

Response to Physical Activity Programs and Their Effects on Health Behavior

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EVALUATION of the overall effectiveness of health programs concerned with disease prevention and health enhancement requires examination of the factors that influence response to such programs, as well as of the changes in health attitudes and behavior that they generate. We have given specific attention to these issues in regard to programs of supervised physical activity for middle-aged men considered at risk of coronary heart disease.

Data were obtained as part of a collaborative research effort which included pilot studies at the Universities of Minnesota, Wisconsin, and Pennsylvania State in 1966-68. These studies, supported by the Heart Disease and Stroke Control Program of the Public Health Service, were designed primarily to examine the relationship between physical activity and changes in cardiovascular risk. The research effort was coordinated by the Steering Committee on Co-operative Pilot Studies of Physical Activity and Coronary Heart Disease, comprised of Dr.

At the time of the study, Dr. Heinzelmann was chief of behavioral science activities and Mr. Bagley was a research assistant with the Heart Disease and Stroke Control Program, Regional Medical Programs Service, Health Services and Mental Health Administration. Dr. Heinzelmann is now with the National Institute of Law Enforcement and Criminal Justice, Department of Justice. Mr. Bagley is currently employed in California.

Henry L. Taylor, chairman, Dr. Richard Remington, director of the statistical center, Dr. Ellsworth Buskirk, Dr. Bruno Balke, Dr. Samuel Fox III, Dr. Jeremiah Stamler, and Dr. Frederick Epstein. Dr. Taylor (Laboratory of Physiological Hygiene, University of Minnesota, Minneapolis) and co-authors have prepared a report outlining the nature of this research effort, which includes a discussion of the physiological effects of the physical activity programs.

The pilot studies provided an opportunity to systematically examine the factors influencing response to this kind of health program as well as the behavioral effects of participation. These issues were explored in line with a broader research focus dealing with determinants of health behavior and of health behavior change (1). The design of the pilot studies made it possible to examine these issues on a prospective and longitudinal basis. This type of research approach serves a necessary and useful function in expanding the body of social science theory and research data dealing with health behavior (2-4).

The study groups included in this research effort were selected from a metropolitan community—Minneapolis, Minn.—and from university settings that included both faculty members and service employees—Madison, Wis., and College Park, Pa. All persons participating in the programs were sedentary men 45-59 years

of age who were found to have certain characteristics relative to blood pressure readings and cholesterol levels which increased their risk of coronary heart disease. These men were asked to participate in supervised physical activity for 1 hour three times a week. The programs of physical activity were conducted at the three sites for approximately 18 months and involved a total of 239 men. Another 142 men were assigned to control groups. At each site, the men were randomly assigned to either the exercise or control group. (Subsequent variation in the numbers in the exercise and control groups reflects the varying number of respondents from whom specific kinds of information were obtained.).

In order to examine attitudes and behavior systematically, a uniform research approach was used at each study site. For example, initially a telephone health survey was carried out at each site in which the attitudes, beliefs, and health behavior of potential participants were assessed before they were invited to take part in the program. After the men who were invited had made their decisions about participating, additional data on their attitudes, beliefs, and behavior were obtained at standard 3-4-month intervals during the program and at the time the program terminated. Comparable data on attitudes and behavior were obtained from members of the control groups, who did not exercise but along with the participants in the programs of physical activity, received medical evaluations at the standard 3-4-month intervals.

In all of these studies, the social-psychological data on attitudes and behavior were obtained by interview as well as through a series of self-administered questionnaires.

Factors Influencing Participation

In order to identify and define some of the factors that influenced the response to the programs of physical activity, the men who volunteered were asked to indicate their reasons for participating. Their responses were then collated and summarized in a brief list. Each volunteer was asked to review this list at the beginning of the program and to rank order each of the reasons listed in terms of the extent to which it influenced his own participation. A

total of 159 men (approximately two-thirds of the study participants) provided data relevant to this issue.

The reasons the men listed as most important in influencing their participation included the desire to feel better and healthier, concern about lessening the chance of a heart attack, and a desire to help the cause of medical research. This last reason was a direct function of the research context in which the programs of physical activity were organized and conducted. Other reasons that the men indicated were of moderate importance in influencing their participation included their desire to gain health knowledge, to have recreation and pleasure, and to vary their usual routine. At the beginning of the program, the reasons which the volunteers considered least important in influencing their decision to participate included the social aspects of the exercise program and the desire to please their wives.

Best Liked Program Features

At the end of the exercise program, the participants were asked which features they liked best and what factors had most influenced them to stay in the program. The respondents most often mentioned the organization of the program and the leadership. The features of the program which were most liked and the percentage of the 161 respondents listing each are as follows:

<i>Best liked features</i>	<i>Percent of participants</i>
Organization and leadership.....	32
Exercising in general.....	31
Recreation—games.....	29
Social aspects—camaraderie.....	26
Health and fitness benefits.....	14
Regularity of exercise.....	12
Medical evaluations.....	9
Feeling of accomplishment.....	6

In contrast to the study group's earlier evaluation of the social aspects of the program as among the factors of least importance in influencing their decision to participate, at the end of the program, more than one-fourth of the respondents listed the social aspects as among the best liked features and a factor which influenced their adherence. Physical activity is apparently often viewed as a social activity; persons often prefer to exercise with

another person or with a group rather than alone. For example, when participants were asked to state in what circumstances they preferred to exercise, almost 90 percent of the 195 men who responded indicated that they preferred to exercise with a group or with another person. In carrying out physical activity with others, persons report that they seem to enjoy it more, experience social support, feel a sense of personal commitment to continue, and welcome the opportunity to compare their own progress and level of fitness with that of others.

Influence of Wives

While members of the exercise group did not view their decisions to participate as having been greatly influenced by a desire to please their wives, a wife's attitudes or feelings about the project obviously constituted a significant variable in relation to her husband's adherence during the 18 months the project was in existence. The data in figure 1 clearly indicate that the husband's pattern of adherence was directly related to his wife's attitude toward the program.

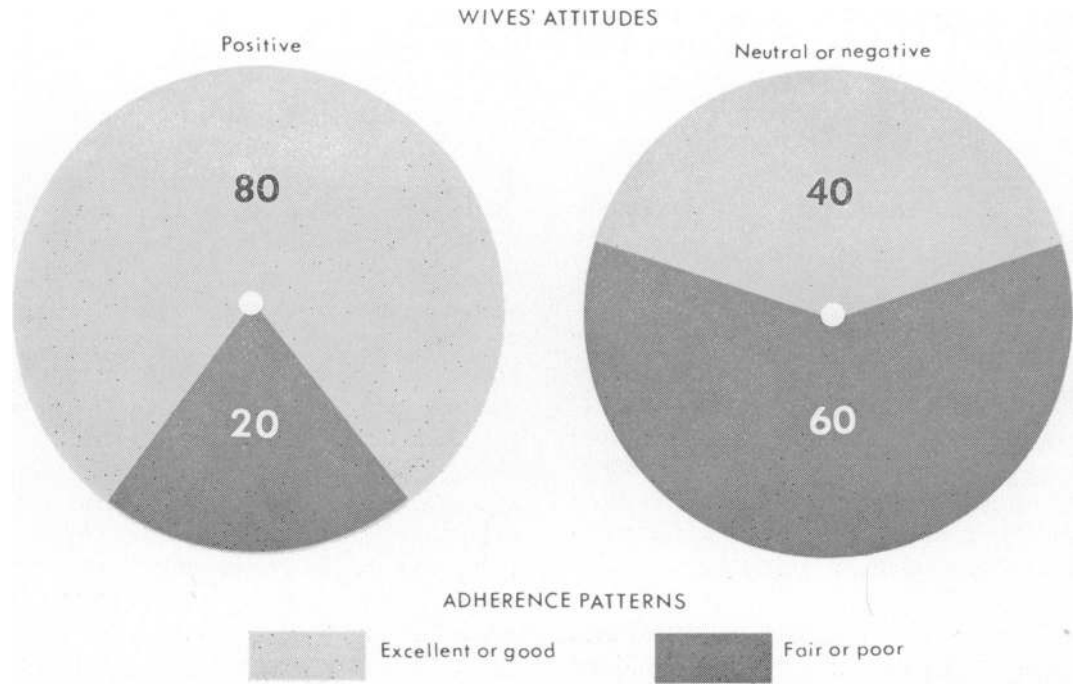
Of the 143 men whose wives' attitudes

towards the program were positive, 80 percent had good or excellent patterns of adherence. In contrast, only 40 percent of the 39 men whose wives' attitudes were neutral or negative had good or excellent patterns of adherence. Conversely, about 20 percent of the men whose wives had a positive attitude exhibited a fair or poor pattern of adherence, compared with 60 percent of those whose wives' attitudes were neutral or negative. Our results suggest that a husband's pattern of adherence was influenced as much by his wife's neutral or indifferent attitude as by a negative one.

Implications Concerning Program Response

Our study data have several implications for the organization and administration of programs of physical activity. First, our results highlight the fact that persons may be motivated to participate in such programs for a variety of reasons—health, recreation, change of routine, and so forth. Therefore, in promoting participation, the focus should be diverse and take a variety of motives into account whether or not they are health-related and whether or not they are consonant with the

Figure 1. Wives' attitudes in relation to participants' adherence to the program of physical activity, in percentages



views of the persons organizing or administering the project.

Second, our data indicate that the factors influencing a person's decision to participate may differ from those that influence his adherence over time. Since the social aspects of physical activity encourage adherence, more attention should be given to this factor and efforts made to insure that the program is organized and administered so as to support, rather than impede, the development of social influences.

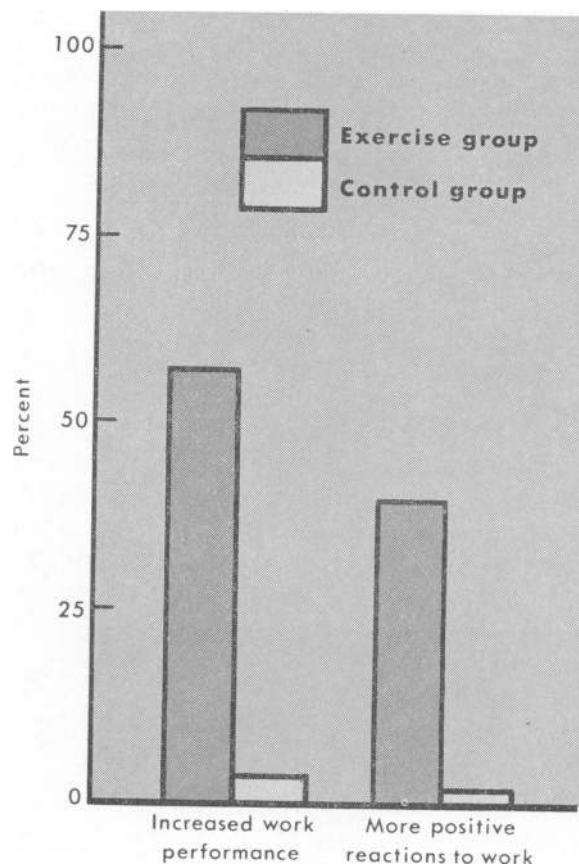
Third, when efforts are made to organize and administer programs of physical activity, attention should be focused not only on the potential participant, but also on those persons to whom the prospective participant relates most directly, such as his wife, other members of his family and, if possible, his colleagues at work. The attitudes and reaction of the persons around the potential participant often determine whether or not he will take part in the activity and adhere to it over time.

Program's Effect on Attitudes and Behavior

At the end of the program, the effects of physical activity on health attitudes and health-related behavior were given special attention. Comparisons were made of the changes or effects that members of the exercise group and the control group reported in three major areas of their lives since the start of the project. The two groups were directly comparable since the men had been randomly assigned either to an exercise group or to a control group. The differences between the two groups in effects reported were all found to be statistically significant beyond the 0.01 level of confidence. Moreover, the periodic medical evaluations that the control group received along with the participants probably served to attenuate these differences by making the control group more health conscious. In short, sharper differences would likely have been observed between participants and a group not involved in the control phase of the study. Both the exercise and control groups reported beneficial effects from the program; only a few men reported any undesirable effects, such as gaining weight instead of losing it.

Work performance and attitudes. The first major area of the men's lives that was examined

Figure 2. Percent of exercise group and of control group reporting that the program had beneficial effects on their work



for changes resulting from the program dealt with their performance at work and attitudes toward work. Almost 60 percent of the 108 program participants who provided information on this point indicated that they had noticed that the program had a significant positive effect on their work performance (fig. 2). In contrast, only about 3 percent of the 80 men in the control group reported such improvement. Typical comments by the participants were: "I have a greater capacity to work harder both mentally and physically." "I have improved my power of decision and concentration."

Differences were also observed in the men's attitudes toward their work after completion of the program. About 40 percent of the participants reported a more positive attitude, compared with only 1 percent of the men in the control group. Typical comments included: "I feel more energetic and more productive." "I

enjoy my work more because I get more done.” “My normal work routine seems less boring now.”

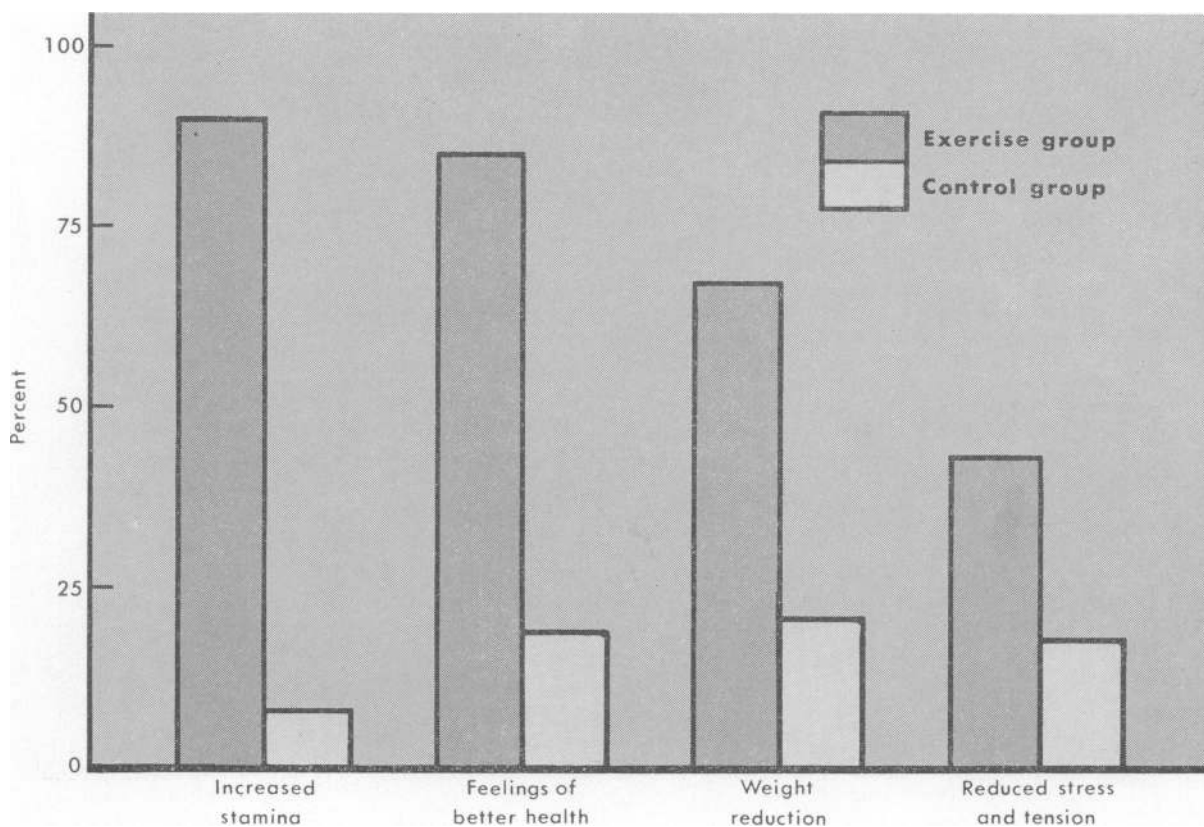
Aspects of personal health. The second major area examined for changes included several aspects of personal health. In this area, too, the men reported meaningful differences as a result of the program, such as increased stamina and energy, more positive feelings about their health, weight reduction, and greater ability to deal with stress and tension. In all of these aspects, the participants reported changes significantly more often than members of the control group (fig. 3).

Habits and behavior. The final area examined for changes was that of habits and behavior. Once again positive effects of the program were reported more often by the 108 program participants who provided information on this point than by the 80 members of the control group who responded (fig. 4). For example, the two groups differed in the amount of food they

reported they were eating, but not in the kinds of food. The majority of the participants who reported changes in this area indicated they were eating less and avoiding snacks between meals whenever possible. Only a few men reported that they were eating more at the end than before the program began. In general, participants appeared to be more interested in, and more aware of, the importance of weight control than members of the control group.

Differences were also observed in the recreational patterns of the two groups. Participants again reported changes more often than members of the control group. In general, participants indicated that they had increased their recreational activities with family and friends. The majority stated that they now walked and cycled more than before. Many of the participants reported that they used stairs rather than elevators and often walked rather than rode when they had an option. It is clear that physical activity had influenced the life pat-

Figure 3. Percent of exercise group and of control group reporting that the program had beneficial effects on their health



terns of many of the participants; their behavior in a variety of settings reflected a more positive attitude toward physical activity in general. In short, physical activity had become a pervasive habit in the life style of many of these men.

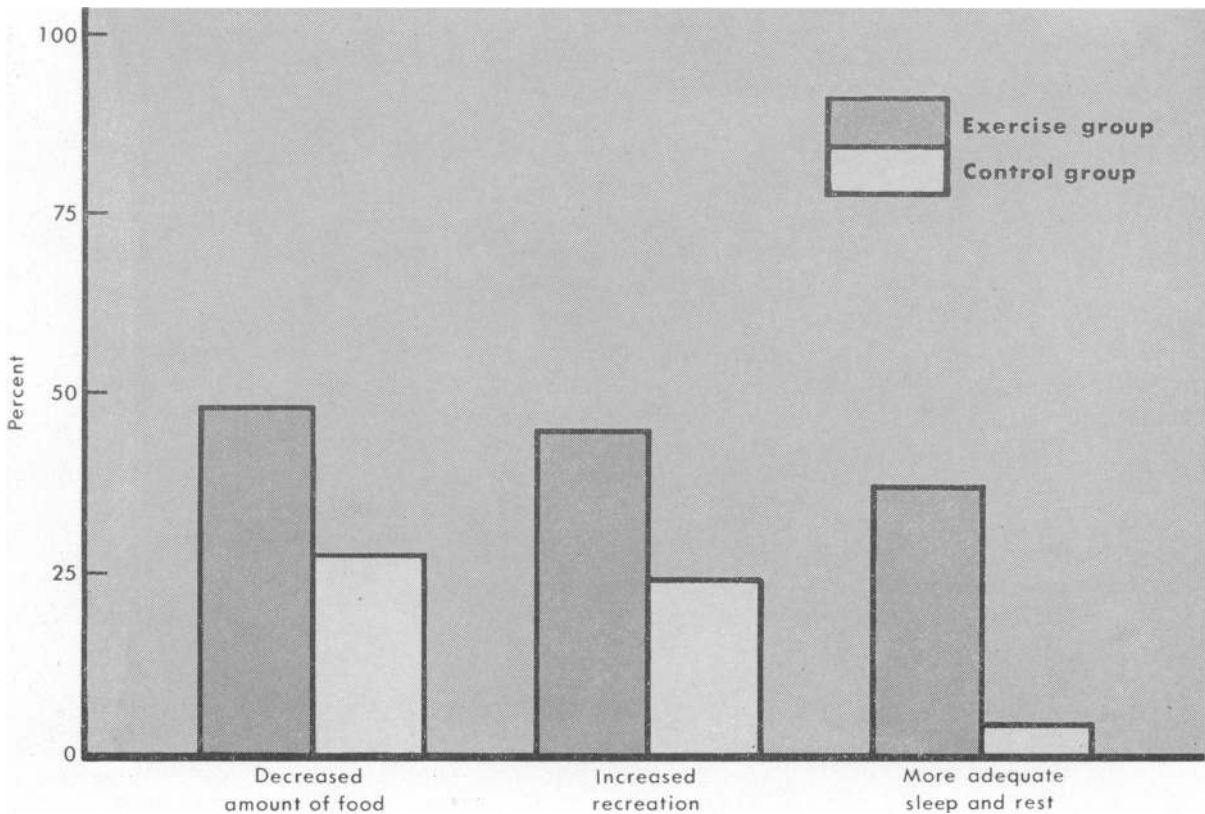
Participants also reported a greater change in their patterns of sleep and rest than did members of the control group. They generally indicated a need for less sleep, as well as the ability to obtain a sounder and more relaxed kind of sleep. No differences were found between the men in the exercise and control groups in terms of changes reported in the kinds of food eaten or in smoking behavior. About one-third of the persons in both groups reported that they were now eating less fats and starches than before. About 20 percent of the persons in both groups reported that they smoked less.

A number of standard social-psychological measures were also used to assess the attitudes and beliefs of the participants and members of

the control group. (Subsequent reports will deal with these factors in more detail.) The results obtained with these measures were highly consistent with the other results of our study, for they demonstrated marked differences between the participants and men in the control group. In general, participants were likely to manifest a more positive self-image, which was reflected in optimism about their health and a feeling of decreased vulnerability to specific health threats, including a heart attack.

After this research was completed, the general results were replicated in another study we conducted of a physical activity program within a Federal agency (5). In addition, a highly consistent and positive relationship was found between the personal health effects that the program participants reported and the improvements that were noted in their cardiovascular and physiological functioning, based on treadmill performance. Significant differences in these measures of improvement were found be-

Figure 4. Percent of exercise group and of control group reporting that the program had beneficial effects on their habits and behavior



tween participants who reported favorable health effects and those who did not.

Summary

The overall effectiveness of health programs is linked to an understanding of the factors that influence response to such programs and of the kinds of changes in health attitudes and behavior that participation generates. These issues were examined as part of a collaborative research effort that included three pilot studies of programs of supervised physical activity. The programs were made available to sedentary men 45-59 years of age who were considered to be at risk of coronary heart disease. The study sites included a metropolitan community and two university settings; the university settings included both faculty members and service employees. The study groups consisted of 239 men randomly assigned to an exercise program and 142 men randomly assigned to a control group. Program participants were asked to exercise for 1 hour three times a week for 18 months. Research data (medical, physiological, and social-psychological) were obtained from program participants and from members of the control group at regular 3-4-month intervals while the program was in operation.

A number of variables influencing the men's response to the physical activity programs were identified and defined; these included a variety of motivational factors as well as the social aspects of physical activity and the attitude of the participant's spouse. Differences were noted between the factors influencing the men's decisions to participate and those affecting their continued adherence to the program.

Physical activity was found to influence the participant's attitudes and beliefs, his habits and behavior, and his general self-image. Significant effects were reported on the man's work performance and his attitude toward work, along with such general health effects as feeling in better health, having increased stamina, experiencing a weight reduction, and possessing a greater ability to cope with stress and tension. In addition, the effects of participation were reportedly reflected in behavioral changes relating to the amount of food eaten, the kind of sleep and rest obtained, and the participant's pattern of recreation. These changes were linked to a more positive self-image which served to support the person's thoughts, feelings, and actions.

REFERENCES

- (1) Heinzelmann, F. : Social-psychological research in heart disease control programs. *Amer Psychol Assoc Bull (Division 22)* 15: 8-9, March 1968.
- (2) Kasl, S., and Cobb, S. : Health behavior, illness behavior, and sick role behavior. *Arch Environ Health* 12 (pt. 1) : 246-266, February 1966; (pt. 2) : 531-541, April 1966.
- (3) Rosenstock, I. M. : Why people use health services. *Milbank Mem Fund Quart* 64: 94-127, July 1966.
- (4) Hochbaum, G. : Health behavior. Wadsworth Publishing Company, Inc., Belmont, Calif., 1970.
- (5) Durbeck, D., et al. : The NASA-USPHS Health Evaluation and Enhancement Program. Monograph. Division of Occupational Medicine, Headquarters, National Aeronautics and Space Agency, Washington, D.C. In press.

Tearsheet Requests

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Program Notes

North Carolina Tops Nation

In 1969, more than 3,600 children in North Carolina suspected of having a developmental handicap were evaluated (see frontispiece). About 30 percent of the children referred as retarded are diagnosed as "not mentally retarded." Only New York and Pennsylvania came close to evaluating as many children for mental retardation in that year.

The success of the program in North Carolina can be attributed mostly to long-range planning in locating clinics throughout the State, according to Dr. T. D. Scurletis, director, personal health division, North Carolina State Board of Health. No State, he said, has more complete geographic coverage than North Carolina in the placement of clinics to evaluate children with suspected developmental handicaps. More such clinics are needed, however, said Dr. Robert Neely, chief of the board of health's mental retardation section. He pointed out that about 90,000 of North Carolina's 2 million children are mentally retarded.—*The Health Bulletin* (North Carolina State Board of Health), June 1970.

Illness From Pet Turtle

The little green turtle, a familiar pet in the home and classroom, can cause serious illness, especially in younger children, according to Thomas W. McKinley, director of the disease investigations service, Georgia Department of Public Health. "It is not known," he said, "how many times a sickness obtained from a pet turtle has been blamed on some other cause like bad food, indigestion, upset stomach, or 24-hour virus."

At the time of purchase, McKinley explained, more than half of the pet turtles have *Salmonella* organisms in their intestinal tract. These organisms get on their bodies as they swim around in their tank water. People get the harmful organisms

on their hands when they pick up the turtle or handle its bowl.

The health official recommended a number of rules for those with pet turtles to follow, such as not changing the turtle's water in the kitchen sink, using the turtle's dish only for the turtle, and washing one's hands after handling the pet or any object with which it has been in contact.—*Georgia's Health* (Georgia Department of Public Health), May 1970.

Nutrition and Fitness

Free nutrition and fitness courses have been recently initiated for citizens of Fond du Lac, Wis. These courses are designed "To reverse the trend of a disease-oriented society to one in which there is emphasis on staying well and to help people find less costly and more interesting ways of keeping fit."

The courses are sponsored by the Wisconsin State Department of Health and Social Services, the Fond du Lac Technical Institute, and the Wisconsin Heart Association. The first of each 2-hour evening session is devoted to informal presentations, group discussions, panels, films, and demonstrations on health-oriented subjects, for example, on food fads and facts. The second hour includes exercise and dancing under the direction of physical education instructors from local schools; a physical therapist is also present. Thirty-seven persons, ranging in age from 25 to 65 years, signed up for the eight-session course that began in January 1969; 24 came to five or more classes. Because of the response, a second course of 10 sessions was offered, for which 34 persons signed up.—*Wisconsin's Health*, Spring 1970.

Training Police as R.N.'s

An experimental program to train policemen and firemen as registered nurses begins this fall at the City University of New York. The program will prepare police and fire

department personnel who are eligible to retire within 5 to 8 years to take the New York State registered nurse licensing examination. New York City policemen and firemen are eligible for retirement after 20 years of service.

The 2½-year training program is designed to fit a work-study schedule. Classes will be held for 3 hours, 3 nights a week. Plans call for admission of 100 men to the program in September 1970 and admission of 100 more men in September 1971.—*Hospital Week*, July 17, 1970.

Testing for Lead

About 8.1 percent of the children in the District of Columbia tested recently for lead poisoning had an abnormally high level of lead in their bodies. A total of 823 children, 18 months to 4 years old, were tested in the period June 2-8, 1970, in 10 free clinics operated by the District of Columbia Health Services Administration in cooperation with the United Planning Organization and the Medical Committee on Human Rights.

About 50,000 children in the District live in substandard houses, painted with lead-based paints which are now peeling. Many children put these paint chips in their mouth and lead poisoning may result.—*D.C. Health News and Notes*, July 1970.

Prescribing by Generic Name

Physicians and dentists participating in the Maryland Medical Assistance Program have been urged to prescribe drugs by their generic name so that pharmacists may "dispense a quality product, reasonably priced." The request was made in a joint statement issued by the Medical and Chirurgical Faculty of Maryland, the Maryland Pharmaceutical Association, and the Maryland State Department of Health and Mental Hygiene. A comparative drug price list accompanied the statement.

Items for this page: Health departments, health agencies, and others are invited to share their program successes with others by contributing items for brief mention on this page. Flag them for "Program Notes" and address as indicated in masthead.