Countywide Screening Programs for Chronic Disease

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EARLY in 1959, the Public Health Committee of the Prince George's County Medical Society endorsed the request of the county health officer for a study to explore the value of a diabetes detection program in the county. A total of 2,200 persons of all ages were given blood tests for diabetes and, incidentally, also for syphilis. While only four cases of syphilis were found, one previously unknown case of diabetes was discovered for every 200 persons tested. This was the beginning of a countywide diabetes detection program that got underway in September 1960 and was soon followed by a glaucoma detection program.

Prince George's County, adjacent to Washington, D.C., has a current population of about 400,000. In common with most suburban counties in the nation, it has been growing rapidly. During the period 1940–60 its population quadrupled, and current growth is at the rate of approximately 17,000 persons per year. Ninety-one percent of the residents are white, with the remaining 9 percent Negro.

The county covers 386 square miles. While a considerable portion is still rural, suburban growth is rapidly encroaching on the more rural areas. The county has a high birth rate and a low crude death rate due, primarily, to a preponderance of residents in the lower and middle age groups. Only 4 percent of the population is aged 65 or over.

The county, one of the wealthiest in Maryland, has an assessed valuation in excess of $1 billion. Many of its residents work in one of the Federal agencies in the Washington area, some of which are located in Prince George's County.

Dr. Grant, now director of public health of the District of Columbia, and Mr. Paupe, now with the Division of Chronic Diseases of the Public Health Service, were at the time of the study with the Prince George's County Health Department. Dr. Grant was the health officer and Mr. Paupe was a public health investigator.

Diabetes Detection Program

During the past few years a very good relationship has developed between the health department and the medical society, and the health officer discusses all proposed health department programs with the society's Public Health Committee. When a diabetes survey was proposed, the medical society was most receptive. A local physician, interested in diabetes and well thought of by the society, was brought into the Public Health Committee meetings as a consultant and helped sell the society on the diabetes detection program.

The objective of the diabetes programs is:

1. To find previously unknown cases of diabetes.
2. To direct persons suspected of having diabetes to a private physician for definitive diagnosis and, where appropriate, for treatment.
3. To redirect persons previously known to have diabetes to their private physicians for continued treatment.
4. To insure that the diabetic is maintained on a proper routine for prevention of disability or premature death.
5. To educate the general population about diabetes.

Population groups screened. In general, any person 25 years of age or over is eligible to participate in the program. In addition, special studies of two groups have been undertaken: mothers delivering babies weighing 9 pounds or over and blood relatives of known diabetics have been encouraged to submit to a blood test for diabetes.

Screening is carried out at locations all over Prince George's County; some is performed in connection with the mobile chest X-ray unit which is partially owned by the County Tuberculosis Association, while other testing is carried out in industries or in governmental agencies. Civic groups, church groups, fraternal and women's organizations, and parent-teacher associations have been invited to participate in the screening program. In addition, a number of communitywide screening surveys have been conducted.

During 1960, to enable the health department to initiate this program, an employee, who was assigned as a sanitarian but who had had premedical training, was given special training in collecting blood specimens, in epidemiologic principles, and in interviewing techniques. The facilities of the Public Health Service, the Maryland State Health Department, and the District of Columbia Health Department were extensively used for this training.

The work of the employee assigned to this program and to the subsequent glaucoma detection program, as well as to venereal disease work, accident prevention, and the followup of recalcitrant tuberculosis patients, is similar to that of the chronic disease representative of the Public Health Service. We, however, call the employee a public health investigator. Subsequently, we have employed one additional public health investigator in the health department, and the Public Health Service has assigned two chronic disease representatives to participate in chronic disease programs, with one concentrating mainly on accident prevention.

Preparation and planning. Several months in advance of a testing program, a public health investigator, a health educator, and certain other key members of the health department staff meet to determine which areas of the county will be scheduled during the next several months. In general, two locations are scheduled each month. Two months before a program is to begin in any locality, the public health educator contacts one or more community groups in that area to discuss the program and to arrange for their participation. The health educator endeavors to arrange for volunteers from these groups to serve as hosts or hostesses and registration clerks, to assist in arranging for publicity, and to help transport patients to the clinic.

The health department, through the health educator, supplies to the community group and to the whole area all of the publicity material necessary, including posters and pamphlets developed by the department. The educator is also responsible for appropriate news releases to newspapers, radio, and television.

The public health investigator is responsible for seeing that all of the equipment and supplies are available and ready for the testing program. To insure that the health department laboratory is equipped to handle the increased load brought about by a diabetes clinic, the investigator discusses each forthcoming clinic with the laboratory director.

In an industrial or local governmental agency survey, the health educator and the public health investigator jointly visit plant management or the agency director well in advance of the proposed clinic to arrange for employee participation in the clinic.

Procedure at the blood testing unit. Clinics are held either outdoors, for example in a shopping center plaza, or indoors, such as in a church building, depending upon the weather. Signs are posted in the area directing patients to the clinic. Each applicant is registered by a volunteer who completes a simple form. Then an intravenous blood specimen is drawn in a Sheppard tube containing sufficient sodium fluoride to prevent hemolysis until the sample can be tested in the laboratory. The tube is transmitted to a volunteer, who properly labels the specimen and stores it with others in racks provided. The public health investigator is responsible for transporting these racks to the laboratory and placing them under refrigeration. All blood specimens are examined within 48 hours.

Laboratory testing and reporting. The

screening is done by the Wilkerson-Heftmann method on a clinitron borrowed from the Public Health Service. The machine is used to screen the venous blood samples at a 130 mg./100 ml.-level. All specimens are drawn at random hours after eating without regard to whether the person has eaten beforehand. All persons having a blood screening test result of less than 130 mg./100 ml. are classified as negative and are so notified by mail.

All persons having a blood screening test of 130 mg./100 ml. or more are classified as positive and requested by letter to visit the health department laboratory for a fasting blood sugar test. This test is performed by the Hoffman method, and the following criteria govern disposition of results: persons with a fasting blood sugar reading of 100 mg./100 ml. or below are classified as negative; persons with a reading of 101 mg./100 ml. and up to and including 150 mg./100 ml. are classified as suspects and requested to return to the health department laboratory for a glucose tolerance test; persons having a reading of 151 mg./100 ml. or more are considered positive and are immediately referred to their private physicians.

The 3-hour and 100-gm. oral glucose tolerance test, using the Hoffman method, is the final test before final referral to physicians is initiated. The criteria for determining the results of this test are:

Time after glucose	*Minimum reading considered positive (mg. per 100 ml.)*
Fasting	110
1 hour	170
2 hours	120
3 hours	110

Referral and diagnosis. After diagnostic tests have been checked by a health department physician, the person with positive results is sent a letter advising him to go to his private physician for examination. At the same time a letter is transmitted to the private physician, along with the results of all tests and a card requesting the physician to inform the health department whether or not a specific diagnosis of diabetes has been made. When a card is returned from a private physician indicating a positive diagnosis, the patient's name and address are referred to our public health nursing service. The public health nurse then visits the patient, insures that proper care and medication are available, and obtains the names and addresses of all blood relatives of this patient who reside in the county. This information is transmitted to the public health investigator so that the relatives may be invited to submit to a blood test for diabetes.

We have had little difficulty in receiving completed cards from physicians to whom patients have been sent.

Results. It appears clear from the figures below and from additional information that approximately 1 percent of the 6,769 patients screened from September 1960 through September 1962 had previously unknown diabetes.

Number of clinics	78
Number of persons screened	6,769
Referrals to private physicians	102
Diagnosis of diabetes confirmed	67
Previously unknown	54
Previously known	13
Diagnosis of diabetes not confirmed	12
Diagnosis pending	13
Diagnosis unknown (moved, deceased, refused service, etc.)	10

Glaucoma Detection Program

During 1961, the health department began to explore with the ophthalmologists in the county the possibility of developing a glaucoma detection program. After presentation of this program to the Public Health Committee of the medical society in May 1961, plans were made to initiate a countywide glaucoma detection program similar to the diabetes detection program. This project got underway in January 1962. The program is aimed at:

1. Finding previously unknown cases of glaucoma.
2. Directing persons suspected of having glaucoma to a physician for definitive diagnosis.
3. Insuring that the glaucoma patient is maintained on a proper routine for the prevention of partial or total blindness.
4. Educating the general public about glaucoma.

Test population. All persons age 40 years or over are eligible to participate in the glaucoma detection program. Two exceptions are made to this limitation: (*a*) persons who are blood relatives of glaucoma patients are eligible

to receive the test irrespective of age; (*b*) for persons known to have diabetes, the minimum eligible age is reduced to 30.

Because of the higher prevalence of glaucoma in older age groups, we have emphasized testing in homes for the aged, nursing homes, and old-age clubs. However, members of civic clubs, church groups, industrial or governmental agency groups, and patients coming to health department clinics have also been tested. In addition, communitywide glaucoma surveys are conducted wherever possible. As in the diabetes detection program, the key technician is the public health investigator, who, before initiation of the project, was sent for special training to the District of Columbia Health Department, to the Washington Society for the Prevention of Blindness, and to the offices of local ophthalmologists. The ophthalmologists in the county were enthusiastic about the program and participated in much of the planning that preceded its actual development.

Preparation and planning. As with the diabetes program, approximately 2 months before a planned glaucoma detection program, a health educator contacts a community group to discuss the program and to arrange for the group's participation. Wherever possible a local Lions Club is invited to help. Volunteers are enlisted to serve as clerks or hostesses at the clinic, to aid in arranging for publicity, and to assist with transportation to the unit. A volunteer is selected to set up appointments for the proposed clinic.

In the glaucoma detection program, all patients are seen by appointment. In each community selected, persons are requested to call the volunteer responsible for making appointments. As an indication of community support, 749 of the first 750 people who made appointments for tests for glaucoma kept them; the one person who did not keep an appointment called to tell us why she could not be there. At first, when we had only one public health investigator, assisted by a public health nurse at the clinic, six appointments were made for every 15 minutes. With an expanded staff of two public health investigators, one vision screening technician, and one public health nurse at each glaucoma detection unit, we are now able to take 12 patients every 15 minutes.

Case Histories

Mrs. F, 65 years old, showed positive results in a test for diabetes conducted by the Prince George's County (Md.) Health Department and went immediately to her private physician. Examination revealed a pancreatic tumor. Mrs. F was being scheduled for surgery at the time this paper was in preparation.

Mr. H, 70 years old, with a family history of blindness of unknown etiology, had high pressure ocular readings when tested at a glaucoma detection clinic of the Prince George's County Health Department. He was told that it was urgent for him to see his ophthalmologist immediately. Nine days later Mr. H was hospitalized, and surgical relief of the pressure was carried out.

As with the diabetes program, the health educator supplies all posters and pamphlets to the community groups. He is also responsible for news releases. The public health investigator is responsible for insuring that all equipment and supplies are available for the testing program. In an industrial or agency survey, the health educator and the public health investigator are jointly responsible for contacting management to discuss the program and to make necessary arrangements.

Testing procedures. All glaucoma detection clinics are held inside a building. Some of the buildings typically used are the main health department building, churches, fire department halls, community meeting halls, and schools. As a patient enters the clinic he is greeted by a volunteer hostess and presented with a pamphlet which describes the tests the patient will get as he goes through the clinic. The hostess directs the patient to a volunteer clerk, who registers him on a simple form.

The clerk directs the patient to the vision-screening technician, who performs a visual acuity test, both with and without glasses, using a Titmus vision tester. After recording the findings, the technician directs the patient to the public health investigator, who conducts the tonometry examination. Standardized Schiotz tonometers are used. The patient is placed comfortably in a reclining position. The

cornea is anesthetized, using 0.5 percent Ophthaine, and the ocular pressure is measured in both left and right eyes, using a 7.5-gram weight. The public health investigator records the ocular pressure readings, instructs the patient not to scratch his eyes, and directs him to the public health nurse. She notifies the patient of the result of the test before he leaves the clinic and gives him a pamphlet, which again cautions him not to rub or scratch his eyes. The public health investigator insures that the footplate of the tonometer is cleaned with Zephiran solution immediately after each use.

Interpretation of test results. The following criteria govern disposition of the results of the ocular pressure reading on initial screening:

1. Measurements lower than 23.8 mm. of mercury are considered negative.
2. Measurements of 23.8 mm. or more of mercury are classified as suspect.
3. Persons having a differential ocular pressure between eyes of 5 mm. or more of mercury are also classified as suspects.

The public health nurse informs those classified as suspect that further tests are necessary and makes appointments for these patients to visit the health department for these tests. Retesting consists of a second ocular pressure measurement and, where indicated, a water pressure test. Persistent high pressure readings recorded at the end of a 45–60 minute water provocative test which show an elevation of 4 mm. or more of mercury are considered suggestive of glaucoma, and the patient is referred.

Procedure for referral. Patients are requested to ask their private physician to refer them to an eye specialist or, if the physician wishes, to the health department eye clinic. (Persons indicating that they do not have a private physician are given a list of the names, addresses, and telephone numbers of all practicing opthalmologists in Prince George's County and requested to call the ophthalmologist of their choice for an appointment.) Patients are also asked to inform the health department of the name of the ophthalmologist so that test results can be formally referred. The letter of referral requests the ophthalmologist to return an enclosed diagnosis card to the health department, indicating whether or not a specific diagnosis has been made. At the same time the health department sends a copy of this referral to the patient's family physician if the patient has named one. After 60 days, a followup letter is sent to ophthalmologists who have not returned the completed diagnosis card. However, as in the diabetes detection program, the health department has encountered little difficulty in receiving the diagnosis cards.

Results. The following results of the testing program during January–September 1962 indicate that when all diagnoses have been completed we shall probably find that approximately 1 percent of all patients examined had previously unknown glaucoma.

Number of clinics	15
Total number of patients	2,220
Referrals for possible glaucoma	50
Diagnosis of glaucoma confirmed	18
Previously unknown	13
Previously known	5
Diagnosis not confirmed	13
Diagnosis pending	19

Summary

The Prince George's County (Md.) Health Department is conducting two chronic disease detection programs with full support of the county medical society and the local communities. During September 1960 through September 1962, 6,769 persons were screened for diabetes, and 54 previously unknown but subsequently confirmed cases were discovered. In the period January–September 1962, the department screened 2,220 persons for glaucoma and referred 50; in 18, glaucoma had been confirmed at time of preparation of this paper. Both programs were geared to high prevalence groups irrespective of financial status. Results indicate the value of such detection programs as definitive public health measures for reducing disability or preventing premature loss of life.