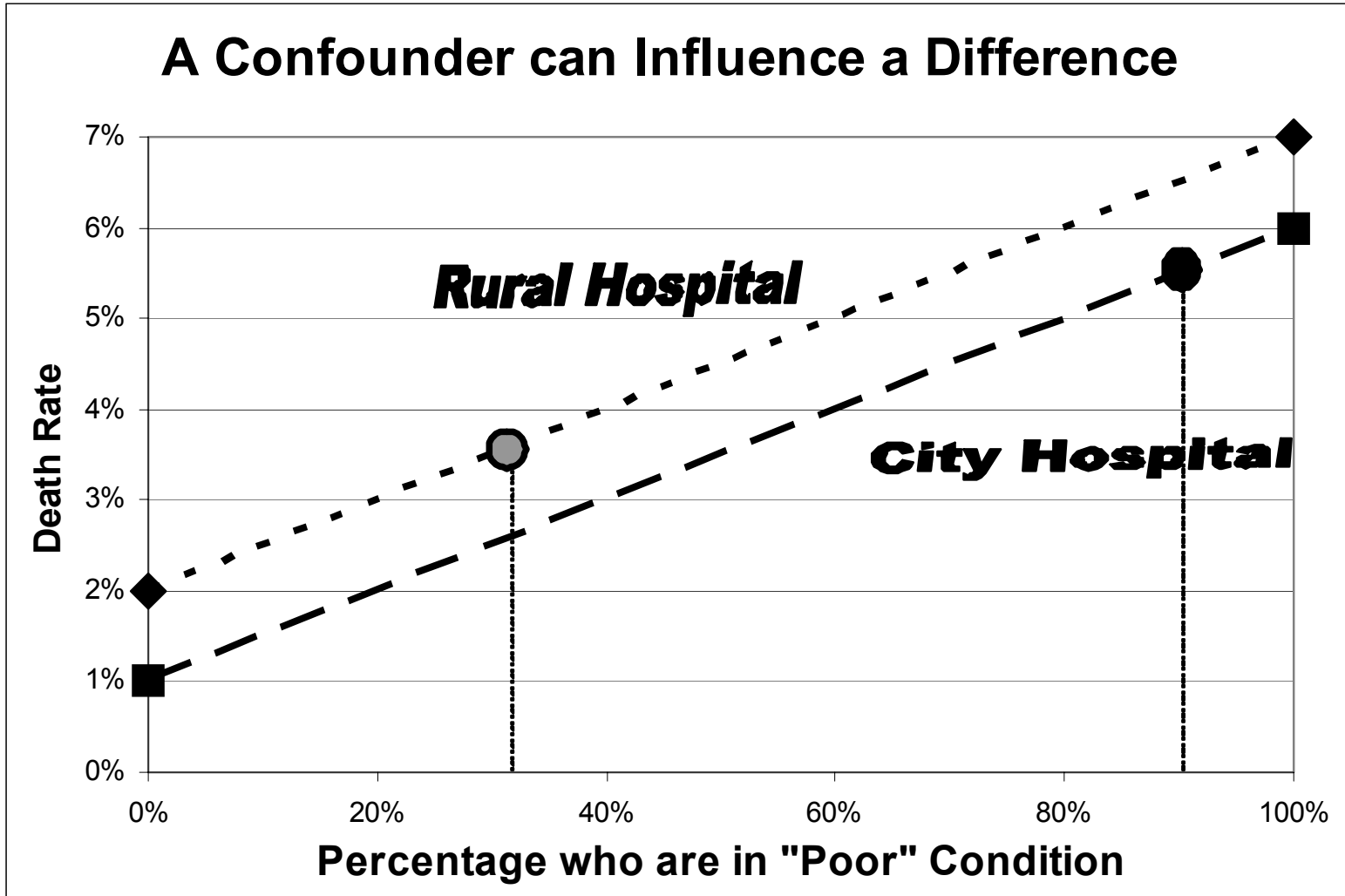
Air accidents can be

- *decreasing* (per million passenger miles) AND
- *increasing* (per million flights)

For a rare disease, a medical test can be

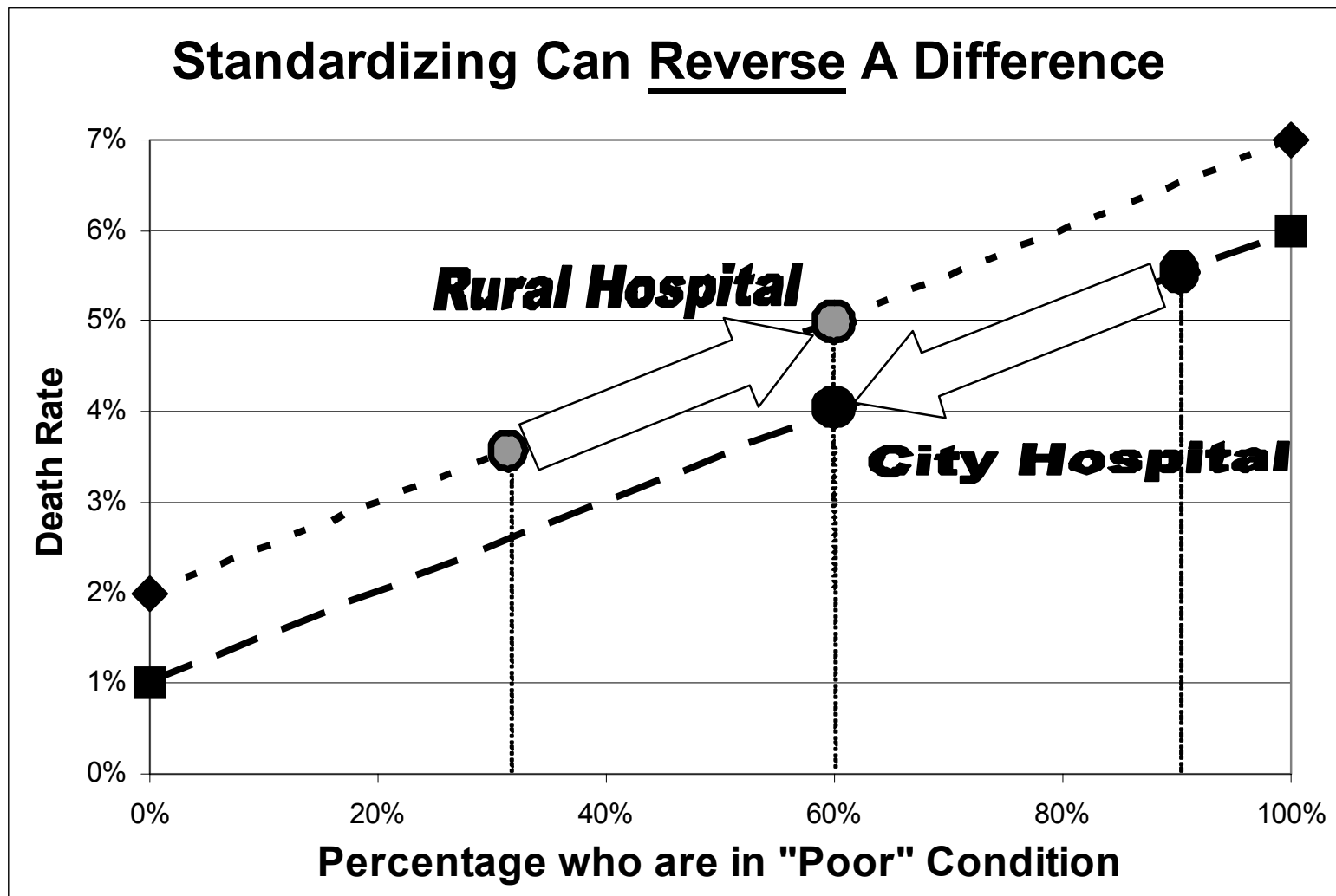
- *good at confirming* ( $> 90\%$  accurate) AND
- *bad at predicting* ( $< 10\%$  accurate).

# 5b. Interpreting Ratios Confounders

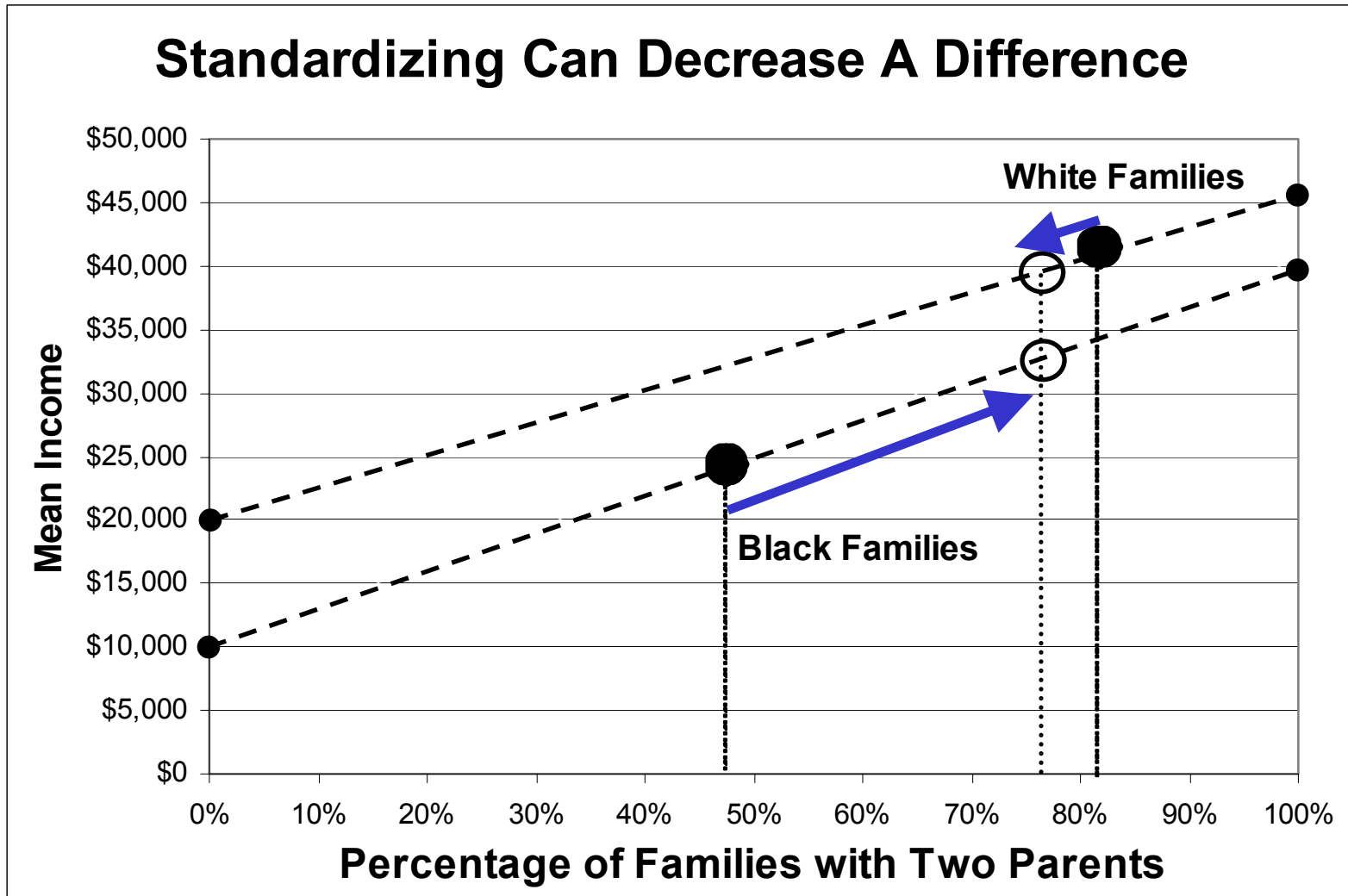




# 5c. Interpreting Ratios Standardizing



# 6. Interpreting Measures Standardizing



# Statistical LITERACY

## Focuses on Social Arguments

Florence Nightingale

*“Seven times as many  
died after the battle  
as died in the battle.”*

**Nurses save lives;  
We need more nurses!**





# Statistical LITERACY

## Adds Perceived Value

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Percentage of 48 Statistical Literacy students\*  
**who strongly agree that this course**

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- helped my critical thinking skills..... **48%**
- is relevant to my major or work..... **42%**
- is relevant to my personal or civic life.. **33%**
- should be *required* for graduation..... **23%**

\* Preliminary results: 48 students 2001T4 & 2002T1 all taught by Schield