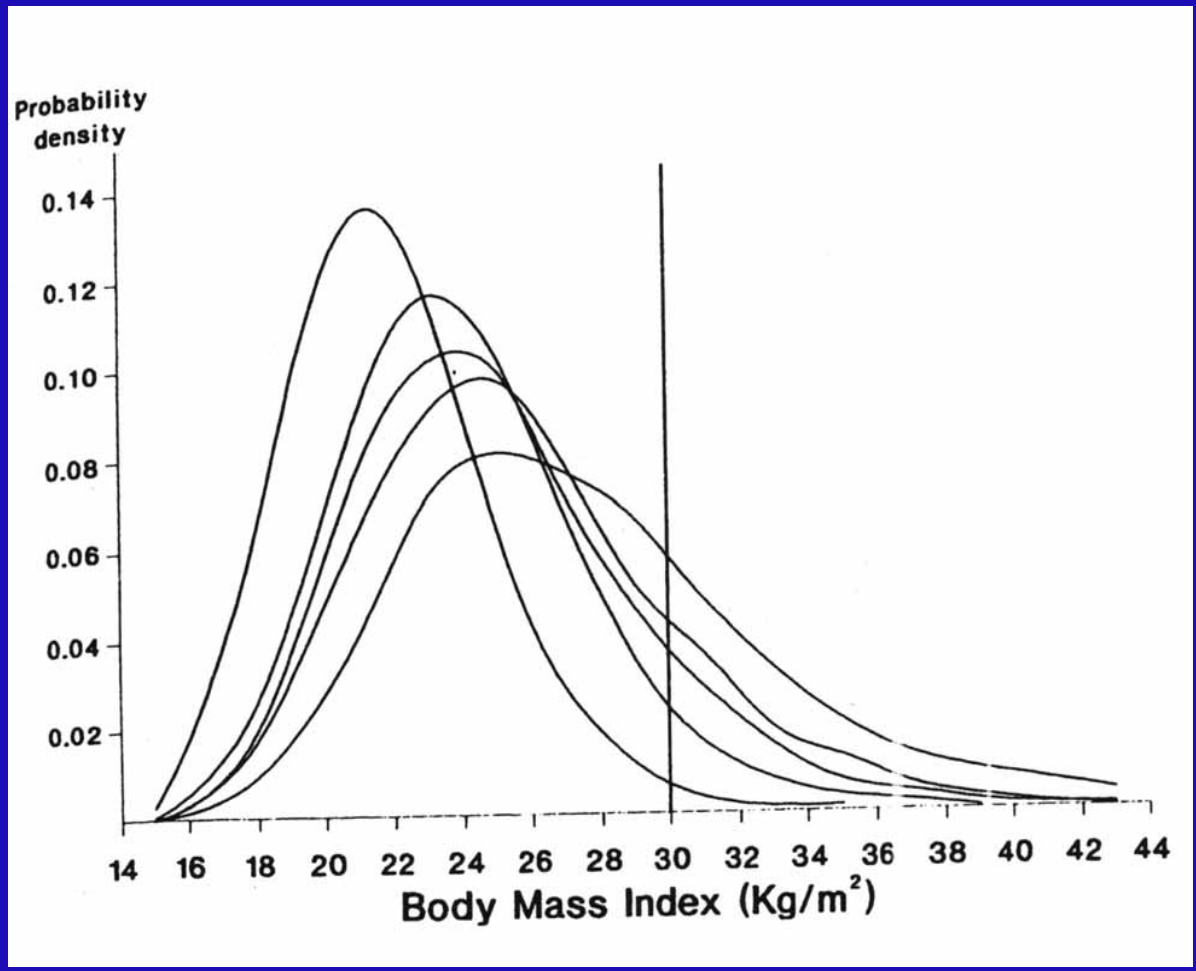
Decrease in population mean that would indicate a 50% reduction in prevalences of deviant values

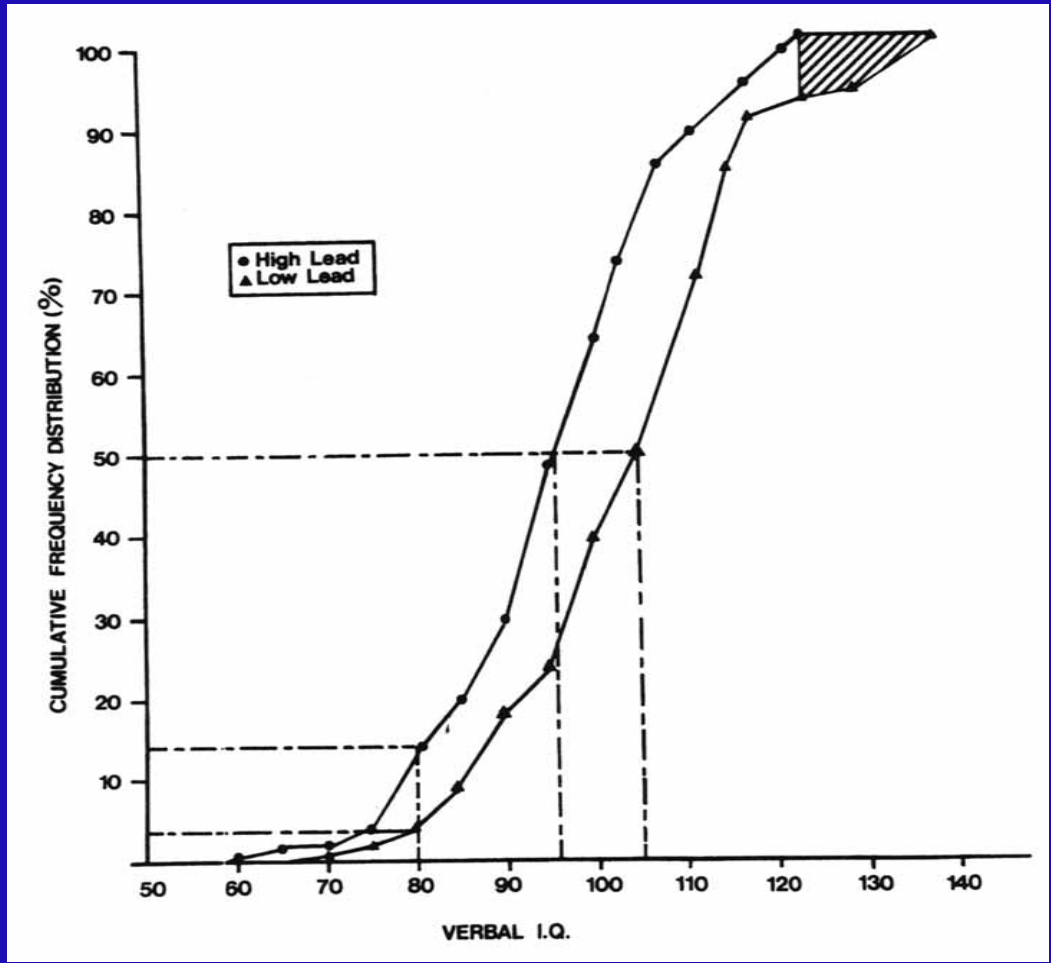
Health index	Definition of "high" value	Change needed in mean
systolic BP	≥140 mmHg	8
diastolic BP	≥90 mmHg	4
overweight	BMI >30 kg/m^2	2 kg

Distributions of Body Mass Index and Obesity in 5 Populations of 20-59 Year Old Men and Women



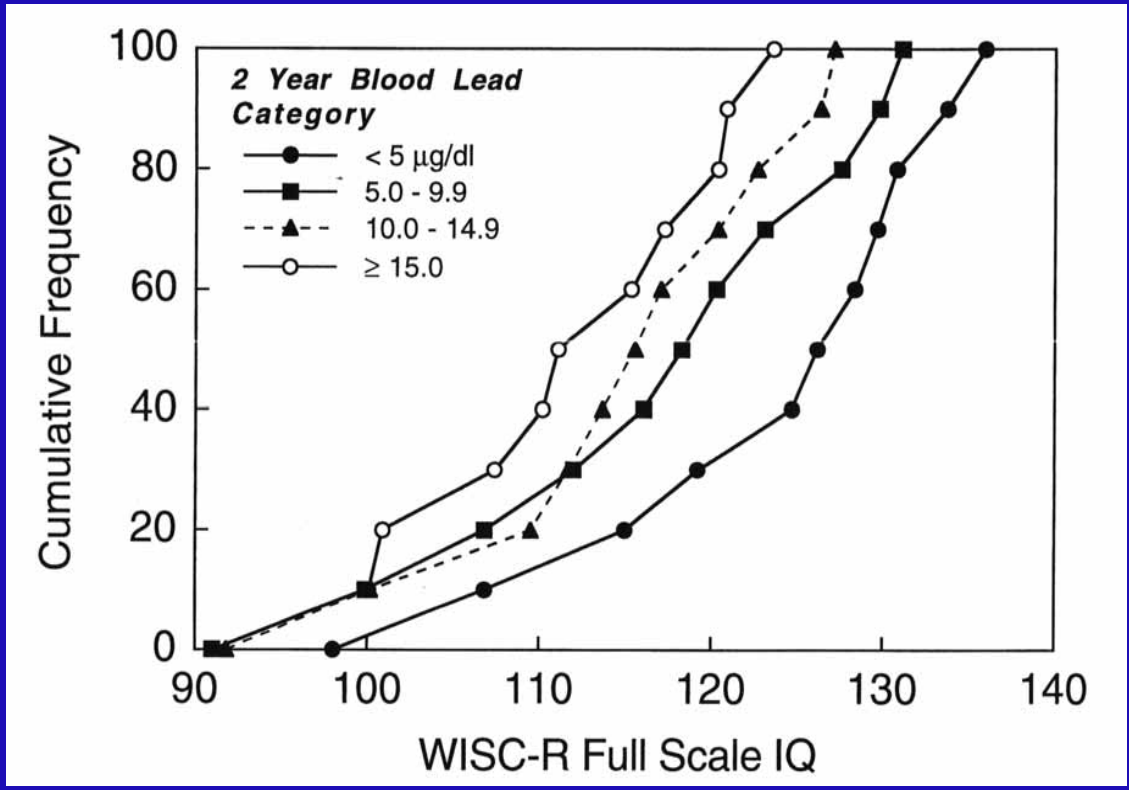
Rose G. *Circulation* 1991; 84;1405-1409

Cumulative Frequency Distribution of Verbal IQ, Stratified by Tooth Lead Level

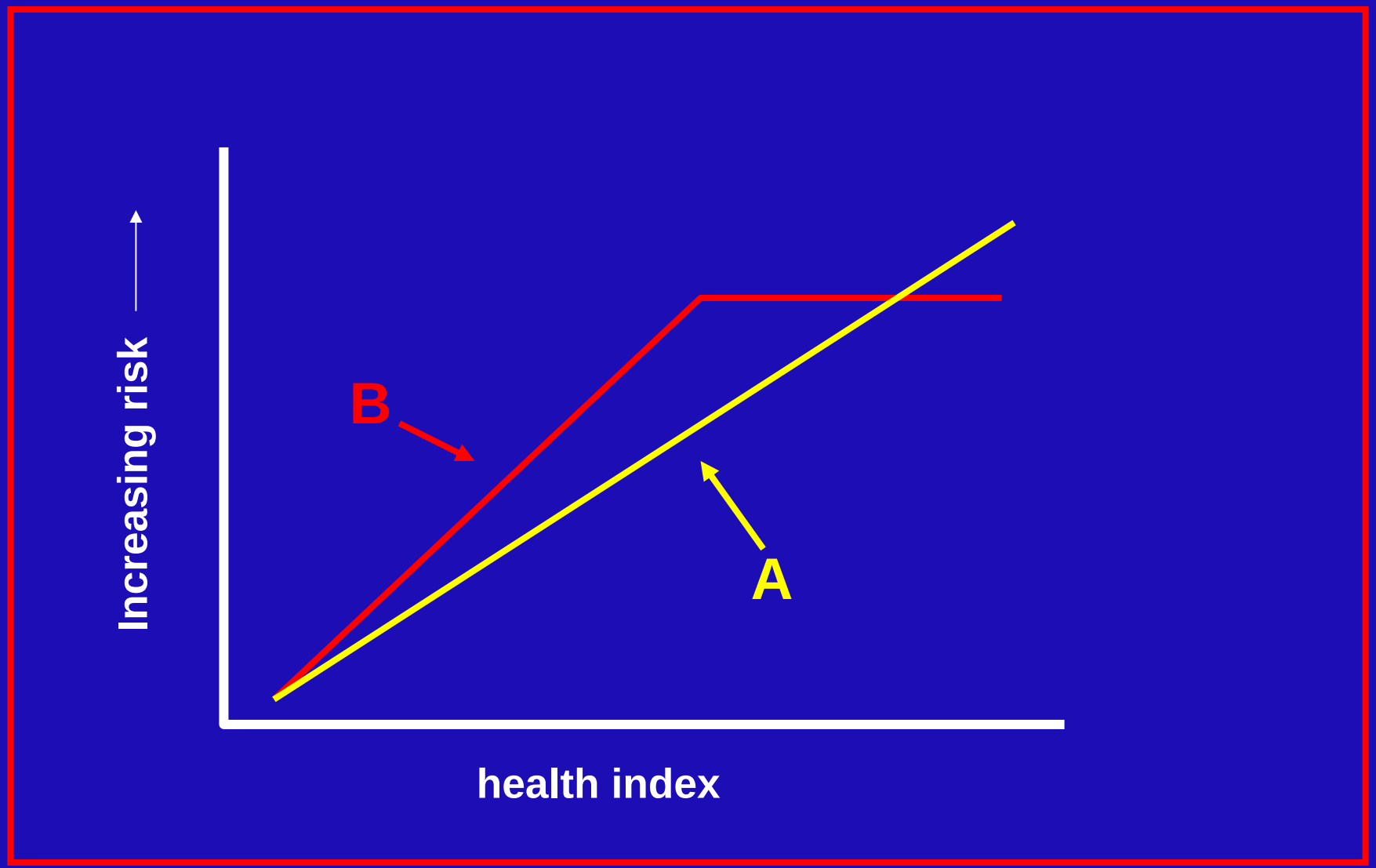


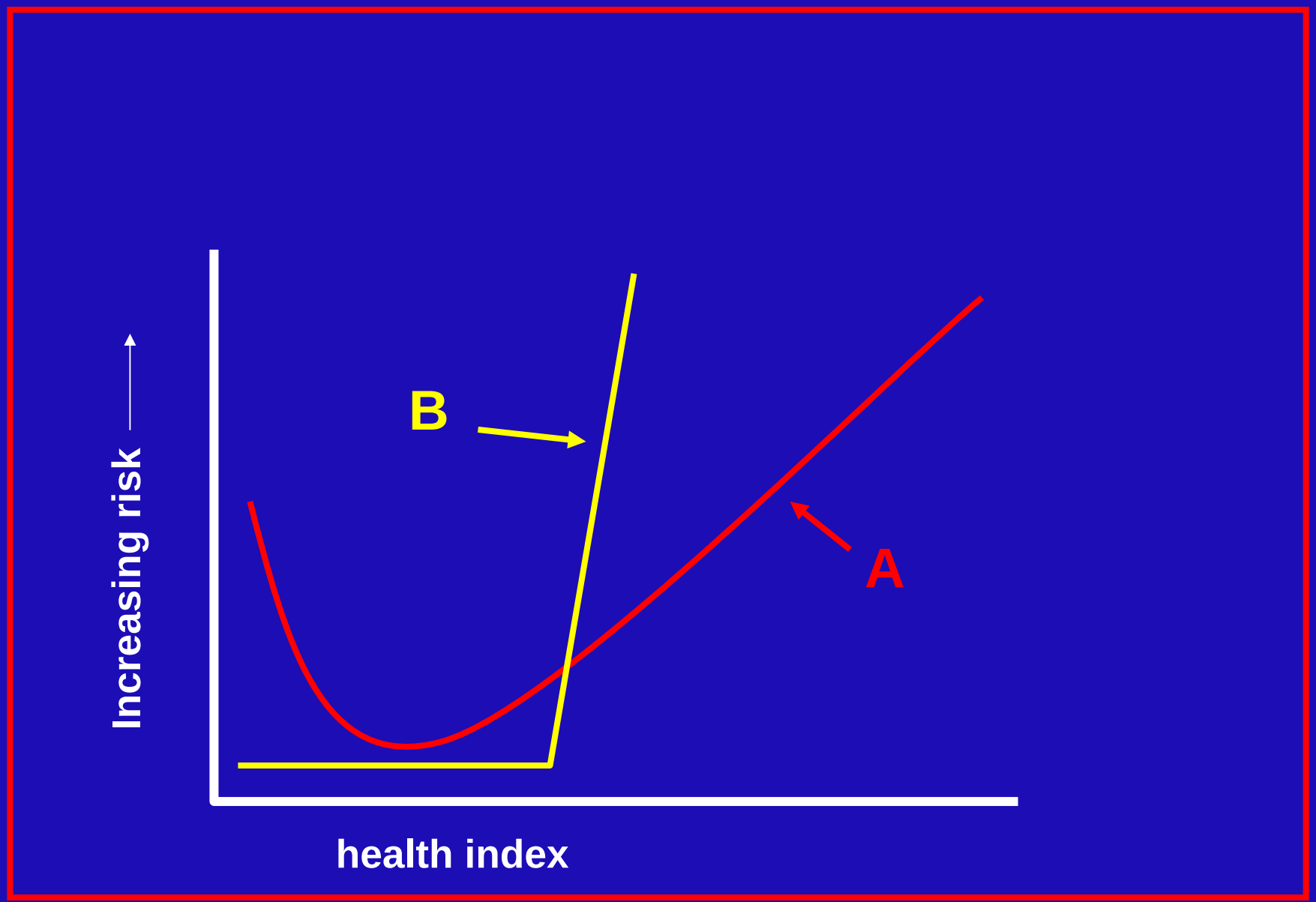
Needleman, Leviton, Bellinger. *N Engl J Med* 1982; 306; 367.

Cumulative Frequency Distributions of Full-Scale IQ, Stratified by Blood Lead Level at 2 Years of Age

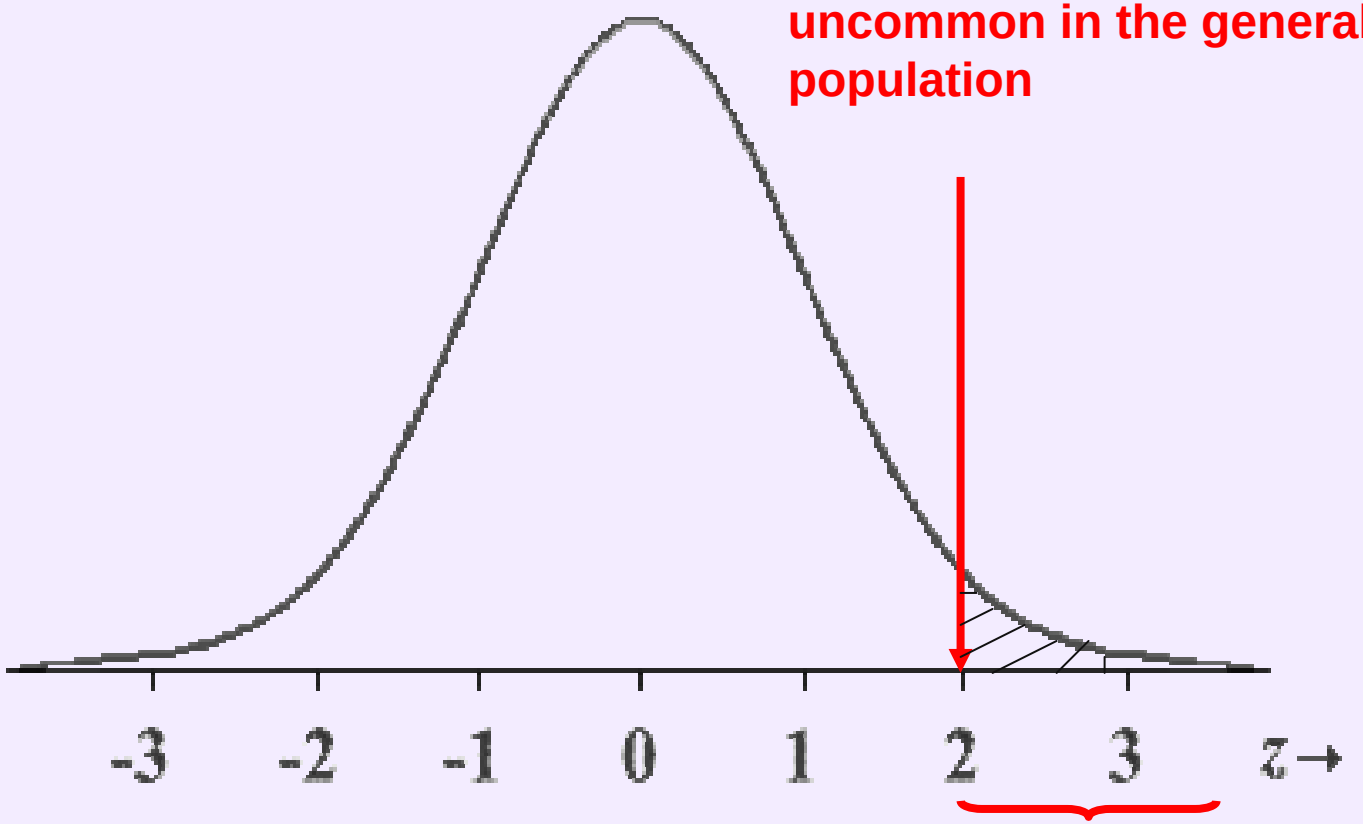


Bellinger, *Neurotoxicol Teratol* 1995; 201-212.


Increasing risk
B
A
health index

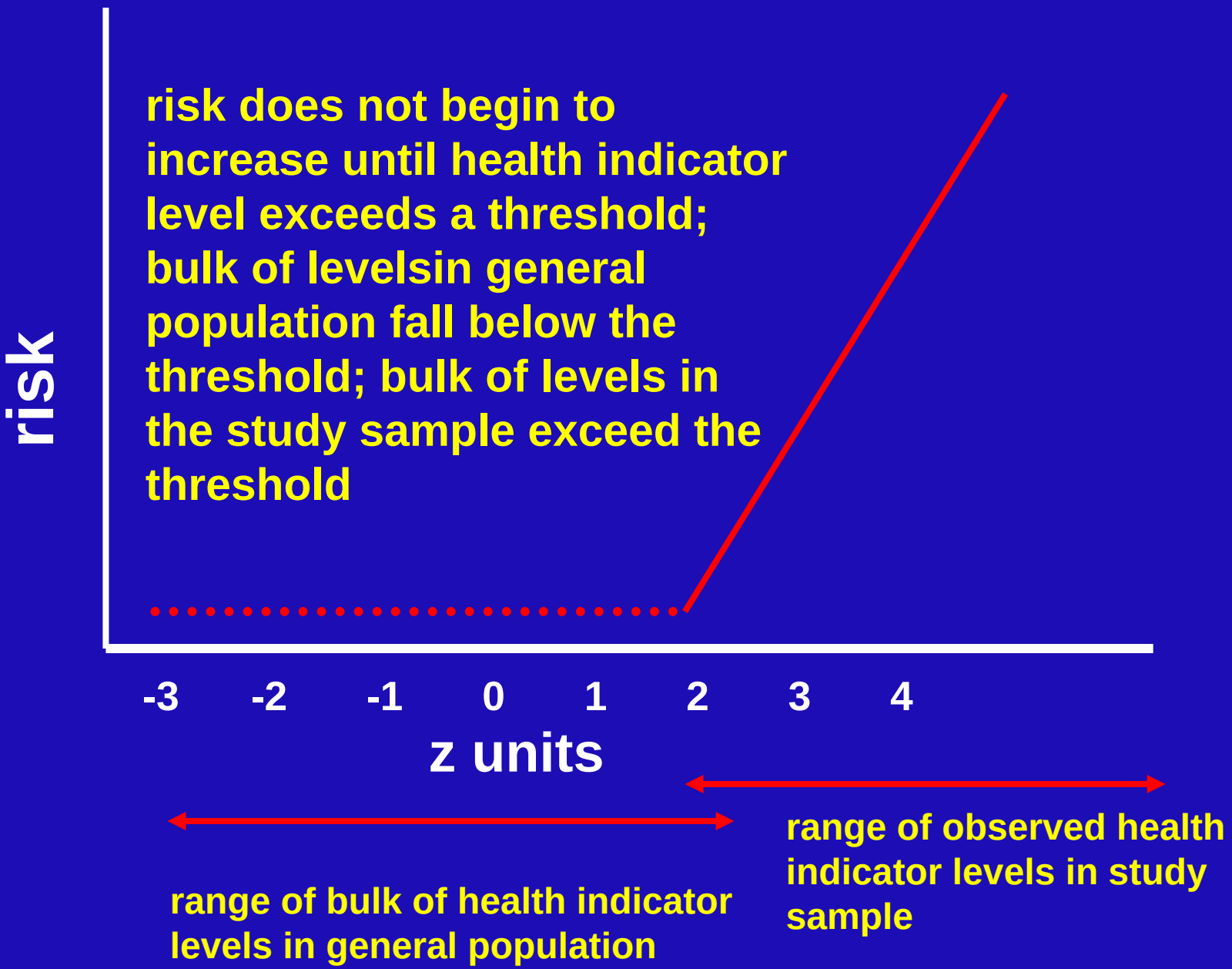

Increasing risk
B
A
health index

range of health indicator levels in study sample is limited to levels that are uncommon in the general population



Z units

100% of study sample,
2.3% of general population


risk does not begin to increase until health indicator level exceeds a threshold; bulk of levelsin general population fall below the threshold; bulk of levels in the study sample exceed the threshold
risk
-3
-2
-1
0
1
2
3
4
z units
range of bulk of health indicator levels in general population
range of observed health indicator levels in study sample

Conclusions

- **A small shift in the mean value of a health index can have substantial implications for population health**
  - **A shift that is clinically insignificant for an individual can signal large changes at the population level in the prevalence of individuals with clinically meaningful values on the index**
- **The validity of this conjecture depends heavily on the functional form of the dose-effect relationship**
- **In drawing inferences about implications for population health, it is important to:**
  - **be aware of possible variations in the form of the dose-effect relationship over different ranges of the exposure**
  - **evaluate the overlap between the exposure ranges represented in the study sample that provided the data used to derive the dose-effect relationship and the population to which the inferences are to be generalized**