
National Survey of Personal Health Practices and Consequences: Background, Conceptual Issues, and Selected Findings

RONALD W. WILSON, MA
JACK ELINSON, PhD

IN 1965, HEALTH QUESTIONNAIRES were completed by nearly 7,000 people constituting a probability-based sample of the adult residents of Alameda County, Calif. An analysis of the questionnaire data on the relationship of physical health status and health practices was reported by Belloc and Breslow in *Preventive Medicine*, August 1972 (1). The findings were described as follows: "A striking examination that demonstrates the relationship between the whole spectrum of physical health and actual day-to-day practices."

Since the publication of the Belloc and Breslow article, a number of other papers have appeared, based on analyses of the Alameda data. Among these was Belloc's ground-breaking 1973 report, "Relationship of Health Practices and Mortality," which was headlined by *Preventive Medicine* in these words: "A number of personal health practices show a striking inverse relationship with mortality rates, especially for men" (2). Her paper was based on a 5½-year mortality experience of the persons queried in Alameda County in 1965. A subsequent working paper, also by Belloc, reported on 9 years of mortality experience with substantially similar results ("Health Practices and Mortality—a 9-Year

Follow-up," a preliminary working paper supported by research grant No. 14500368, April 1976, from the National Center for Health Services Research). Further analysis of the 9 years of mortality experience and, in addition, of the persistence of health habits of the Alameda sample, was reported by Breslow and Enstrom in 1980 (3).

The articles cited are the principal reports, based on the Alameda County sample survey, that document the relationships between health practices and physical health status and between health practices and mortality. Other investigators who have analyzed the Alameda data have shown other relationships: between social networks and mortality (4,5) and between indulgence in the sick role and survival (6). A report by Wiley and Camacho assessed the relative value of the selected health practices examined in the Alameda study in predicting health status (7).

The reports on health practices of the Alameda group and the popular interpretations (8-10) have provided support to proponents of the notion that, in the face of seemingly diminishing returns from further expenditures for medical care (11,12), more attention should be paid to influencing individual health maintenance behavior and lifestyles (13-16).

The Secretary of the Department of Health, Education, and Welfare in 1977 established a Prevention Initiative. An impressive array of activities was carried out, sponsored, or coordinated by the Office of Disease Prevention and Health Promotion under the general direction of J. Michael McGinnis, Deputy Assistant Secre-

Mr. Wilson is Director, Division of Environmental Epidemiology, National Center for Health Statistics. Dr. Elinson is a service fellow with the division and professor of sociomedical sciences, Columbia University School of Public Health.

Teasheet requests to Ronald W. Wilson, National Center for Health Statistics, Rm. 2-27, Center Bldg., 3700 East-West Highway, Hyattsville, Md., 20782.

tary for Health and Assistant Surgeon General. Many of these activities were addressed to the potential health consequences of modifying individual behavior.

Earlier, in 1974, the Canadian Government had issued a report, "A New Perspective on the Health of Canadians" (13), which brought into focus, by reference to four health fields (human biology, environment, lifestyle, and health care organization), the modest gains in health status attributable to medical care compared to the potential gains from changes in environmental or lifestyle influences on health. In 1975 the Fogarty International Center of the National Institutes of Health and the American College of Preventive Medicine co-sponsored a National Conference on Prevention and subsequently published a conference report, "Preventive Medicine, USA" (17). The Institute of Medicine of the National Academy of Sciences, under contract with the Public Health Service, convened a Conference on Prevention (February 16–18, 1978); for it, groups of experts prepared working papers on three basic areas—human environment, human lifestyles, and human services. These papers were presented in "Perspective on Health Promotion and Disease Prevention in the United States" (18). In 1977 DHEW organized a Departmental Task Force on Prevention; its work culminated in three major documents (19–21). One of these, "Healthy People" (19), set forth the strategy and goals for achieving improvements in the health of the nation. These goals were further developed into a number of specific and measurable objectives for 15 priority areas in "Promoting Health/Preventing Disease—Objectives for the Nation" (22).

As a part of these efforts, the Deputy Assistant Secretary for Health requested that the National Center for Health Statistics (NCHS) collect data on the extent and distribution in the population of positive personal health practices, their stability over time, and their relationship to morbidity and mortality. The design, selected preliminary findings, conceptual issues, and future plans for analysis of this study, the National Survey of Personal Health Practices and Consequences (NSPHPC), are presented in this paper.

The National Center for Health Statistics has collected data on various health practices in a number of its surveys over the past 15 years. Information on smoking has been collected as a part of the National Health Interview Survey (NHIS) since 1965, although not every year (23,24). Smoking data have also been collected in the National Health Examination and Nutrition Surveys—NHANES I (25) and NHANES II (26). The current National Natality and Fetal Death Follow-back Survey is obtaining smoking information on women both before and during pregnancy.

While the Center has not done a major study of drinking behavior, several surveys have collected limited data on consumption of alcohol, including the NHANES I, the 1977 NHIS, and the National Natality and Fetal Death Follow-back Surveys. Efforts are now underway to develop a more comprehensive set of questions about consumption of alcohol to be used in Center surveys. The 1975 NHIS included a supplement on exercise and participation in sports activities (27). More general questions on exercise and daily physical activity levels were asked in the NHANES I and II.

Before the National Survey of Personal Health Practices and Consequences, the major related study was conducted in 1977 when the National Health Interview Survey asked questions of approximately 23,000 adults covering the Alameda health habits (28). A report by Schoenborn and Danchik was issued on the prevalence of the Alameda health practices in the civilian noninstitutionalized U.S. population 20 years and over (29). The practices covered were hours of sleep, eating breakfast, snacking, physical activity, drinking alcoholic beverages, smoking cigarettes, and "desirable" body weight. Data were presented by sex, race, age, income, and education. A more detailed NCHS Series 10 report on these behaviors is forthcoming.

Each of these data bases provides a potential for further analysis of the relationship between the specific health behaviors and the health characteristics collected on the surveys. For example, the exercise and physical activity items on the NHANES I have been used to explain some of the findings on caloric intake and obesity. The greatest potential, because of the large sample size, lies with the 1977 NHIS data and the Alameda County items and the wide range of health data also collected on that survey. All of these data bases are now or will be available in the form of public use data tapes.

Study Design

The data for the National Survey of Personal Health Practices and Consequences were collected in the spring of 1979 by Chilton Research Services, under contract with the National Center for Health Statistics. The target population was all persons aged 20–64 years residing in households with telephones in the coterminous United States. The survey was administered over the telephone through interviews lasting an average of about one-half hour. The questionnaire covered a wide range of health practices and attitudes, including six of the Alameda County items, questions on health status and use of health services, and items on social support, critical life events, and standard demographic variables.

The sampling plan of the survey was a three-stage stratified cluster design incorporating a random digit

dialing method. One sample respondent from each eligible household was selected by a random selection procedure. Self-reporting was required for all questions. For the purposes of estimation, respondents were weighted by the inverse of their overall probability of selection within the household. A response rate of approximately 81 percent was achieved, with 3,025 completed interviews.

Telephone surveys have two distinct advantages over face-to-face interviewing; they result in more rapid and more efficient data collection, and they reduce interviewer variance by allowing continuous monitoring of the quality of interviews. The principal disadvantage of the telephone method is under coverage; about 7 percent of U.S. households did not have telephones in 1979. Detailed analysis of 1976 National Health Interview Survey data revealed that, while persons residing in nontelephone households have disproportionately low income, differences in sociodemographic and health characteristics between the telephone population and the total population are, on the whole, small (30). According to investigators of the University of Michigan's Survey Research Center, who are currently conducting a study for the National Center for Health Statistics, the quality of data obtained using the telephone method and the personal interview method generally appears to be comparable ("Differences Between Telephone and Personal Interview Data. First Report of Findings HIS/SRC Telephone Experiment," by C. F. Cannell and R. M. Groves. 1980, unpublished report).

The respondents in the NSPHPC were reinterviewed 1 year later with essentially the same questionnaire. The findings we report are from the first wave of interviews in 1979. A more detailed description of the methods used in this survey is available upon request from the National Center for Health Statistics.

The completed sample in the NSPHPC was composed of 40 percent men and 60 percent women. This ratio differs from National Health Interview Survey estimates of the proportion of adult men and women (ages 20–64 years) in the telephone households (approximately 47 to 53). For this reason, data are not shown for both sexes combined. To assess the potential bias resulting from this imbalance, the demographic characteristics of NSPHPC respondents were compared with the characteristics of persons sampled in the NHIS. The overall sex composition in the NSPHPC was found to produce no appreciable bias among males and females with respect to race, marital status, and employment status. Modest differences were found regarding the respondents' education and income. NSPHPC respondents appeared somewhat better educated and with slightly lower incomes than the NHIS respondents.

Findings

Each of the six Alameda health practices (1) asked about in the NSPHPC were categorized into favorable or unfavorable behavior to approximate the original Alameda analysis. The favorable practices are as follows:

1. Sleeping an average of 7–8 hours a night.
2. Controlling one's weight—(based on the 1960 Metropolitan Life height-weight standards) weighing between 5 percent under and 19.9 percent over the desirable weight if male, or weighing not more than 9.9 percent over the standard if female.
3. (a) Sometimes or often swimming in summer, taking long walks, jogging, or riding a bicycle or (b) often engaging in a physically active hobby, doing calisthenics, or participating in other active sports.
4. Limiting alcohol consumption to less than five drinks per day.
5. Never having smoked cigarettes.
6. Eating breakfast almost every day.

The Alameda study included a seventh health practice—not snacking between meals—that was not included in the NSPHPC. Some analyses of the Alameda data have failed to substantiate the value of not snacking between meals in predicting health status.

The distribution of persons with favorable health practices, by age, sex, and education is shown in table 1. Following are highlights of these data:

- In general, with respect to most age and education categories, there were no consistently large differences between men and women in the proportion with favorable health practices, with the exception of never having smoked cigarettes and not drinking heavily.
- Where differences existed by educational level, a greater proportion of those with higher education reported favorable practices. The largest differences were among males for the smoking variable.
- Age differences in favorable health practices existed, but with no consistent pattern, except for the variable "eats breakfast almost every day." There is a marked increase with age for this practice.

A health habit score based on the six Alameda County items was computed, and the distribution of the proportion with 0 to 3, 4, or 5 or 6 favorable practices is shown in table 2 by sex, age, and education. Clearer patterns emerge with the composite score than when each behavior is looked at separately.

- More women than men reported five or six "good" practices, and this pattern is found in all age-education categories.

Table 1. Proportion of persons 20–64 years reporting selected favorable health practices, by sex, age, and education: National Survey of Personal Health Practices and Consequences, Wave I, 1979

Health practice and education	Men				Women			
	20–64 years	20–34 years	35–49 years	50–64 years	20–64 years	20–34 years	35–49 years	50–64 years
<i>Average 7–8 hours of sleep a night</i>								
Education:								
All levels	67.4	68.6	67.1	65.5	68.6	66.4	73.7	66.3
Less than 12 years	59.1	63.5	53.6	61.5	61.2	54.4	69.1	60.1
12 years	68.1	65.6	72.4	66.5	67.8	64.2	72.2	68.8
More than 12 years	70.3	71.4	69.7	68.5	73.3	72.1	77.8	69.8
<i>Weight within desirable range for height</i>								
Education:								
All levels	63.6	64.1	62.5	64.2	61.7	73.7	58.8	44.9
Less than 12 years	56.7	61.7	53.0	57.0	45.9	64.1	45.4	34.1
12 years	63.8	64.1	60.4	68.2	58.3	68.4	57.0	40.3
More than 12 years	66.3	64.7	68.5	67.4	73.8	81.7	68.0	62.6
<i>Never smoked cigarettes</i>								
Education:								
All levels	33.7	43.7	24.0	28.5	50.6	53.9	46.9	49.4
Less than 12 years	16.3	10.4	10.8	25.1	43.6	35.9	47.3	46.1
12 years	32.4	38.1	27.6	28.8	52.8	55.5	49.1	52.4
More than 12 years	41.8	53.6	27.7	31.5	62.0	57.6	44.2	49.4
<i>Fewer than 5 drinks per day</i>								
Education:								
All levels	85.1	80.6	88.5	88.7	96.6	94.6	98.7	97.7
Less than 12 years	76.3	68.7	77.7	79.9	94.7	86.2	99.0	97.3
12 years	85.3	79.1	91.2	88.2	96.4	94.5	98.5	97.4
More than 12 years	88.6	83.8	91.6	97.8	97.9	97.1	98.7	98.5
<i>Engages in physical activities</i>								
Education:								
All levels	92.6	94.7	91.3	90.4	91.4	96.6	90.7	83.4
Less than 12 years	86.5	92.2	87.3	82.1	81.4	96.4	84.5	69.3
12 years	93.0	92.5	92.8	94.1	93.0	95.0	93.4	88.5
More than 12 years	94.9	96.5	92.2	95.1	94.9	98.2	91.0	92.5
<i>Eats breakfast almost every day</i>								
Education:								
All levels	53.3	44.7	53.1	69.6	55.9	47.1	55.3	71.5
Less than 12 years	52.8	35.7	50.0	66.5	49.8	34.4	44.4	63.8
12 years	53.1	44.1	53.6	69.4	53.2	41.3	55.9	72.4
More than 12 years	53.6	46.9	54.3	72.8	62.3	56.7	60.5	78.9

• Persons with more than 12 years of education reported 5 or 6 favorable practices more frequently than those with less than 12 years of education. The differences were more than twofold among men in each age group.

Table 3 illustrates the type of attitudinal and other health practices questions asked in the survey and shows the response distribution by sex. Half of the respondents felt that they had a great deal of control over their own health. It is the prevalence of this feeling of control

over one's health that is one basis for any program promoting good health practices. About half of the respondents reported they are doing a good job of taking care of their health, but only about 15 percent felt they are doing an excellent job. However, to the extent that wearing seat belts when riding in a car reflects a positive health practice, only 20 percent of the study respondents reported "always or nearly always" wearing seat belts, while another 15 percent said "sometimes." There is little difference by sex in use of seat belts, although the respondents with more than a high school

Table 2. Proportion of persons 20–64 years reporting 0 to 3, 4, or 5 or 6 favorable health practices according to sex, age, and education: National Survey of Personal Health Practices and Consequences, Wave I, 1979

Health practice score and education	Men				Women			
	20–64 years	20–34 years	35–49 years	50–64 years	20–64 years	20–34 years	35–49 years	50–64 years
0 to 3 favorable practices								
Education:								
All levels	34.9	35.1	40.2	27.2	23.4	21.1	23.8	26.9
Less than 12 years	52.6	56.5	62.0	41.3	39.3	40.0	33.3	43.0
12 years	34.7	41.3	35.2	21.8	23.8	24.8	23.6	22.1
More than 12 years	27.7	27.2	33.2	18.5	14.6	11.8	18.9	15.5
4 favorable practices								
Education:								
All levels	31.8	31.9	27.4	37.9	34.0	33.6	34.4	34.3
Less than 12 years	31.1	28.7	24.7	38.5	36.0	35.4	39.6	33.8
12 years	31.1	25.9	30.8	41.2	34.3	33.7	31.9	38.5
More than 12 years	32.6	35.9	26.3	34.2	32.7	32.9	34.6	29.4
5 or 6 favorable practices								
Education:								
All levels	33.3	33.1	32.4	34.9	42.6	45.3	41.8	38.8
Less than 12 years	16.3	14.8	13.3	20.1	24.7	24.6	27.1	23.2
12 years	34.2	32.8	34.0	37.1	41.9	41.5	44.5	39.4
More than 12 years	39.8	36.9	40.5	47.3	52.7	55.3	46.5	55.1

education were much more likely to use seat belts than were those with less than a high school education. Another practice that is anticipated to be a predictor of other positive health behavior is the use of dental floss or a waterpick. Table 3 shows that two-thirds of the men and one-half of the women in the sample flossed or waterpicked less than once a week, and the majority of these never did.

A composite physical health status variable was developed to provide an approximation of a similar variable in the Alameda study. It is based on four variables: limitation of activity level (similar to the NHIS limitation of activity questions); questions on ability to perform routine activities of daily living (ADL), such as walking, using stairs, sitting or standing for long periods, using fingers to grasp or handle, and lifting or carrying a 10-pound object; number of days spent in bed in the past year because of illness or injury; and energy level. Responses to these items were combined into a 5-point scale of health status:

1. unable to perform major activity (work, housework) or report a "great deal of trouble" in at least one activity of daily living.
2. limited in kind or amount of major activity or limited in other than major activities or report "some trouble" in at least one activity of daily living.
3. no limitation of activity and no difficulty in ADL and eight or more bed days in the past year.

Table 3. Other selected health practices and attitudes by sex in percentages: National Survey of Personal Health Practices and Consequences, Wave I, 1979

Questionnaire item and response	Men	Women
Total ¹	100.0	100.0
How much control do you think you have over your future health?		
None at all	4.1	3.1
Very little	6.3	4.7
Some	34.9	39.6
A great deal	51.9	50.2
How good a job do you feel you are doing in taking care of your health?		
Excellent	14.0	14.6
Good	51.1	53.6
Fair	27.5	27.2
Poor	6.2	4.0
How often do you use seat belts when you ride in a car?		
Always or nearly always	19.8	19.5
Sometimes	13.6	15.3
Seldom	18.1	17.6
Never	48.5	47.5
How often, if ever, do you use dental floss or a waterpick?		
Every day	16.0	28.3
3 to 6 times a week	6.1	7.9
1 or 2 times a week	12.2	14.9
Less than once a week	13.5	10.9
Never	52.1	37.8

¹ Total includes unknowns.

² Asked of persons who have at least some natural teeth; percentages represent percent of persons with natural teeth.

- 4. no limitation of activity *and* no difficulty in ADL *and* fewer than eight bed days in past year *and* report "less energy than other people your age."
- 5. no limitation of activity *and* no difficulty in ADL *and* fewer than eight bed days *and* report "more energy than other people your age."

The analyses in this paper combine scale categories 1 to 3 into a single category of relatively poor physical health status based on some level of limitation of activity, difficulty with ADL, or eight or more bed days. Overall, 23.6 percent of the men and 35.4 percent of the women were classified as having relatively poor physical health status (table 4).

Some preliminary findings regarding physical health status and health practices are shown in tables 4-6.

- As in the Alameda survey, the more health habits people practiced, the less likely were they to report concurrent physical health problems. This was true for both men and women, for the younger as well as the older adults, and for those who had gone to college as well as those who had not (tables 4 and 6).

- Persons reporting themselves as physically active were less likely to report having had physical health problems. Physical activity had the highest correlation with physical health status of any of the six Alameda health practices examined. There is, of course, some redundancy in this observation: degree of physical activity can be taken as part of a measure of concurrent physical health status (table 5).

- Also correlated positively with reported concurrent physical health status were these two Alameda health habits: controlling one's weight and sleeping 7-8 hours a night (table 5).

- The other three Alameda health practices examined were relatively uncorrelated with reported concurrent physical health status: never having been a cigarette smoker, moderate alcohol drinking or abstinence, and eating breakfast regularly (table 5).

- Indeed, what has been regarded as heavier drink-

ing of alcoholic beverages (that is, an average of five drinks or more on drinking days) was consistently associated, albeit only slightly, with reports of better physical health status for men and women, younger and older adults, and for better and less well-educated persons.

Table 4. Percentage of persons 20-64 years with physical health status scores 1 to 3, by sex and health practice score: National Survey of Personal Health Practices and Consequences, Wave I, 1979

Health practice score	Men	Women
All scores	23.6	35.4
0 to 3	27.8	47.0
4	21.6	33.9
5 or 6	21.2	30.3

Table 5. Percentage of persons 20-64 years with physical health status scores 1 to 3 by selected favorable and unfavorable practices and sex: National Survey of Personal Health Practices and Consequences, Wave I, 1979

Selected health practice	Men	Women
Sleep:		
Unfavorable	26.4	38.7
Favorable	22.3	33.9
Weight:		
Unfavorable	28.9	43.4
Favorable	20.6	30.5
Smoking:		
Unfavorable	24.8	37.0
Favorable	21.3	33.9
Alcohol:		
Unfavorable	20.6	30.0
Favorable	23.8	35.4
Physical activities:		
Unfavorable	37.6	61.7
Favorable	22.5	33.0
Breakfast:		
Unfavorable	22.8	35.3
Favorable	24.3	35.6

Table 6. Percentage of persons 20-64 years with physical health status scores 1 to 3 by health practice score, sex, age, and education: National Survey of Personal Health Practices and Consequences, Wave I, 1979

Health practice score	Men				Women			
	20-44 years		45-64 years		20-44 years		45-64 years	
	High school ¹	College ²	High school ¹	College ²	High school ¹	College ²	High school ¹	College ²
0 to 3	23.8	21.5	46.2	27.4	36.8	42.3	62.3	53.2
4	20.5	14.9	34.3	18.9	28.8	27.2	46.1	39.2
5 or 6	18.1	11.2	45.2	21.6	26.9	23.9	39.0	42.0

¹ High school—high school graduate or less. ² College—more than high school graduate.

- At all three Alameda health habit levels, generally people whose formal education did not go beyond high school were more likely to report poorer physical health status than persons who had some college education (table 6).

- For both men and women, the relation between number of Alameda health practices and concurrent physical health status obtains (table 6).

- The relationship between number of Alameda health practices and concurrent physical health status holds for younger (ages 20–44) and to a lesser extent also for older adults (ages 45–64) (table 6).

The national survey has verified the relationship found between certain Alameda health practices and concurrent physical health status, as originally reported by Belloc and Breslow (1). On the other hand, the relationship between other of the Alameda health practices and concurrent physical health status was not verified on the national survey.

Conceptual Issues

Several conceptual issues complicate the analysis of the relationship between health practices and health status. The major issue is the potential for circularity between certain practices and health status measures. For example, one of the Alameda health practices concerns physical activity levels, and the physical health status variable also includes the ability to perform certain activities. This issue was recognized by Breslow and Enstrom in their most recent analysis of the Alameda data (3).

A closely related issue is the assumption that good health practices should lead to better health status. However, in investigations of the relationship between the two, there is the problem that health status can also affect health practices, that is, persons in poor health may be unable to perform many of the practices. Certain health conditions or their management may cause a person to lose weight or may restrict their smoking, drinking, exercise, or sports activity. The temporal relationship between practices and health is difficult to obtain in cross-sectional studies, although questions about past practices and past health status can be asked. In fact, in the NSPHPC, respondents were asked if certain of their health practices had changed in the last 2 years and, if so, was the change because of a health condition. The fact that the respondents were interviewed at two points in time will permit additional analysis of this temporal factor.

Another issue in any interview survey is the self-reporting of practices and appraisal of health status, an issue infrequently raised in the analysis and interpretation of survey data. In addition to the problem of accuracy of reporting health practices, such as the number of

hours slept, to what extent are self-reports of health status variables influenced by respondents' perception of both their health status and health behavior? People who perceive themselves as healthy might overlook and not report certain health characteristics that otherwise might be reported if they perceived their general health status differently. For example, are people who perceive their health as excellent as likely to report the bed days due to influenza that occurred several months ago as are people who have a poor self-concept of their general health status? This methodological issue has not been fully addressed in health interview surveys.

Future Analysis

Several reports on this survey will be forthcoming later in 1981. One presents data on about 50 selected health practices by sex, age, and education, similar to those shown in table 1. This report also contains a copy of the survey questionnaire (31). The second report shows the percentage distribution of responses to most questionnaire items by sex, similar to the format of table 3 (32). There will be analyses similar to the Alameda study of the relationship of the six practices with the physical health status variable. One of the main purposes of the survey was to determine the distribution and predictive power of a wider range of health practices than were reported in the Alameda study. The 1-year reinterview of the respondents will permit analysis of the relative stability of these practices over time. Data will be presented both in terms of aggregate changes in the behaviors of subgroups of the population and in terms of individual changes.

Much of the initial analysis will be an examination of the relationship between the selected health practices identified in the survey to determine whether certain positive practices tend to cluster. In addition, there will be an effort to determine whether selected health practices can be used as indicators of more general positive health behavior. For example, do people who regularly wear seat belts or floss their teeth tend to follow a number of other "good" practices?

Additional analysis will be done on the impact of health practices on health status, although the health status measures in this study are rather general. Two types of analyses are possible with the data. The relationship between health practices and concurrent health status can be analyzed for both the first and second wave of data. The followup design will permit the analysis of the relationship between health practices at the first wave and health status at the second wave. In addition, several retrospective questions on the first wave will permit analysis of whether current health behaviors are influenced by previous health status.

A significant feature of this national study is the ability to follow the mortality experience of the sample, as was done in the Alameda County study. Data were obtained from the respondents that will permit matching them with the new National Death Index developed by the National Center for Health Statistics. Each year, the sample will be checked against a list of all deaths that have occurred in the country so that, as the data are accumulated over the years, estimates can be made of the life expectancy based on previous health behaviors. This, of course, is a long-term analysis plan, with the first major analysis at least 5 years in the future.

References

1. Belloc, N. B., and Breslow, L.: Relationship of physical health status and health practices. *Prev Med* 1: 409-421 (1972).
2. Belloc, N. B.: Relationship of health practices and mortality. *Prev Med* 2: 67-81 (1973).
3. Breslow, L., and Enstrom, J. E.: Persistence of health habits and their relationship to mortality. *Prev Med* 9: 469-483 (1980).
4. Berkman, L. F.: Psychosocial resources, health behavior, and mortality: a nine-year follow-up study. Presented at the 10th annual meeting of American Public Health Association, Washington, D.C., Oct. 31, 1977.
5. Berkman, L. F., and Syme, S. L.: Social networks, host resistance and mortality: a 9-year follow-up study of Alameda County residents. *Am J Epidemiol* 109: 186-204 (1979).
6. Berkman, P. L.: Survival, and a modicum of indulgence in the sick role. *Med Care* 13: 85-94 (1975).
7. Wiley, J. A., and Camacho, T. C.: Life-style and future health: evidence from the Alameda County study. *Prev Med* 9: 1-21 (1980).
8. Breslow, L.: Life styles are bettering health. *The Record*, (Bergen-Passaic-Hudson Counties, N.J.) Feb. 2, 1981, p. B1.
9. Brody, J. E.: The health sins include snacking and too much or too little sleep. *Personal health column*. *New York Times*, Dec. 10, 1980.
10. Elison, J.: Lifestyles, longevity, and quality of life. *Public Opinion Q* 44: 421-427, fall 1980.
11. Fuchs, V. R.: Who shall live? Health, economics and social choices. Basic Books, New York, 1974.
12. Fuchs, V. R. Economics, health, and post-industrial society. *Milbank Mem Fund Q* 57: 153-182, spring 1979.
13. LaLonde, M.: A new perspective on the health of Canadians. Department of National Health and Welfare, Ottawa, 1974.
14. Knowles, J. H.: Responsibility for health. [Editorial.] *Science* 198: 1103, December 1977.
15. Somers, A. R.: Life-style and health. Ch. 26 *In* Maxcy-Rosenau. *Public health and preventive medicine*. Ed. 11, edited by J. M. Last, Appleton-Century-Crofts, New York, 1980, pp. 1046-1065.
16. Bauer, K., and Wilson, R. W.: Prevention profile, *In* *Health United States 1980*. DHHS Publication No. (PHS) 81-1232, U.S. Government Printing Office, Washington, D.C., October 1980, pp. 351-463.
17. Fogarty International Center and American College of Preventive Medicine: *Preventive medicine*. U.S.A. Prodist, New York, 1976.
18. Institute of Medicine: *Perspective on health promotion and disease prevention in the United States*. National Academy of Sciences, Washington, D.C., 1978.
19. Public Health Service: *Healthy people: the Surgeon General's report on health promotion and disease prevention, 1979*. DHEW Publication No. (PHS) 79-55071. U.S. Government Printing Office, Washington, D.C., 1979.
20. Public Health Service: *Healthy people: the Surgeon General's report on health promotion and disease prevention—background papers, 1979*. DHEW Publication No. (PHS) 79-55071A. U.S. Government Printing Office, Washington, D.C., 1979.
21. Public Health Service: *Disease prevention and health promotion: Federal programs and prospectives*. DHEW Publication No. (PHS) 79-55071B. U.S. Government Printing Office, Washington, D.C., 1978.
22. Public Health Service: *Promoting health/preventing disease—objectives for the nation*. U.S. Government Office, Washington, D.C., fall 1980.
23. National Center for Health Statistics: *Cigarette smoking and health characteristics, United States, July 1964—June 1965*. Series 10, No. 34, PHS Publication No. 1000, U.S. Government Printing Office, Washington, D.C., 1967.
24. National Center for Health Statistics: *Changes in cigarette smoking and current smoking practices among adults, United States, 1978*. *Advancedata*, No. 52. U.S. Government Printing Office, Washington, D.C., Sept. 19, 1979.
25. National Center for Health Statistics: *Plan and operation of the Health and Nutrition Examination Survey, United States, 1971-1973*. Series 1, No. 10b. DHEW Publication No. (PHS) 79-1310. U.S. Government Printing Office, Washington, D.C.
26. National Center for Health Statistics: *Plan and operation of the second Health and Nutrition Examination Survey, 1976-1980*. Appendix II, Series 1, No. 15. In press.
27. National Center for Health Statistics: *Exercise and participation in sports among persons 20 years of age and over, United States, 1975*. *Advancedata*, No. 19. U.S. Government Printing Office, Washington, D.C., 1978.
28. National Center for Health Statistics: *Current estimates, United States, 1977*. Series 10, No. 126. DHEW Publication No. (PHS) 78-1554, U.S. Government Printing Office, Washington, D.C., September 1978.
29. National Center for Health Statistics: *Health practices among adults: United States, 1977*. *Advancedata*, No. 64. U.S. Government Printing Office, Washington, D.C., Nov. 4, 1980.
30. Thornberry, Jr., O. T., and Massey, J. R.: Correcting for undercoverage bias in random digit dialed national health surveys. *In* *Proceedings of the Section on Survey Research Methods, 1978 meeting American Statistical Association*. Aug. 13-17, San Diego, Calif., 1978.
31. National Center for Health Statistics: *National survey of personal health practices and consequences: Highlights from 1979 interviews, United States*. Series 15, No. 1, DHHS Publication No. (PHS) 81-1162. In press.
32. National Center for Health Statistics: *National survey of personal health practices and consequences: Basic data from 1979 interviews, United States*. Series 15, No. 2, DHHS Publication No. (PHS) 81-1163. In press.