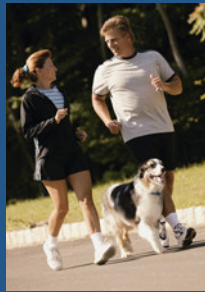




KnowYourNumber™
The Key To Proactive Good Health



RISK STRATIFICATION CREATES MORE COST-EFFECTIVE HEALTH PROMOTION

Martin Root, Ph.D.

BioSignia, Inc.
Durham, NC

Question

Would chronic disease prevention be more cost effective if it was targeted to those at highest risk?

How to do this?

- 1) Community-based employer (self-insured)
- 2) A tool for multi-disease risk assessment
- 3) Intervention stratified on risk level
- 4) Logistics to satisfy all stake-holders

Case Study

- NC employer with 17,652 employees
- Simulated this group based on age, gender, ethnicity data using NHANES III
- Limitations
 - Not region specific
 - 14 year old data
 - Missing data

Multi-Disease Risk Assessment Tool

- 3 diseases - CHD, stroke, type 2 diabetes
- Combined for total risk of vascular disease
- Synthesis Analysis technology
- Absolute risk of disease in 5 years
- Achievable and modifiable risks

Partners in Disease Prevention

- Personal physician
- Staff nursing
- Diet and exercise
- Lab services
- Payer
- Employer

Prevalent and Future Diseases in Simulated Population

Disease	Prevalent Cases	5 Year New Cases	5 Year Achievable Cases	5 Year Modifiable Cases
CHD	397	398	108	290
STROKE	196	218	72	146
DIABETES	300	357	35	322
NEW DIABETES	1069	-	-	-
ALL	1780	806	174	632

Intervention - Uniform Prevention

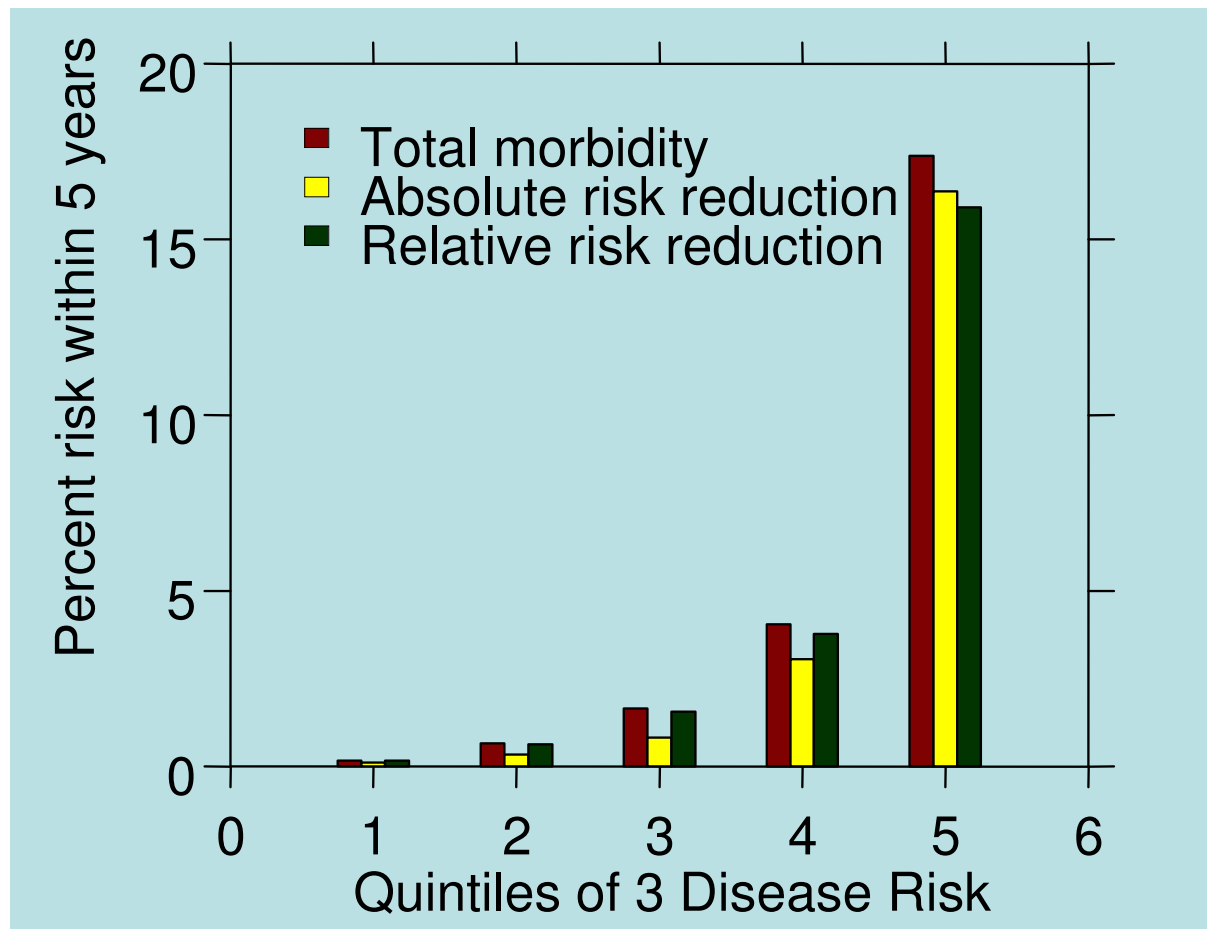
Assumption - Prevention is proportional to \$ spent.

- 1) Assume an absolute reduction in risk of 0.1% per \$ spent.
 - **Institute a \$10/person/year program**
 - **Absolute 1% reduction in disease risk**

- 2) Assume an equivalent relative reduction in risk
 - **1.71% reduction in relative risk**

Yield - 13% reduction in disease events in 5 years

Uniform Risk Reduction

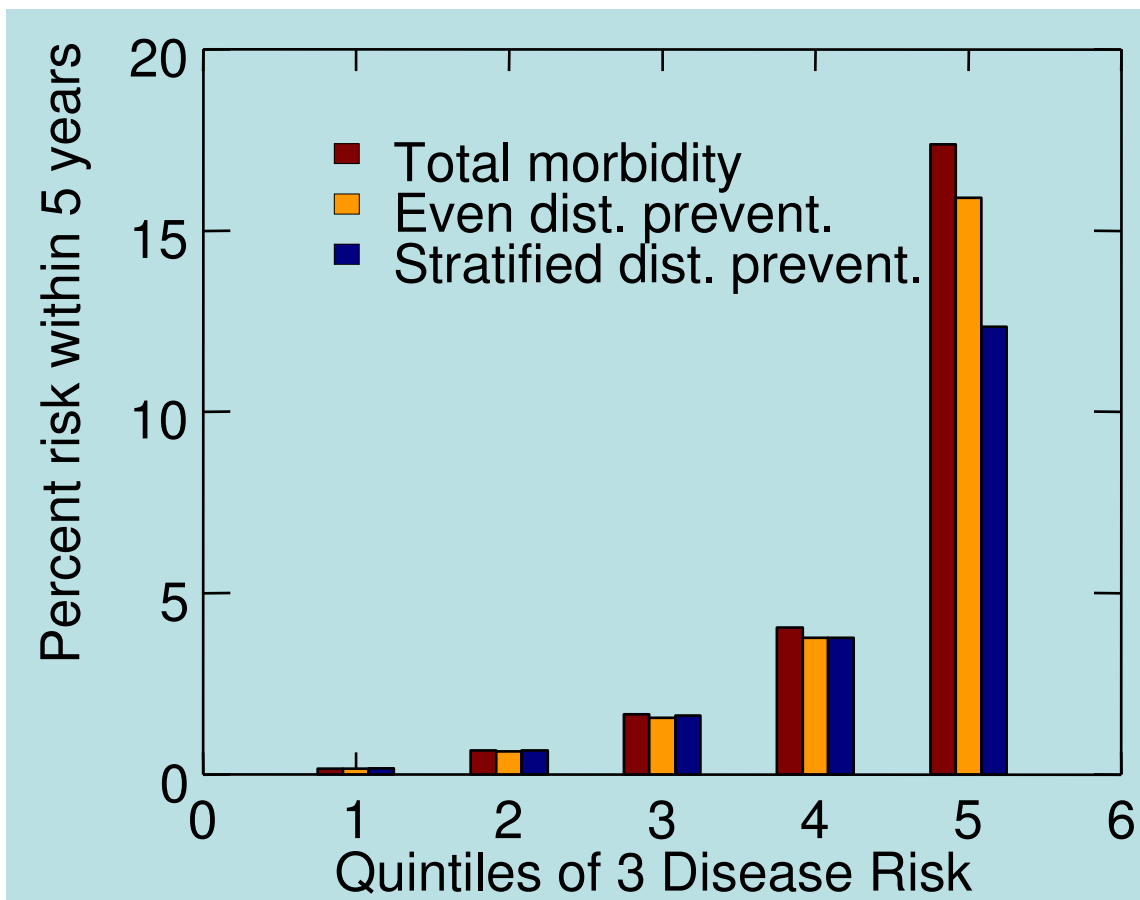


Intervention - Stratified Prevention

- Strategy - **Spend prevention \$ in proportion to risk level. (e.g., 69% of \$ to top quintile of risk)**
- Assume same \$ spent
- Focus on relative risk reduction

Yield - 38% reduction in disease events in 5 years, a 2.8 fold improvement

Effect of stratification on prevention effectiveness



Realistic Concessions

- 10% overhead for stratification
- 3 prevention strata instead of 5

Yield - 34% reduction in disease events in 5 years,
still a 2.5 fold improvement

How to intervene in high risk group?

Odds ratios of 5th vs. 4th quintiles

Risk Factor	OR	Risk Factor	OR
Cholesterol > 200	1.4	IFG	3.2
Hypertension	2.3	C-React. Prot >10	2.8
BMI >30	2.5	Triglycerides >150	1.6
Smoker	1.3	HDL Chol <40	2.0
LDL Cholesterol > 130	1.1	No Exercise	1.3
Homocysteine >12	1.8		

Possible Study Extensions

Secondary prevention

- Develop secondary disease risk models to combine with primary risk before stratification.

Other diseases

- COPD, Depression, Osteoporosis, CHF, Lung and Colon Cancers

Conclusions

An employer-based health promotion program stratified according to multiple disease risk levels could be an effective and efficient community program for chronic disease prevention.

Risk Factor	CHD	Stroke	Diabetes
AGE	X	X	X
GENDER	X	X	
DIABETES Dx	X	X	
SMOKER	X	X	
SYSTOLIC BP	X	X	X
LVH	X	X	
TOTAL CHOLESTEROL	X		
HDL CHOLESTEROL	X		X
FAMILY HISTORY	X	X	X
EXERCISE LEVEL	X	X	X
HRT	X		
ASPIRIN	X		

LIPOPROTEIN (a)	X		
ALBUMIN	X		
HOMOCYSTEINE	X		
FIBRINOGEN	X		
C-REACTIVE PROTEIN	X		
OTHER CVD		X	
ANTI-HYPERTEN. Rx		X	
BMI		X	X
ATRIAL FIBRILLATION		X	
ETHNICITY		X	
WAIST MEASUREMENT			X
GLUCOSE			X
TRIGLYCERIDES			X