Manuscript #563

1. Full Title: Predictors of improved coronary artery risk factor behavior among persons with multiple risk behaviors
   Abbreviated Title (length 26):

2. Writing Group (list individual with lead responsibility first):
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3. Timeline:
   Begin October 1997, complete June 1998

4. Rationale:
   Three common behaviors are associated with the occurrence of coronary artery disease: cigarette smoking, physical inactivity and a diet high in fat. These behaviors often cluster together in individuals (USDHHS, 1991). Physicians are strongly encouraged to counsel patients to quit smoking, increase physical activity and decrease intake of saturated fat. (IJSPTF, 1996) Physicians, however, lack the time and the resources to effectively counsel patients to change multiple risk factors, forcing them to triage their clinical and preventive services to those that are the most urgent and/or the most effective (Orleans et al, 1985). Two unresolved questions are whether or not it is useful to recommend changing more than one behavior at a time and, if so, which two behaviors may be complementary in changing simultaneously. An understanding of the patterns of changing multiple risk behaviors would be very useful to the clinician faced with a patient with more than one cardiac risk behavior. Patients in the MRFIT trial were able to stop smoking and lower their cholesterol level with behavior modification simultaneously (Multiple Risk Factor Intervention Trial Research Group, 1982), but smokers who attempt to quit and lose weight at the same time have not been successful (Hall et al, 1992, Fiore et al, 1996). In one observational study, people who were considering changing one risk factor behavior were seriously considering changes in other behaviors simultaneously (Emmons et al, 1994). No study, to date, has reported the patterns of cardiac risk factor behavior change among free-living individuals in the general population with multiple adverse behaviors. Research into the predictors of smoking cessation, physical activity, and dietary fat has focused on psychological and demographic variables with very little
attention given to the role of incident and prevalent illness in future behavior change. Exercise, smoking cessation and dietary changes to lower cholesterol, however, are widely recommended to lower overall risk of coronary artery disease in patients with prevalent cardiovascular disease and those at increased risk. Whether patients at increased risk actually change these behaviors is largely unknown. Observational studies of smokers hospitalized for myocardial infarction have demonstrated smoking cessation rates between 20% and 60%, far in excess of spontaneous cessation rates in well individuals (Schwartz, 1987). Two thirds of hypertensive smokers in one cross-sectional study of urban poor found that finding out about their hypertension increased their desire to quit. (Hyman, 1996) Using pulmonary symptoms, carbon monoxide and spirometry results as evidence of increased risk, Risser and Belcher, in 1990, found an increased smoking cessation rate among smokers who were given such feedback as compared to controls. Lerman and colleagues, however, found no difference in 2-month cessation rates using genetic susceptibility testing to counsel smokers at increased risk of lung cancer (Lerman et al, 1997). In addition, individuals with diabetes are more likely to smoke than their nondiabetic counterparts, suggesting that perceived risk may not be related to subsequent risk behavior change (Malarcher et al, 1995). No study, to date, has investigated the association of cardiac risk factors (including past medical history, incident disease and incident risk factors for coronary artery disease) with changes in cardiac risk factor behaviors among free-living individuals. If it were found that knowledge of risk factors is associated with spontaneous behavior change, this would support using such risk factor information to personalize motivational behavior change messages.

5. Main Hypothesis:
Two parallel analyses will be conducted with theoretically related hypotheses yet different sampling frames.

Hypotheses A: Among individuals who are smokers, more sedentary, and have a higher fat diet, favorable changes in these behaviors will cluster in individuals.

A. Sample: Prospective study of ARIC participants who reported all three of the following behaviors at:
   a) current cigarette smoking
   b) Baecke total physical activity index in lowest quartile
   c) dietary fat intake greater than 30 percent of total calories.

Only patients who are alive at V3 and have complete data on critical variables at both V1 and V3 will be included.

A. Covariates:
   1) Age, gender, race, education, body mass index.
   2) Baseline non-behavioral risk factors for cardiovascular disease (hypertension, hypercholesterolemia, HDL, diabetes, family history of myocardial infarction, family history of stroke, family history of diabetes, family history of hypertension) or prevalent cardiovascular disease (claudication, coronary artery disease, stroke, TIA)
   3) Incident cardiovascular disease or incident risk factors for cardiovascular disease over
6 years of follow-up (hypertension, diabetes, coronary artery disease morbidity/mortality, hypercholesterolemia/low HDL).

A. Outcome:
"Quit smoking" will be defined as those who were former smokers at V3.
"Decreased dietary fat intake" will be defined as those who, between V1 and V3, have decreased the percent of calories from fat in their diet by 5%. 
"Increased physical activity" will be defined as those whose Baecke total physical activity index at V3 is 25% greater than at V1.

A. Analysis:
Logistic regression of each of the behavior changes (A,B,C) on each other (three comparisons adjusting for baseline values of the baseline values of age, gender, race, education, body mass index, percent of dietary calories from fat and Baecke total physical activity index.

Hypothesis B: Incident and prevalent hypertension will be associated with a spontaneous change in cardiac risk behaviors.

B. Sample: Prospective study of ARIC participants who admitted to at least one of the following behaviors at visit 1:
- current cigarette smoking
- Baecke total physical activity index in lowest quartile
- dietary fat intake greater than 30 percent of total calories

Three groups will be formed for comparison:
1) current smokers
2) low physical activity
3) high dietary fat intake.

Only patients who are alive at V3 and have complete data on critical variables at both V1 and V3 will be included.

B. Covariates (same as analysis for hypothesis A):
1) Age, gender, race, education, body mass index.
2) Baseline non-behavioral risk factors for cardiovascular disease (hypertension, hypercholesterolemia/low HDL, diabetes, family history of myocardial infarction, family history of stroke, family history of diabetes, family history of hypertension) or prevalent cardiovascular disease (claudication, coronary artery disease, stroke, TIA)
3) Incident cardiovascular disease or incident risk factors for cardiovascular disease over 6 years of follow-up (hypertension, diabetes, coronary artery disease morbidity/mortality, hypercholesterolemia/low HDL).

B. Outcome:
a) "Quit smoking" will be defined as those who were former smokers at V3.
b) "Decreased dietary fat intake" will be defined as those who, between V1 and V3, have decreased the percent of calories from fat in their diet by 5%.
c) "Increased physical activity" will be defined as those whose Baecke total physical activity index at V3 is 25% greater than at V1.

B. Analysis:
2) Logistic regression of each of the exposure variables on subsequent behavioral
risk factor change while adjusting for baseline values of age, gender, race, education, and body mass index.

6. Data (variables, time window, source, inclusions/exclusions):

7. Endnotes: