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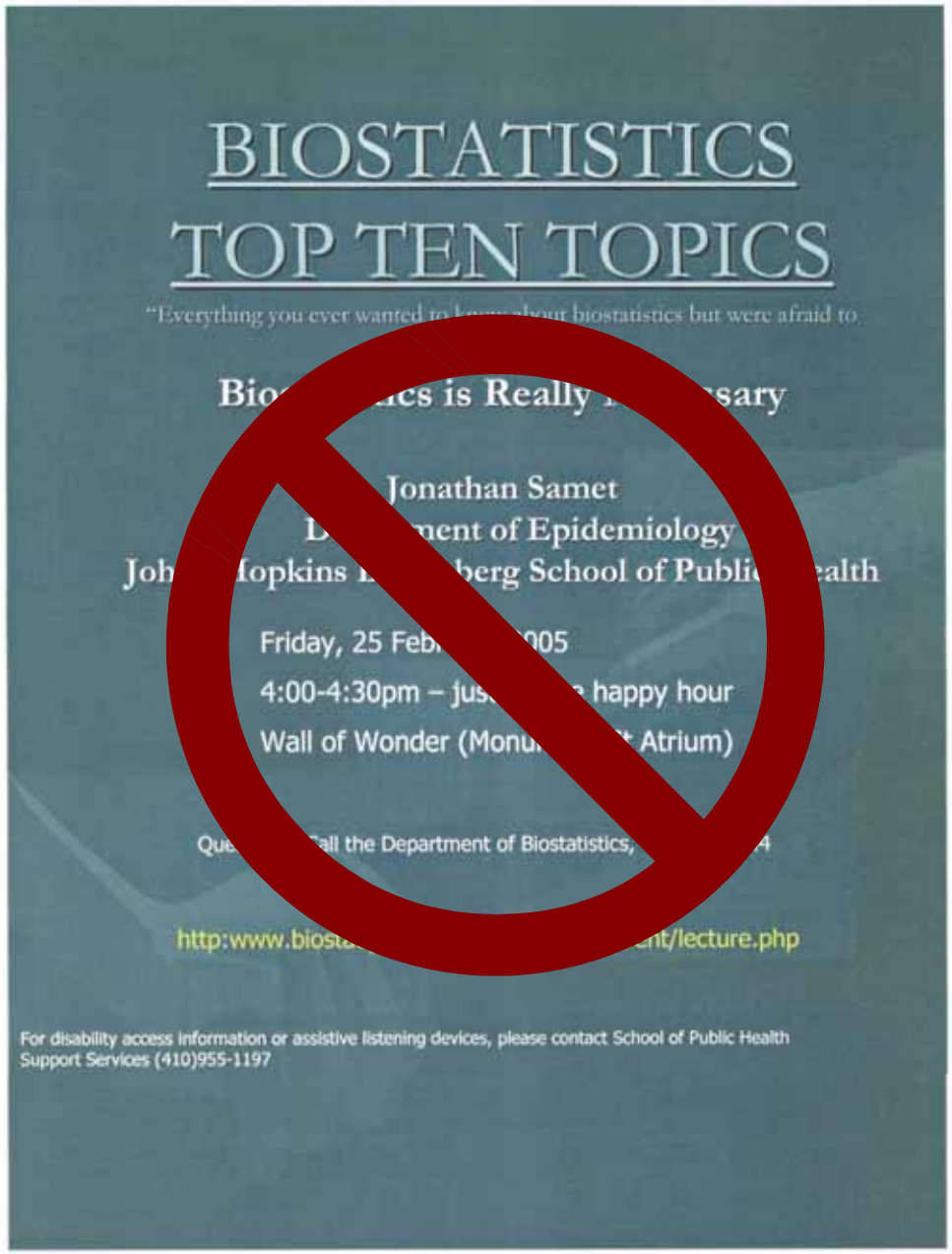
Protecting Health, Saving Lives—*Millions at a Time*


BIOSTATISTICS
TOP TEN TOPICS
"Everything you ever wanted to
about biostatistics but were afraid to
Bio ics is Really sary
Jonathan Samet
ment of Epidemiology
Joh lopkins berg School of Publi ealth
Friday, 25 Feb 005
4:00-4:30pm – jus happy hour
Wall of Wonder (Monu t Atrium)
Que all the Department of Biostatistics,
http:www.biosta nt/lecture.php
For disability access information or assistive listening devices, please contact School of Public Health
Support Services (410)955-1197

Department of Epidemiology

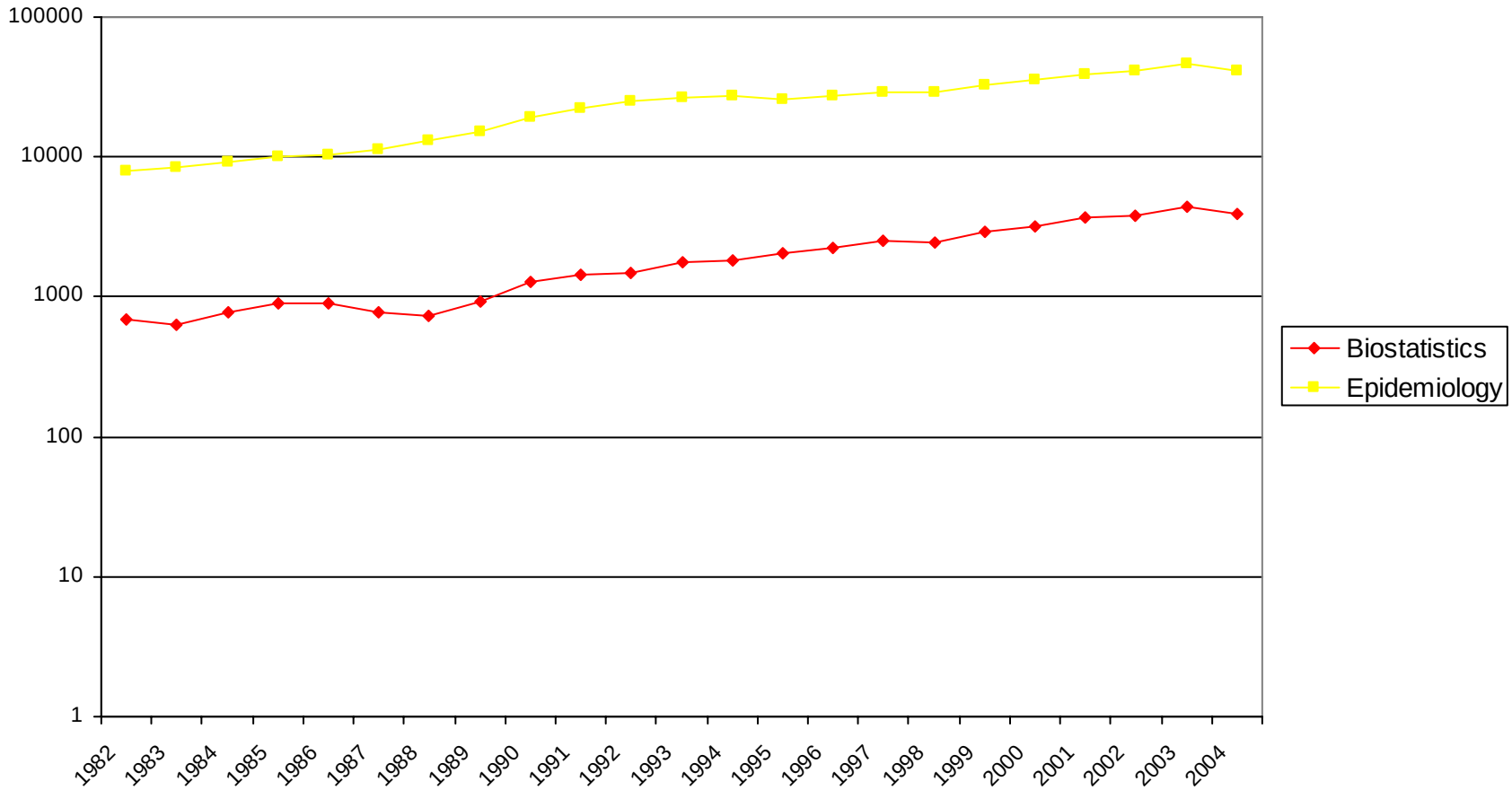
Is Biostatistics Necessary?
A Non-Systematic Review of the Evidence

Jonathan M. Samet, MD, MS

Pre-test
Is Biostatistics Necessary?

“Some of my best friends are …”

PubMed "Hits" on Biostatistics[1] and Epidemiology, 1982[2] - 2004



Drs. Zaner and Zeger

1. Why biostatistics is irrelevant
2. A cause is a cause
3. Ocular data analysis
4. Finding haystacks not needles
5. The seven deadly sins of biostatistics
6. When is biostatistics unavoidable?
7. Tips on the care and feeding of biostatisticians.

Why Biostatistics Is Irrelevant

Advice From the Data Guru

Al Sommer on Data

Sommer on Data

Sommer on Data

Mislead By the Model

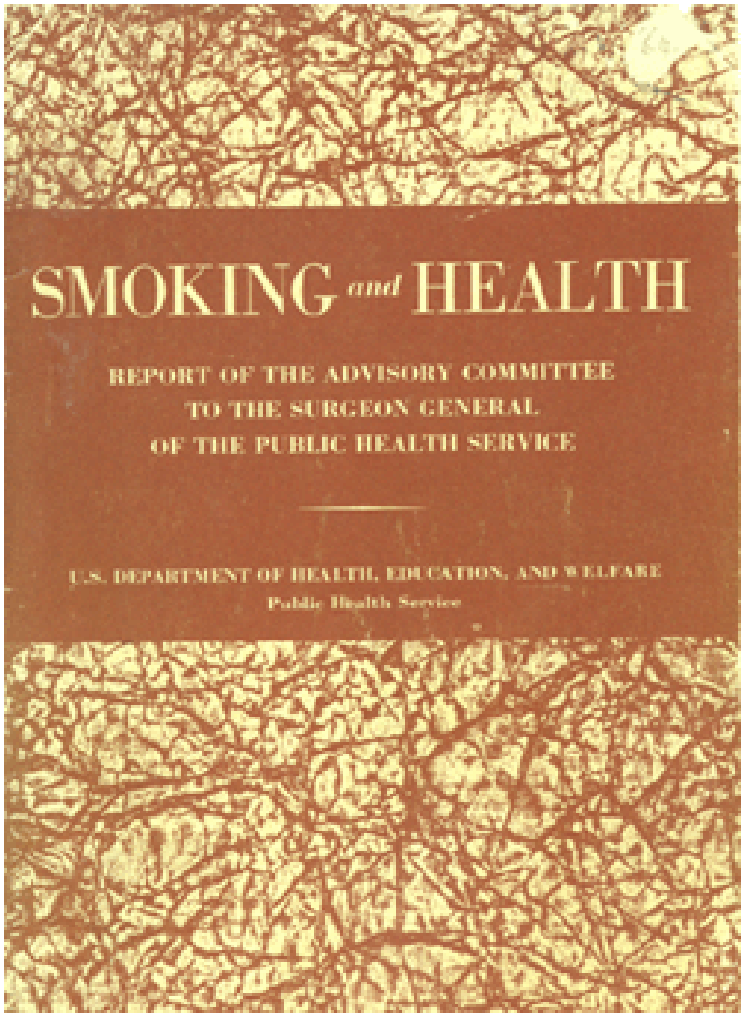
Independent Predictors of Mortality

Predictor	HR (95% CI)*	pValue†
Age	1.04 (1.02-1.06	0.001
Gender (female vs. male)	0.86 (0.42-1.79)	0.69
SAPS II score	1.04 (1.02-1.06)	0.0001
Admitting diagnosis (medical vs. surgical)	3.61 (1.53-8.5)	0.003
Nutritional status (class I/II vs. class III/IV)	1.37 (0.4-4.66)	0.62
Enteral nutrition	0.44 (0.24-0.8)	0.007
Postimplementation group vs. preimplementation group	1.01 (0.56-1.82)	0.98

*HR > 1 indicates a greater "hazard" of death.
†Cox proportional hazards analysis (n=199).

A Cause Is A Cause

A Cause is a Cause

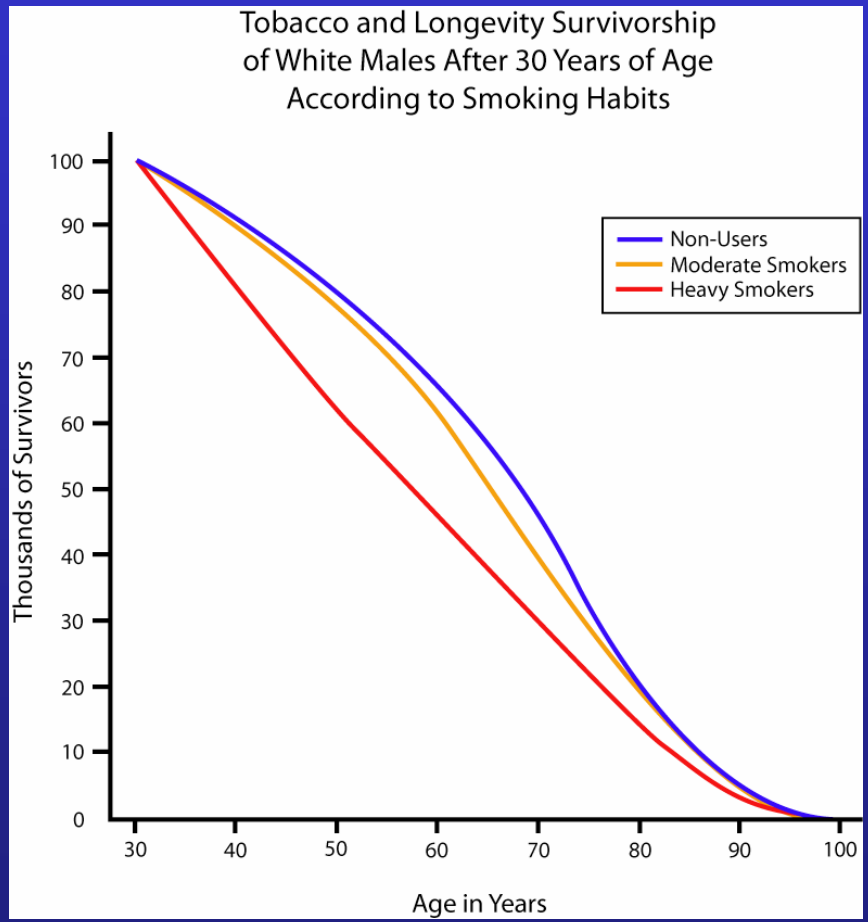


The 1964 Surgeon General's Report

Ocular Data Analysis

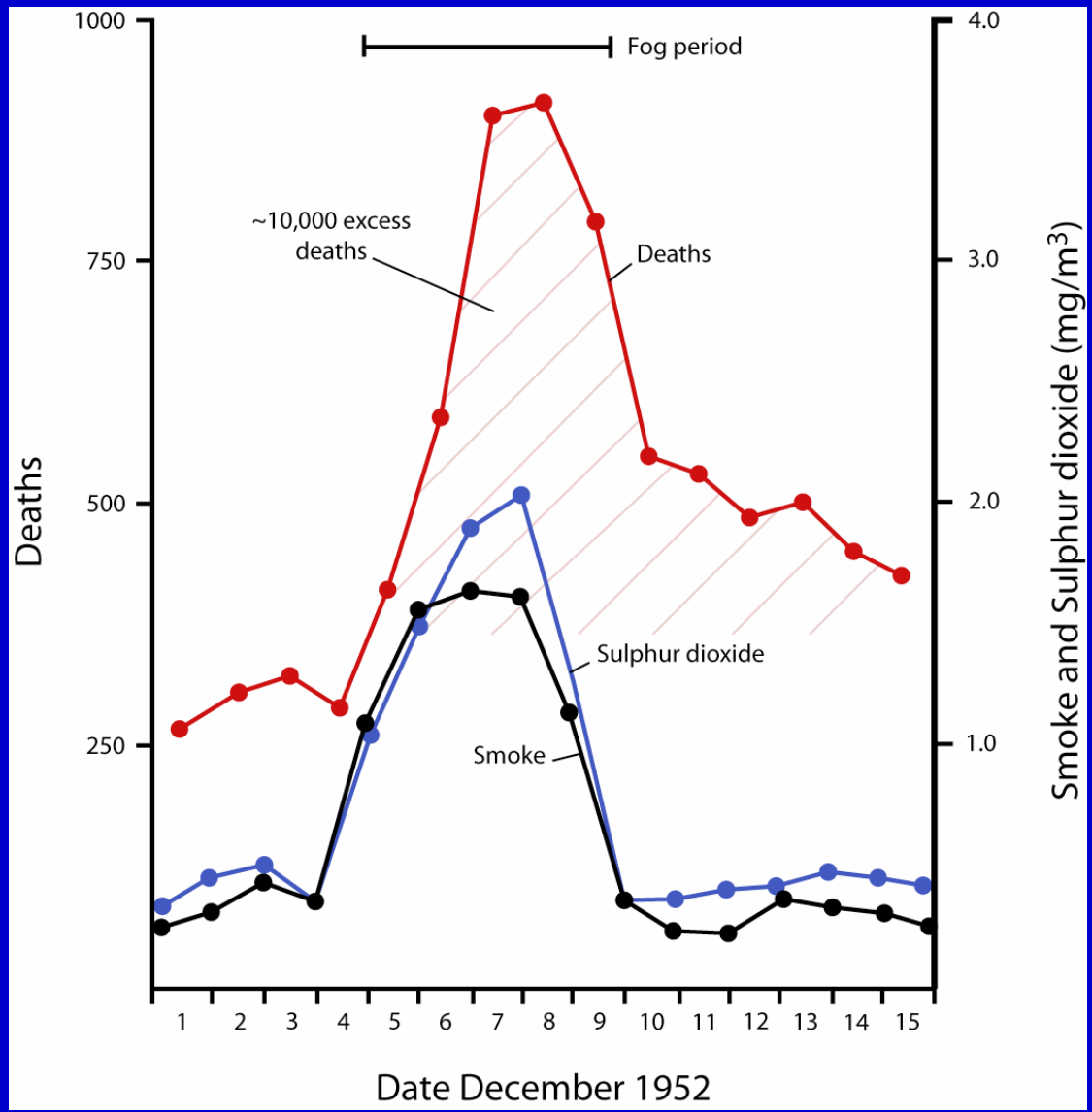
Raymond Pearl, 1938: Smoking Shortens Lifespan

Raymond Pearl, 1879-1940



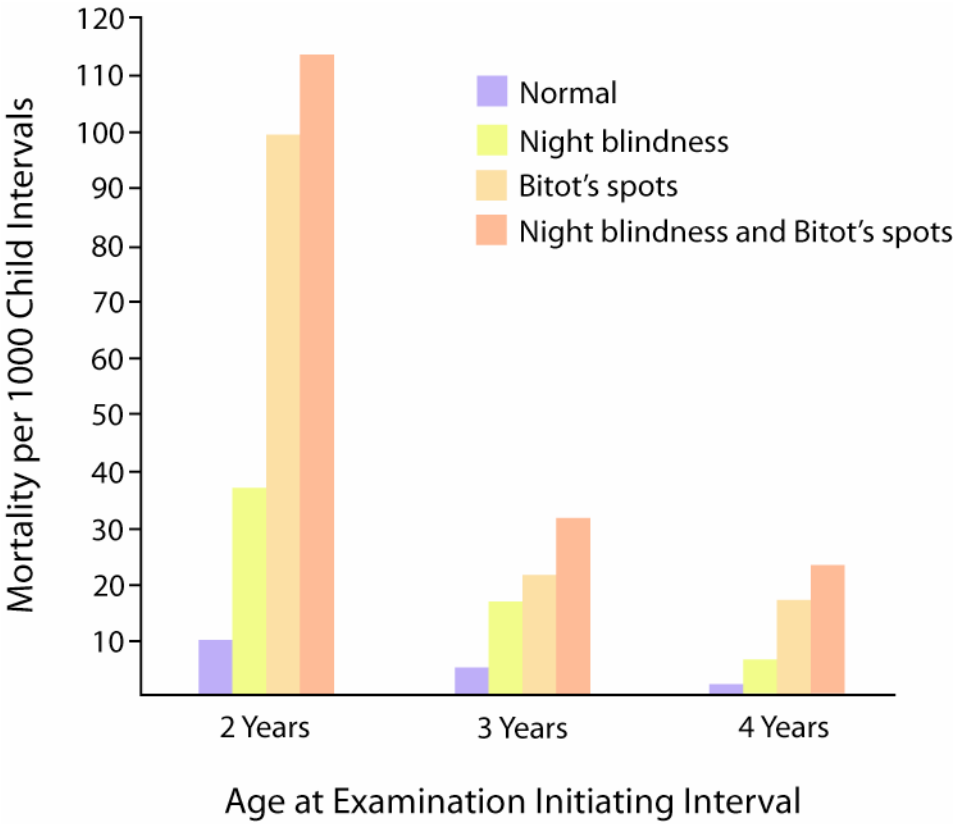
Source: Adapted by CTLT from Pearl, Science 1938

1952 London Fog

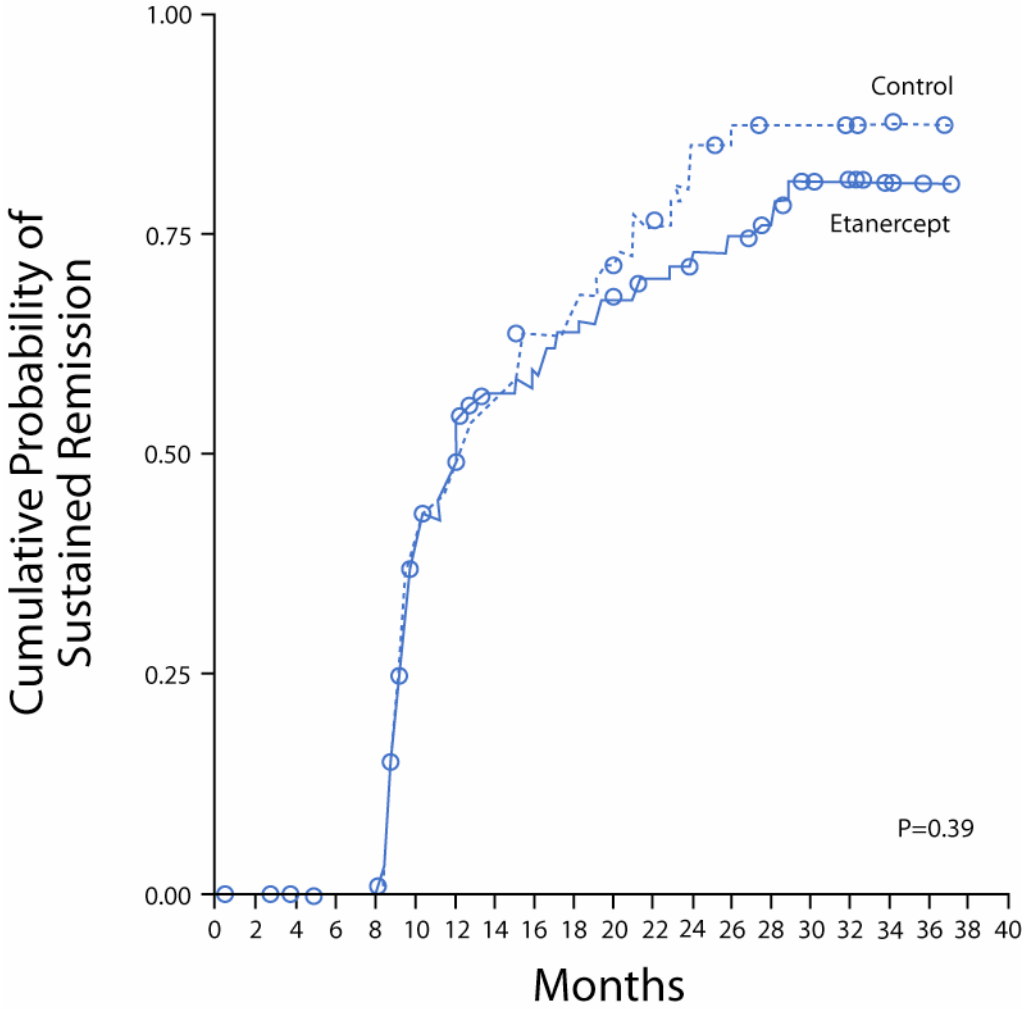


This is a graph shown in several documents published shortly after the episode. Showing the high levels of pollution and the similar patterns in daily mortality.

Adapted by CTLT

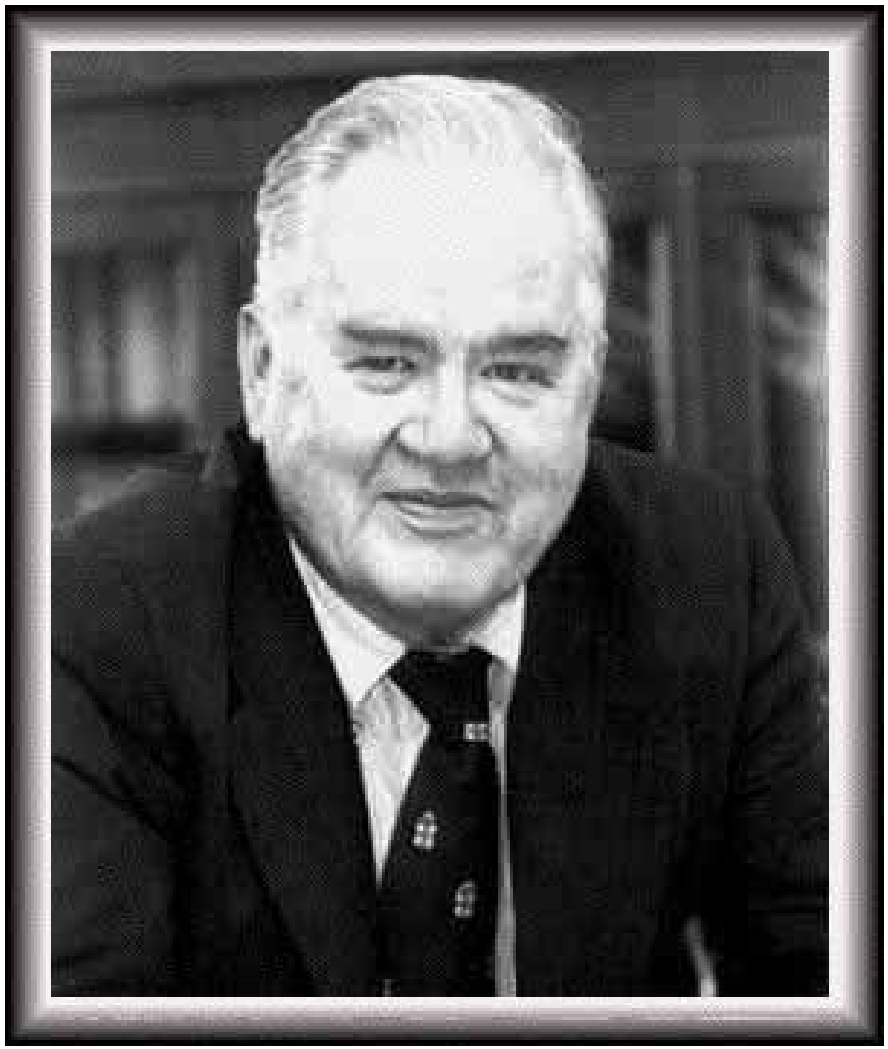


Mortality among subjects who were free of respiratory disease and were 2 through 4 years of age at examination initiating each of the six study intervals.



Kaplan-Meier Estimates of the Time to Sustained Remission.
Sustained remission was defined as a BVAS/WG of 0 for a minimum of six months. The P value was determined by means of the log-rank test.
Circles indicate censored observations.

John Wilder Tukey
16 June 1915 - 26 July 2000



John W. Tukey on His Book, Exploratory Data Analysis

CAN DO

WELL

DONE

Discussion of “Role of Statistics in National Health Policy Decisions”

Finding Haystacks Not Needles

Small Sample Gems

Adenocarcinoma of the Vagina: Association of Maternal Stilbestrol Therapy with Tumor Appearance in Young Women

Most significantly, seven of the eight mothers of patients with carcinoma had been treated with diethylstilbestrol started during the first trimester. None in the control group were so treated (p less than 0.00001).

Uranium Mining and Navajo Men

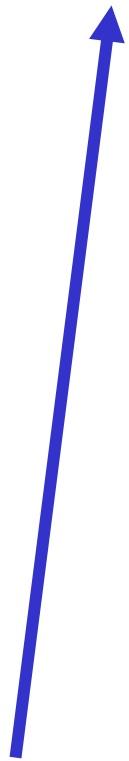
Finding Haystacks not Needles

The Seven Deadly Biostatisticians

The Seven Deadly Sins of Biostatistics

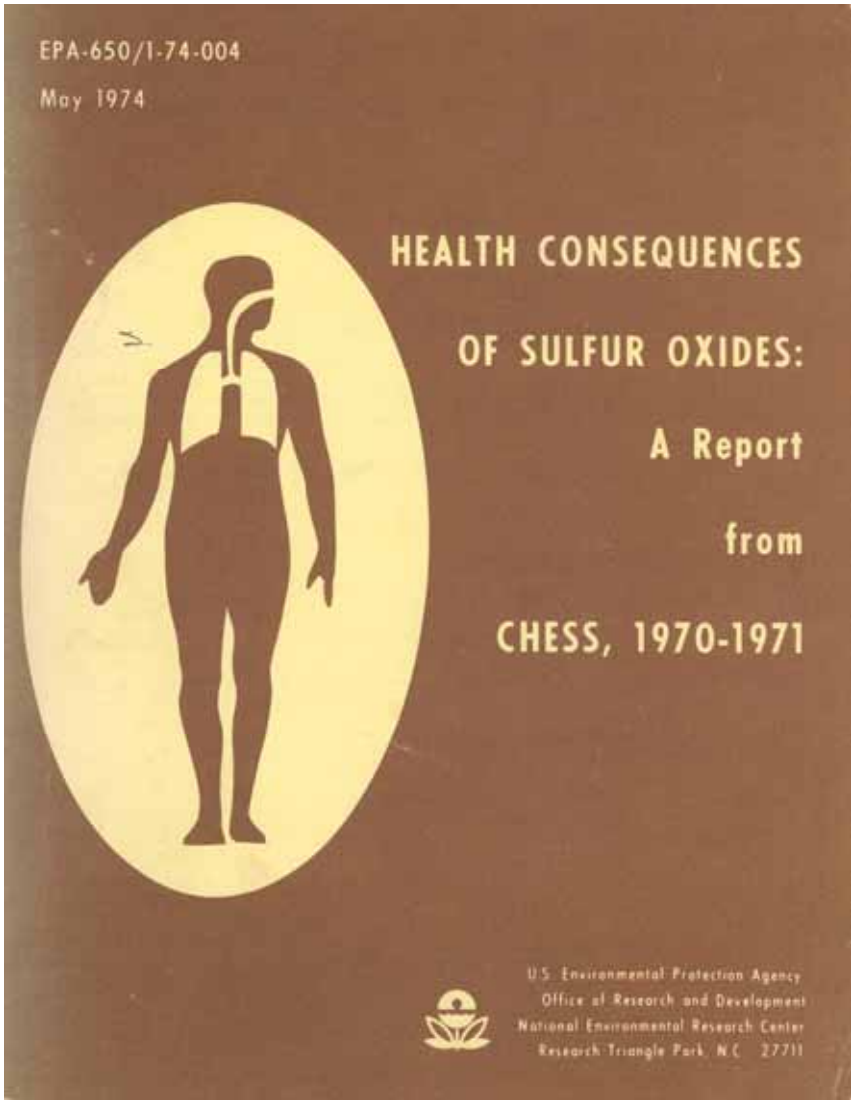
P-Valuing: A Recent Example

Relative Risk of breast cancer according to quintile of adolescent caloric and fat intake in women in the NHS II



Intimidating by Sophistication

Model As Message:
Analysis to Meet the Policy Need



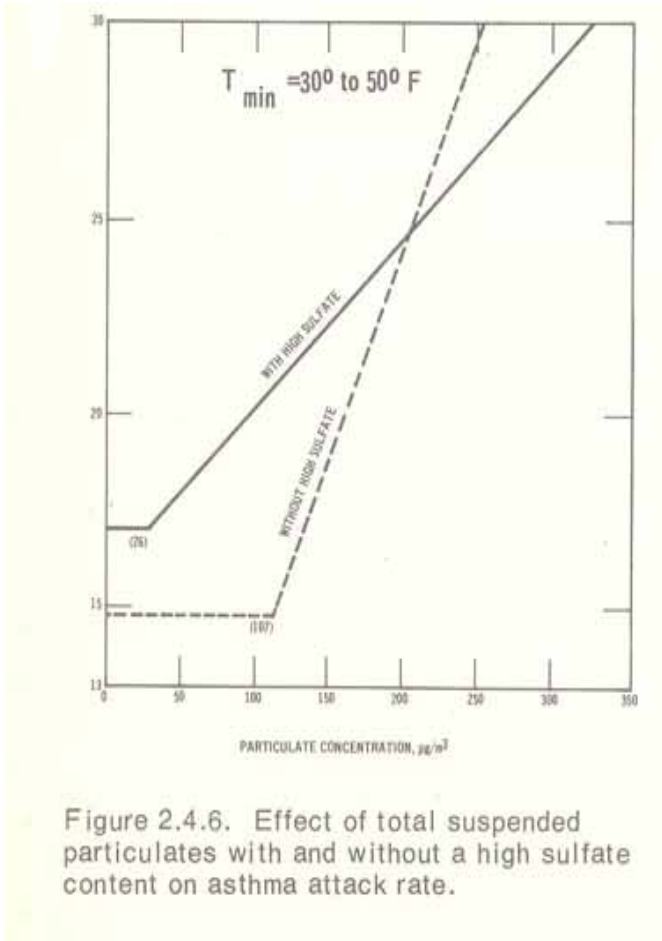
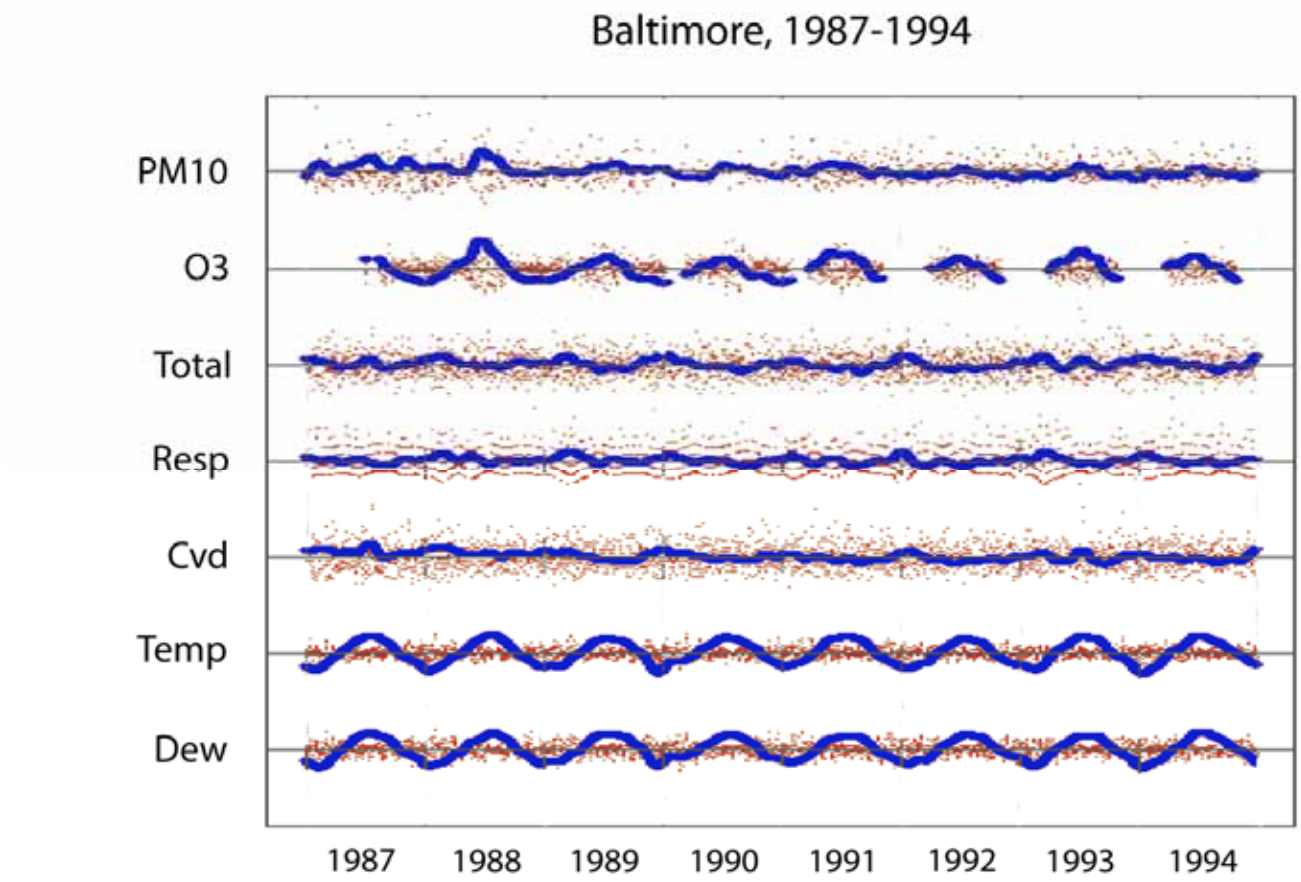


Figure 2.4.6. Effect of total suspended particulates with and without a high sulfate content on asthma attack rate.

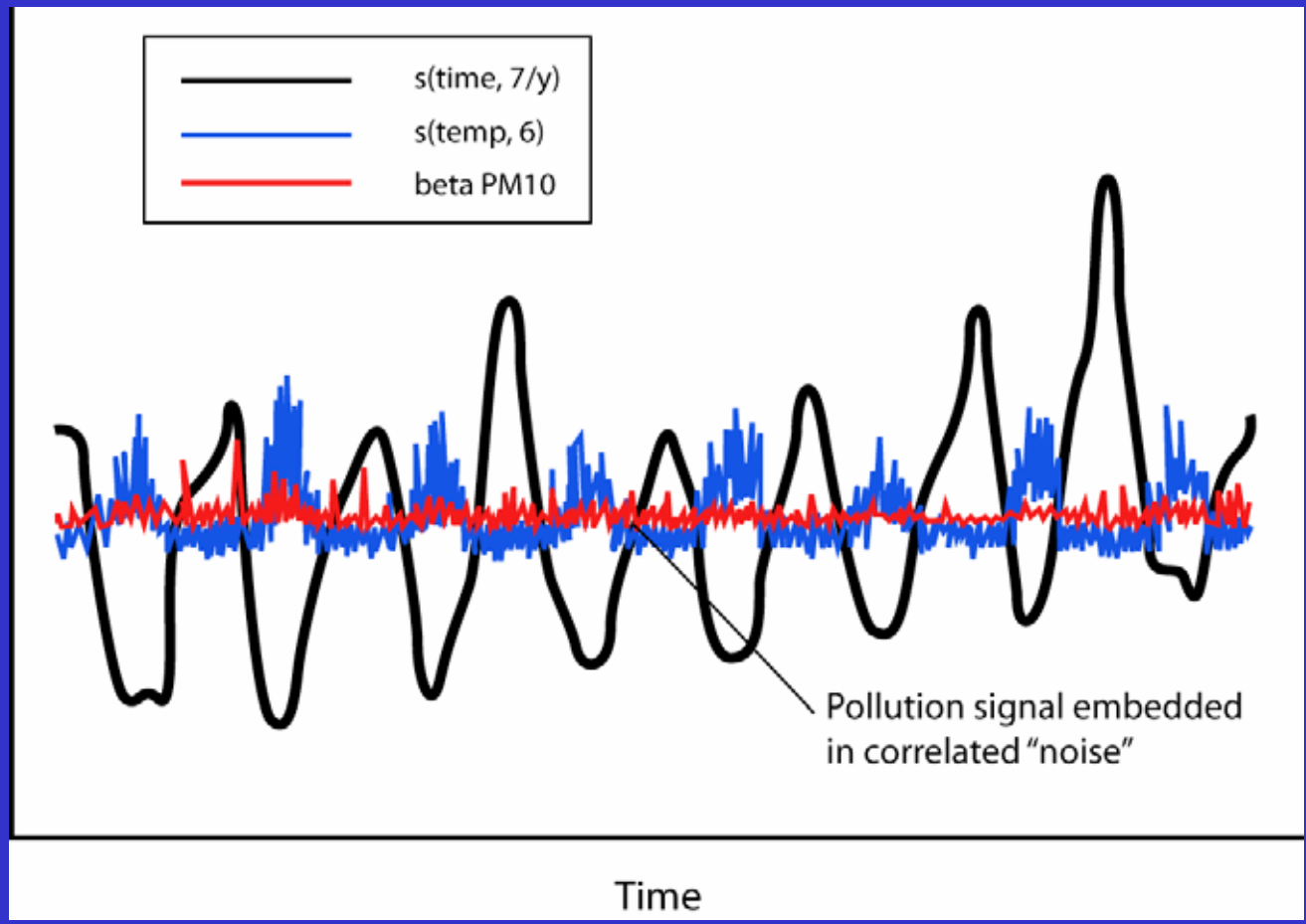
Finding Needles Not Haystacks

Daily time series of air pollution mortality and weather in Baltimore 1987-1994



Adapted by CTLT

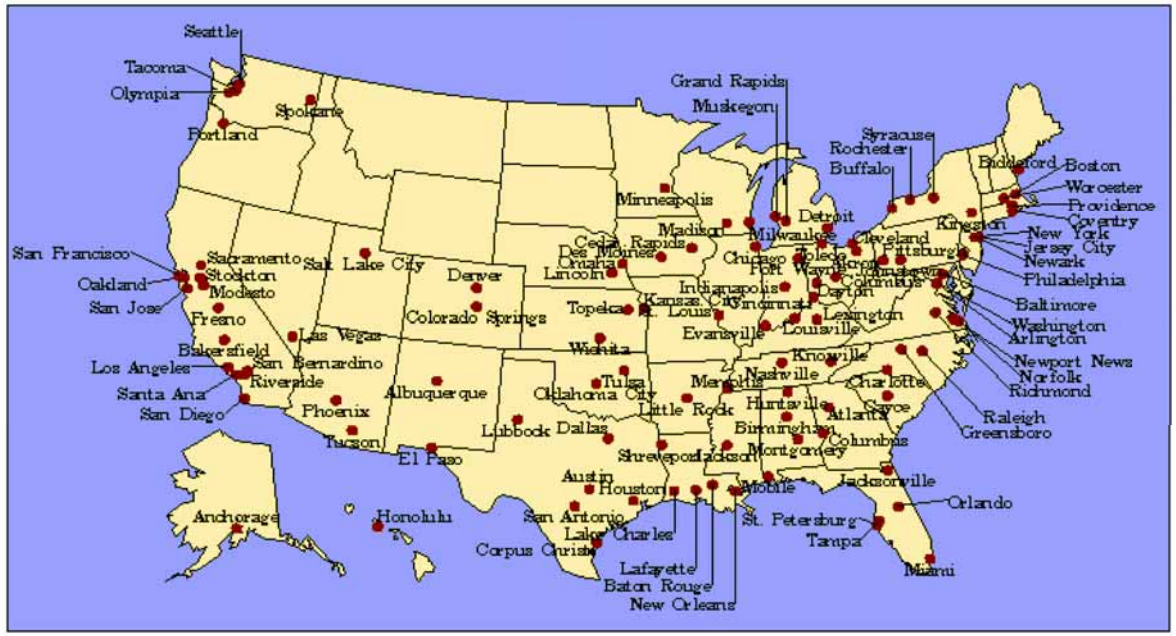
Air pollution signal order of magnitude smaller than confounders



Estimates of model predictors in the GAM model Pittsburgh (1987-1994)

Adapted by CTLT

NMMAPS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San Jose
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Los Angeles
San Bernardino
Riverside
Santa Ana
San Diego
Las Vegas
Salt Lake City
Denver
Colorado Springs
Albuquerque
Phoenix
Tucson
El Paso
Lubbock
Dallas
Oklahoma City
Tulsa
Wichita
Topeka
Kansas City
Omaha
Lincoln
Cedar Rapids
Des Moines
Minneapolis
Madison
Grand Rapids
Muskegon
Milwaukee
Detroit
Chicago
Fort Wayne
Indianapolis
St. Louis
Evansville
Louisville
Cincinnati
Dayton
Columbus
Toledo
Cleveland
Pittsburgh
Buffalo
Rochester
Syracuse
Kingston
Biddeford
Boston
Worcester
Providence
Coventry
New York
Jersey City
Newark
Philadelphia
Baltimore
Washington
Arlington
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Anchorage
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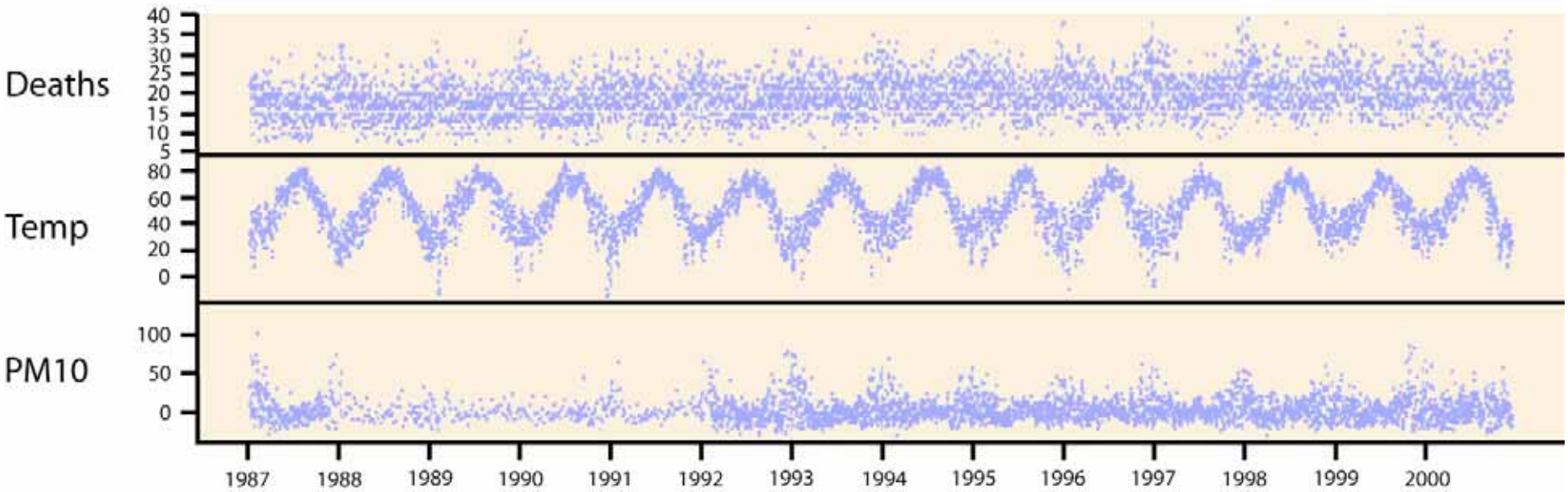
Deaths
40
35
30
25
20
15
10
5
Temp
80
60
40
20
0
PM10
100
50
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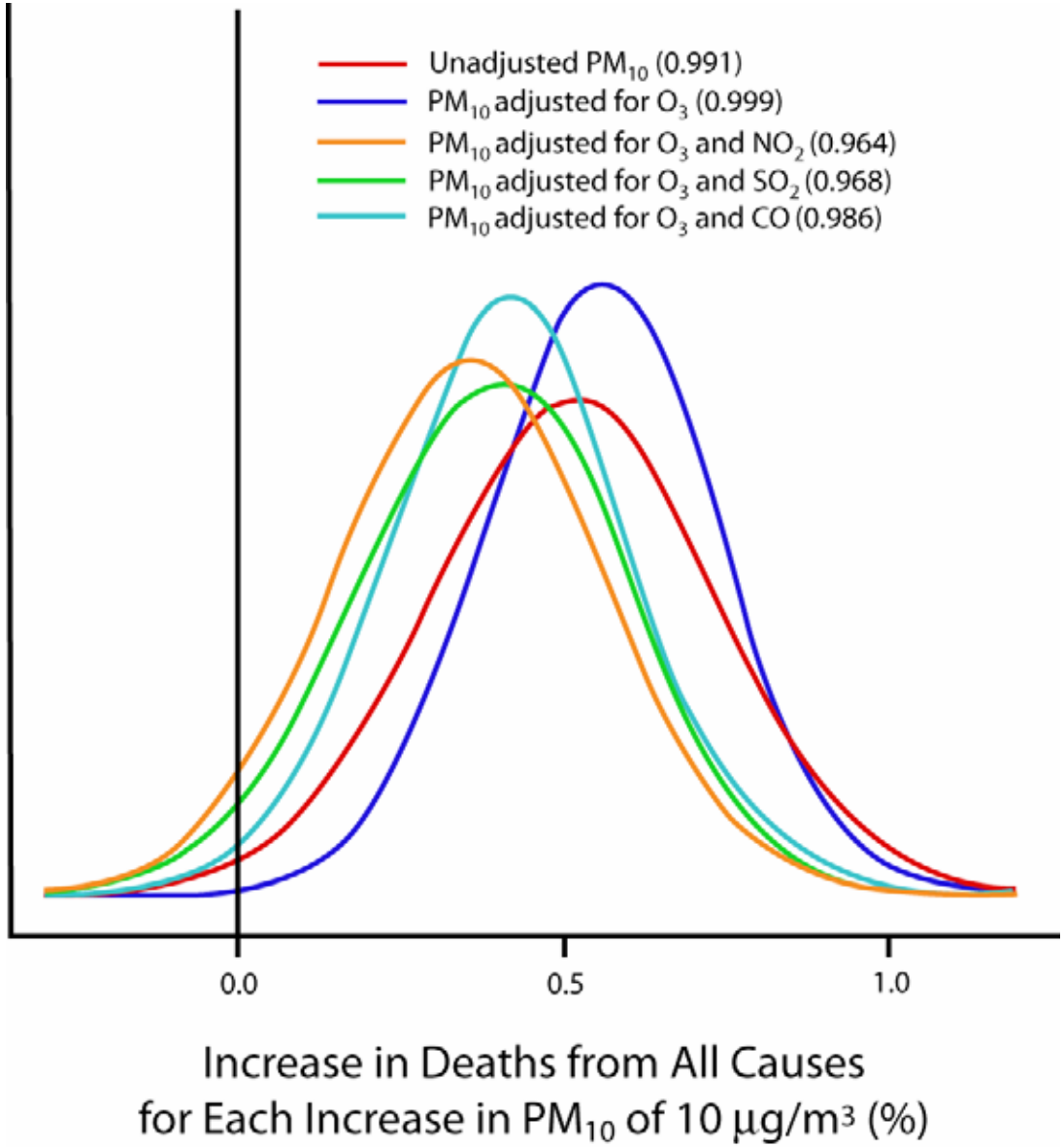
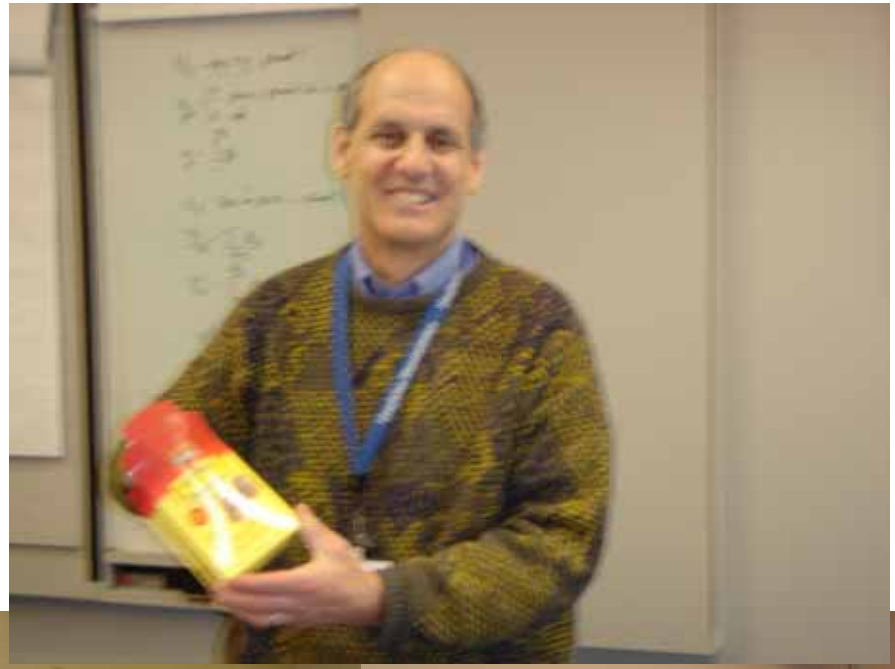


Adapted by CTLT from: Jonathan M. Samet, M.D., Francesca Dominici, Ph.D., Frank C. Curriero, Ph.D., Ivan Coursac, M.S., and Scott L. Zeger, Ph.D. New England Journal of Medicine

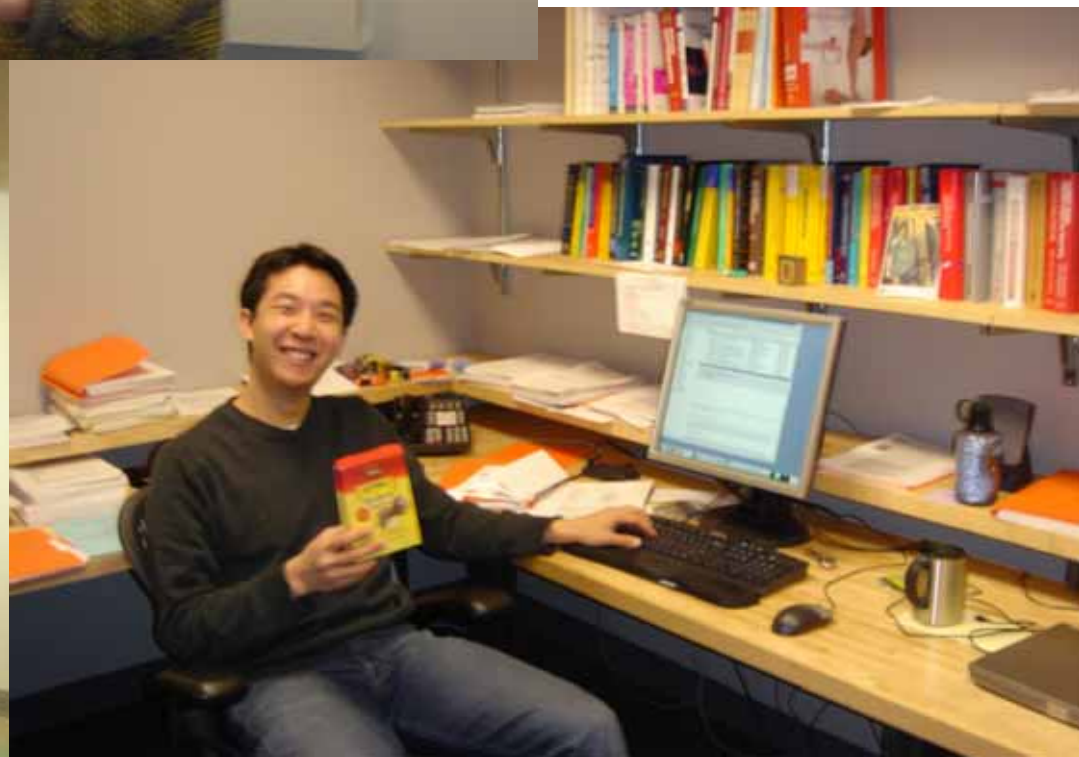
Gibson's Law

Or for every biostatistician, there's an equal and opposite biostatistician.

The Care And Feeding Of Biostatisticians




Think Outside
The Square



Post-test
Is Biostatistics Necessary?

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