C1

Augsburg Goal

Statistical Literacy

Develop Textbook

5/04/2001

To generate
Statistical Literacy
Teaching Materials
that are Useful and Usable

Augsburg Proposal

C4

Books Related to Statistical Literacy

Statistical Literacy

Develop Textbook

5/04/2001

Critical Thinking   Epidemiology

Applied Statistics

C2

Develop Textbook for Statistical Literacy

Statistical Literacy

Develop Textbook

5/04/2001

Incorporate feedback on ...

* **TOPICS from advisors**
* **USABILITY from teachers**
* **USEFULNESS from students**

Include examples of real data that

* **support arguments for observational causality**
* **involve current social and political disputes.**

C5

Topics Unique to Statistical Literacy #1

Statistical Literacy

Develop Textbook

5/04/2001

1. **Reading tables and graphs:**
   Describing rates and percentages
   Comparing rates and percentages
   Making ratio comparisons using "likely"

2. **Using inappropriate ratios:**
   Inadvertently reversing whole and part
   Using less relevant whole
       Medical tests
       Prediction vs. explanation.

C3

Books Requiring Statistical Literacy

Statistical Literacy

Develop Textbook

5/04/2001

C6

Likely Comparisons

Statistical Literacy

Develop Textbook

5/04/2001

Men are twice as likely to smoke as women
Men are twice as likely to smoke as drink

Unpacked:

Men are twice as likely to smoke as women **are**
Men are twice as likely to smoke as **to** drink

Moral: Small changes in syntax can cause big
   differences in semantics

C7

5/04/2001

Statistical Literacy

MISSING WHOLE: TESTS

Develop Textbook

1 chance in a million of error ➔ ➔ GUILTY

	GUILTY		
	No	Yes	Total
Positive	9	1	10
Negative	8,999,991		8,999,991
Total	9 Million	1	9,000,001

1 chance in 10 of Guilty ➔ ➔ Not GUILTY

C10

5/04/2001

Statistical Literacy

Topics Unique to Statistical Literacy #3

Develop Textbook

5. **Reading and interpreting graphs**
   Cross-sectional vs. longitudinal
   Advantages/disadvantages of each
   Support for causation

6. **Forming Useful Comparisons**
   Comparison > single count
   Ratio comparison > Count Comparison
   Relevant ratio comparison trumps all.

C8

5/04/2001

Statistical Literacy

PREDICTION VERSUS EXPLANATION

Develop Textbook

Explanation
- 90% of heroin users first used marijuana
- 99% of heroin users first used milk

Prediction
- 5% of milk drinkers ever use heroin
- 20% of marijuana users ever use heroin

Students need to know the difference

C11

5/04/2001

Statistical Literacy

Important Topics in Statistical Literacy

Develop Textbook

Attributable to; attributed to:
Percentage in excess of base rate. Used in estimating deaths from probabilistic causes.

Epidemiological Threshold: If the relative risk is more than 2, then an association is more likely to be real than spurious.

Ecological Correlation: Relation between properties of groups mirrors relation between same properties of individuals in those groups.

C9

5/04/2001

Statistical Literacy

Topics Unique to Statistical Literacy #2

Develop Textbook

3. **Dealing with confounding:**
   Know and use Cornfield's Conditions: the necessary conditions for a Simpson's Paradox reversal of an association

4. **Distinguishing association and causation:**
   followed by, explained by
   led to, contributed to,
   attributed to, attributable to

C12

5/04/2001

Statistical Literacy

Statistical Causality

Develop Textbook

"Each year up to 21,000 kids develop asthma *from* second hand smoke"