

Primary Care Research in a Model Family Practice Unit

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A model family practice unit in a rural setting was considered an important training laboratory for a family practice residency program. In preparation for the development of this facility, an in-depth study was made in a rural area of Lancaster County where 4,000 families resided. As a result of the findings in this survey, a model family practice unit was established and has been in operation for over one year. A limited computerized data

collection system was greatly expanded after it had been in operation for nine months. This data has served as a useful resource in further development of the educational program for the training of family practice residents at the Lancaster General Hospital as well as providing important information describing our family practice.

It has become strikingly obvious in recent years that little attention has been paid to research in primary care, which constitutes a large fraction of all doctor-patient encounters each year in this country. For years we have seen an emphasis upon biomedical research focused particularly on hospitalized patients in tertiary care centers. We are now starting to recognize the vast potential for primary care research, which can naturally develop as an integral element of developing family practice residency training programs.

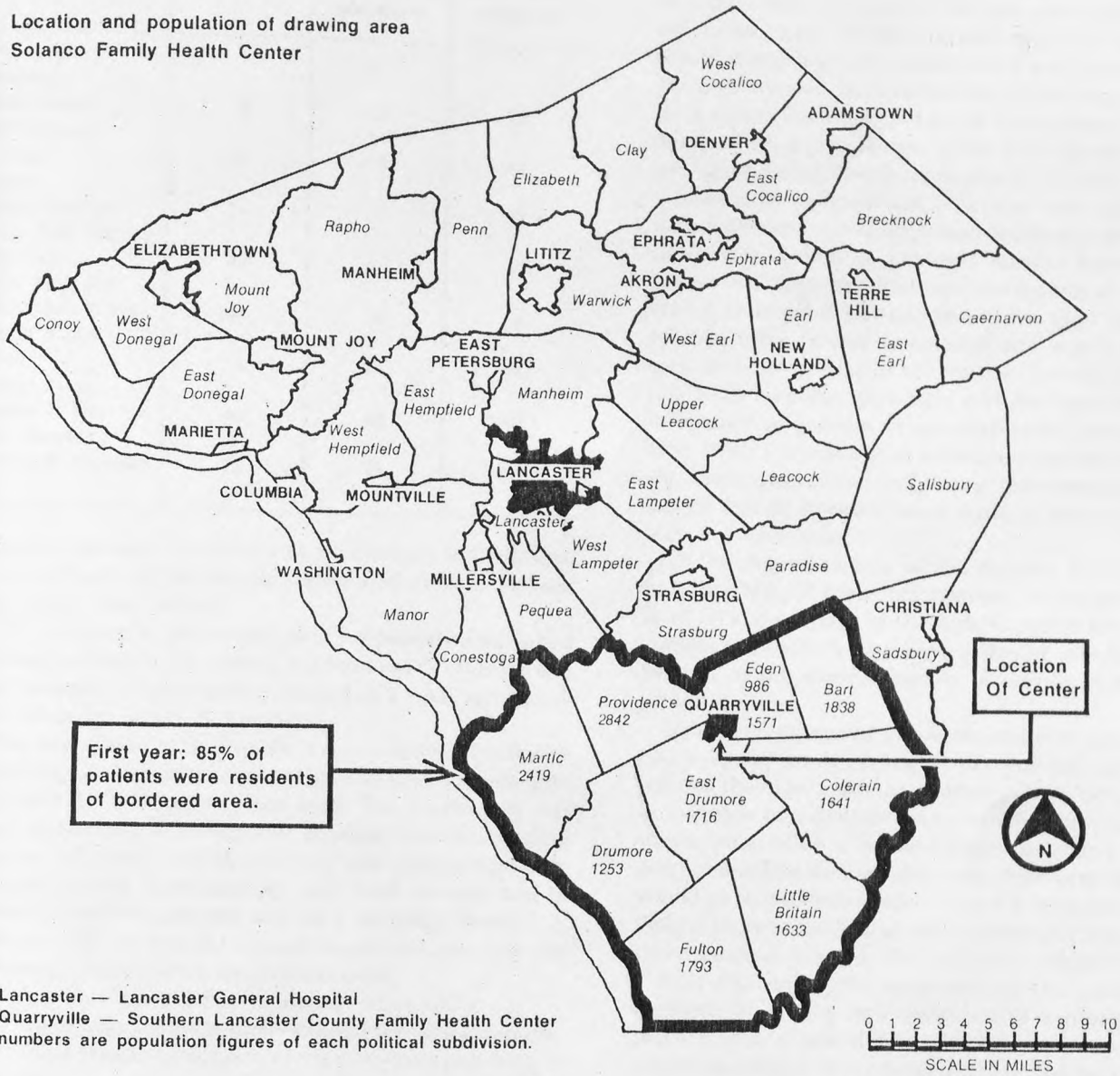
This article will describe first a feasibility study which was carried out to assess the degree of medical need for a model family practice unit in a rural community. A computerized primary care research program will then be outlined involving a variety of clinical and practice management parameters. Results of this research based on the first year's operation of a newly developed model family practice unit will be discussed in terms of their impact on medical care of the community and the family practice residency program itself.

A Feasibility Study for a Rural Model Family Practice Unit

Since the inception of the family practice residency program at Lancaster General Hospital in July of 1970, one goal was the establishment of a model family practice unit in rural Lancaster County where physicians could be trained in a setting simulating a family practitioner's office as nearly as

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Location and population of drawing area
Solanco Family Health Center



Base map compiled from records of Lancaster County Board of Assessments June, 1965

TABLE I

Preventive Health Care 311 Households

Measure	% Reporting None	% Reporting Some Family Members	% Reporting All Family Members
Smallpox Vaccination	3	18	79
DPT Under 1 Year	17	19	64
Polio Immunization	24	27	49
Skin Test For TB, Ever	42	41	17
Skin Test For TB Within 2 Yrs.	64	30	6
Chest X-ray Ever	15	51	34
Chest X-ray Within 2 Yrs.	44	46	10
Pap Smears All Adult Females	32	10	58

possible. Lancaster, Pennsylvania is a business and industrial community of 65,000 people surrounded by rich farmland and many small towns.

Several areas in Lancaster County appeared to be suited for such a model unit. Among the localities considered was the borough of Quarryville, situated in a rural agricultural area 15 miles south of Lancaster.

The population of Quarryville is approximately 1,600 with a drawing population of about 16,000 people comprising an approximate 300 square mile area. The community has been served by one osteopathic physician and two medical doctors. All three were overworked, and one medical doctor was nearing retirement age and more recently had to greatly curtail his practice due to a disabling illness.

In selecting an area for a model family practice unit, the following prerequisites seemed desirable:

1. The area should be "medically deprived."
2. There must be community support for such a venture.
3. There should be support of the physicians practicing in that area.
4. The area should be close enough to the hospital to be practical to operate.

After it had been determined that the Quarryville area would be the most likely location for the model family practice unit, research was necessary to determine its feasibility and advisability.

Some of the questions which needed answering were:

1. How do the citizens of the area view their medical situations?

2. Are they getting even minimum medical care?
3. Where are they getting medical care?
4. How would they feel about the establishment of a facility such as was projected in their community?
5. Would they utilize such a facility if it became a reality?

To answer those questions, and many more, a questionnaire was developed to elicit meaningful and pertinent information from residents of the area concerning their present health care. It was decided that the questionnaire would realize a greater response if it was administered on a personal interview basis rather than by mailing it and waiting for a return. Two critical factors were needed for this endeavor. First, a valid sample of the 4,000 families in the area, and second, qualified interviewers to conduct the survey.

Since the geographical area was well delineated by school district boundaries, it was decided to select a sample size of 500 families on a random number basis from school census lists. Since the school census records all families with school children, it was considered the most complete and reliable listing of area population and would result in the least amount of bias in the survey. Training sessions and follow-up meetings were held with the volunteers in order to establish as uniform an approach to the interview as possible. With the number of volunteers utilized (nearly 40 in all), there was undoubtedly some bias introduced into the survey, but all attempts were made to keep this source of bias at a minimum.

Of the original sample of 500 families, 325 were able to be contacted. Of these 325 families, 14 refused to respond at all for the purpose of the survey, which left 311 sample families from which data were gathered, which is about 52 percent of the original sample. A wealth of material was gathered.

Eighty-seven percent of the respondents stated that they had a regular family doctor; 13 percent did not; 82 percent felt that they saw a doctor as often as they felt it necessary. In response to a question as to whether they would visit a doctor more often if he lived closer or wasn't as busy, 26 percent said that they would. Only 20 percent said that they would go to the doctor more often if it were less expensive. Only 3 percent stated that they had sought and did not receive medical help for illness in the family.

After acquainting the participants in the survey with the methods of staffing and operation of a projected family practice unit, it was determined that 56 percent of them would be interested in having their families become regular patients. Of the 56 percent expressing an interest in having their families become regular patients, 22 percent said that their decision was based on the fact that they had no family doctor at present; 56 percent that their present doctor was overworked; 10 percent stated they would like a new doctor; and 12 percent gave no specific reason. Of the 44 percent who would not be interested in coming to such a unit, satisfaction with their present family doctor was given as the reason by 91 percent.

In an effort to determine what type of preventive medicine was being received by the residents of the area, questions were asked concerning some of the common preventive measures normally carried out in private physicians' of-

TABLE II

Demographic, Sociological and Economic Data Collected at Initial Visit

A. Family Control Data (Collected Once for Each Family)

- 1. Doctor number
- 2. Account number
- 3. Responsible party
- 4. Address & Telephone number
- 5. Health Insurance Details
- 6. Employer's Name and Address
- 7. Employer's Workman's Compensation Carrier

B. Patient Control Data (Collected Once for Each Patient)

- 1. Name and address
- 2. Account number
- 3. Birth date
- 4. Sex
- 5. Race
 - a. White
 - b. Negro
 - c. Latin
 - d. Other
- 6. Marital Status
 - a. Single
 - b. Married
 - c. Divorced
 - d. Widowed
 - e. Remarried
 - f. Separated
- 7. Religion
 - a. Amish
 - b. Other Protestant
 - c. Catholic
 - d. Jewish
 - e. Other
 - f. None
- 8. Residence
(11 categories — corresponding to the Borough of Quarryville, 9 surrounding townships, and "other")
- 9. Birthplace
 - a. Lancaster County
 - b. Other Pa. County
 - c. Other State

TABLE III (a)

**Family History and Occupation Status
The Lancaster General Hospital
Family Health Service**

Patient Name _____ No. _____ Birthdate _____

HISTORY

Family History Of:

- _____ 801 Anemia
- _____ 802 Asthma
- _____ 803 Bleeding Disorder (specify) _____
- _____ 804 Blindness
- _____ 805 Cancer (specify) _____
- _____ 806 Deafness
- _____ 807 Diabetes
- _____ 808 Drug Reaction (specify) _____
- _____ 809 Epilepsy
- _____ 810 Gout
- _____ 811 Hay Fever
- _____ 812 Heart Disease
- _____ 813 Hypertension
- _____ 814 Infection — Recurrent
- _____ 815 Jaundice
- _____ 816 Kidney Disease (specify) _____
- _____ 817 Malformation (specify) _____
- _____ 818 Mental Illness
- _____ 819 Mental Retardation
- _____ 820 Neurological Disorders
- _____ 821 Rheumatic Fever
- _____ 822 Stroke
- _____ 823 Thyroid Disease (specify) _____
- _____ 824 T.B.
- _____ 825 Other Familial, Genetic, or Otherwise Significant Disease (specify) _____

Occupation Status

TABLE III (b)

Occupation (Check one):

- _____ 0. Unemployed
- _____ 1. Agriculture
- _____ 2. Clerical
- _____ 3. Equipment Operator (Incl. Truck Drivers)
- _____ 4. Laborer (Skilled & Unskilled)
- _____ 5. Managerial & Supervisory
- _____ 6. Marketing (Incl. Retail Sales, Route Men, etc.)
- _____ 7. Professional
- _____ 8. Student
- _____ 9. Technical

Subjected to (Check one):

- _____ 0. None
- _____ 1. Elements (Dampness, Thermal Extremes)
- _____ 2. High Accident Risk
- _____ 3. Irregular or Prolonged Hours
- _____ 4. Lung Contaminants & Inhalents (Smoke, Dust, Pesticides, Etc.)
- _____ 5. Radiation
- _____ 6. Tension & Emotional Stress
- _____ 7. Toxic Substances
- _____ 8. Vibration or Noise
- _____ 9. Other (specify) _____

fices. These results are shown in Table I. Large gaps were seen which would indicate need for comprehensive health care in the area, and a definite need for a family-oriented program of medical supervision. In response to a question concerning care of physicians' assistants, 90 percent said they would have full confidence in such paramedical personnel who were trained and supervised by doctors. Only 10 percent indicated that they would have reservations about being seen by anyone but the doctor, some saying that they would refuse to be seen by such a paramedical person.

The survey seemed to indicate that all our criteria for a successful operation had been met, and the decision was made to go ahead with establishment of a model family practice unit at Quarryville.

TABLE IV

Drug Code

DR01	Corticosteroids
DR02	Antidepressives
DR03	Hypnotic
DR04	Other Psychotropic Drugs
DR05	Diuretics
DR06	Specific Hypotensives
DR07	Cardiac Glycosides
DR08	Other Cardiac Drugs
DR09	Birth Control Pills
DR10	Antibiotics and Anti-Infectives
DR11	Oral Hypoglycemics
DR12	Insulin
DR13	Hormones Other Than Listed Above
DR14	Anticoagulants
DR15	L-Dopa
DR16	Other Drugs or Medications

TABLE V

Disposition Codes

01	Rescheduled — within 1 week
02	Rescheduled — within 1 month
03	Rescheduled — within 3 months
04	Rescheduled — within 6 months
05	Rescheduled — within 1 year
06	Discharged — resolved, or with treatment
07	Referred to doctor for consultation
08	Referred to doctor for consultation and treatment
09	Referred to other family doctor
10	Hospitalized at Lancaster General Hospital
11	Hospitalized at other hospital
12	Referred to agency for consultation or care
13	Died
14	Other disposition
15	To return, but interval not specified

TABLE VI

**Patient Questionnaire
Southern Lancaster County Family Health Center
How Can We Serve You Better?**

In order to provide the best possible comprehensive health care for the Southern Lancaster County area, we are interested in your reactions and suggestions. We would appreciate your taking a few minutes of your time to fill out this card. Thank you.

1. So far, has the Family Health Center lived up to your expectations? Yes _____ No _____
2. Does the entire "family approach" appeal to you? Yes _____ No _____
3. Have you any difficulty getting appointments? Yes _____ No _____
4. Are you usually seen promptly? Yes _____ No _____
5. Do you feel comfortable dealing with the secretary and nurses? Yes _____ No _____
6. Do you feel that you have been treated with courtesy and consideration? Yes _____ No _____
7. Do you feel comfortable talking with the physician? Yes _____ No _____
8. Do you feel he takes a real interest in all your problems? Yes _____ No _____
9. Do you think the fees are: Satisfactory _____ Too high _____ Too Low _____
10. Are the costs of the prescribed drugs a problem? Yes _____ No _____
11. Do the physicians discuss your problems with you in a language you can understand? Yes _____ No _____
12. Do you understand the reason the laboratory tests are being done? Yes _____ No _____
13. Do you accept the added costs of these tests? Yes _____ No _____
14. Who is your Family Doctor at the Health Center?

Please give your own comments or suggestions.

*Establishment of Rural Model
Family Practice Unit*

After an intensive period of planning and preparation, a model family practice unit was opened in Quarryville on October 1, 1971. A citizens' advisory group of the Southern Lancaster County area worked in conjunction with the residency program staff and also effectively raised local funds to help with remodeling of a house for this purpose. Medical care was initially provided by five second-year family practice residents and program faculty, with the assistance of part-time volunteer family physicians from the area.

During the course of the first nine months of operation, the residents developed a panel of approximately 100 permanent families each, in addition to caring for many transient patients on an episodic basis. The center is operated similarly to a group practice, and by the end of the first twelve months' operation approximated a two-man partnership. Emphasis was placed on the whole family concept, and the practice was to remain innovative, depending on the needs and expectations of the resident physicians, the perceived requirements of the community, and the philosophy of the Lancaster General Hospital Family and Community Medicine Program. The establishment of this model family practice unit seems to be of great educational benefit to teach the residents in a rural area of medical need.

Methods

From the onset of the program at the Family Health Center, a modified computerized data collection system has

TABLE VII

Disease Problem Categories October 1, 1971 thru September 30, 1972

	Total Pt. Visits	%	Hospitalized	%	Referred to Consultant	%
1. Infectious & Parasitic Diseases	1401	15.1	9	.6	13	.9
2. Neoplasms	50	.7	4	8.0	9	18.0
3. Endocrine, Metabolic, Allergic & Nutritional	724	8.1	4	.6	4	.6
4. Blood & Blood Forming Organs	49	.6	1	2.0	1	2.0
5. Mental & Psychological Disorders	475	5.3	9	2.0	6	1.0
6. Nervous System & Sense Organs	337	3.8	4	1.0	7	2.0
7. Circulatory System	559	6.2	28	5.0	5	.9
8. Respiratory System	432	4.8	4	.9	14	3.0
9. Digestive System	485	5.4	25	5.0	21	4.0
10. Genitourinary System	426	4.7	14	3.0	28	7.0
11. Pregnancy, Childbirth & Puerperium	76	.8	4	5.0	3	4.0
12. Skin & Cellular Tissue	659	7.3	1	.2	23	3.0
13. Bones & Organs of Movement	485	5.4	0	0	15	3.0
14. Congenital Malformations & Certain Diseases of Infancy	15	.2	1	7.0	0	0
15. Symptoms & Ill-defined Conditions	173	2.0	1	.6	8	5.0
16. Accidents & Poisoning	1440	16.0	13	9.0	61	4.0
17. Nonsickness & Prophylactic Procedures	1211	13.6	1	.1	23	2.0
TOTAL	8997	100.0	123	1.0	241	3.0

been in operation. Family and demographic information is collected at the first visit as well as financial and billing data. The data as collected is shown in Table II.

At each patient encounter, the nature of the problem, the type of service provided, and disposition of the case are tabulated. The classification of problems and diseases followed roughly the main categories in the Metcalfe modification of the Royal College of General Practitioner's Code in a much abbreviated fashion. The disposition of the cases is classified according to time of return, hospitalization and consultations. Certain deficiencies in the system became apparent, especially in the area of disease and problem coding, though a wealth of information was obtainable in the monthly printouts.

The Family and Community Medicine Program at the Lancaster General Hospital also operates the Family Health Service, an ambulatory family care facility located in the hospital and serving the indigent population of the City of Lancaster and its environs. Despite its limited scope and its obvious deficiencies, the vast potential of the computerized program at the Quarryville unit was recognized at an early date and plans were made to begin computerizing the services of the Family Health Service as well. Consequently, on July 1, 1972, a greatly expanded computerized data gathering program was instituted at both the Family Health Service at the Hospital and the Southern Lancaster County Family Health Center at Quarryville. A modification of the Metcalfe

system adjusted from the Royal College of General Practitioner's Code is used for disease and problem coding, expanding our previously restricted classifications to about 500 categories.

In addition to the greatly expanded disease and problem classifications, the computer input was also enhanced by addition of an occupational code, health hazard code, and a family history code shown in Table III, a and b.

Codes for certain drug categories that have been prescribed were added (Table IV).

Other procedures which have been added are certain types of counselling and advice, X-rays which have been ordered and immunizations. The disposition coding has been expanded to include the frequency of follow up on all types of patients, as shown in Table V.

Accumulating drug usage by computer tends to point out proper and improper use of certain drugs, as well as the efficacy of drugs for specific conditions. Inasmuch as the system is also used for bookkeeping and billing purposes, it not only exercises economic control on the practice but also tabulates certain other procedures which are performed or ordered, such as laboratory examinations, electrocardiograms, physiotherapy, and so forth.

A questionnaire is given to the patients to complete in order to evaluate their opinion of our services as shown in Table VI.

TABLE VIII

**Patient Visits — Ages 0 to 12 Years
(October 1, 1971 thru September 30, 1972)
(Non-sickness excluded)**

1. Communicable Diseases	716	37.1%
2. Neoplasms	2	0.1%
3. Allergies, Endocrine & Metabolic	150	7.8%
4. Blood Disorders	15	0.8%
5. Mental & Psychological	23	1.2%
6. Nervous System & Sense Organs	105	5.4%
7. Circulatory System	5	0.1%
8. Respiratory System	111	5.7%
9. Digestive System	105	5.4%
10. Genitourinary System	28	1.5%
11. Pregnancy & Complications	—	—
12. Skin & Cellular Tissue	168	8.7%
13. Bones & Organs of Movement	25	1.3%
14. Congenital Malformations	2	0.1%
15. Certain Diseases of Early Infancy	11	0.6%
16. Symptoms, Signs, and Ill-defined Conditions	29	1.5%
17. Accidents, Poisoning, and Violence	436	22.7%
Total	1931	100.0%

Completion of these has been very helpful in reviewing our weak and strong points in the eyes of the consumer (the patient).

Results

Table VII shows the various disease problem categories of patients during the first year of operation of the Southern Lancaster County Family Health Center. A total of 3,188 patients had been seen comprising 8,997 patient visits. Of these, 123 patients had been hospitalized, and 245 had been sent to specialists for consultation and/or treatment. It will be noted that three categories comprise 44.7 percent of the problems of patients seen — 1) nonsickness; 2) accidents; and 3) infectious diseases.

Table VIII shows the various classifications of problems for patients under 12 years of age. In the pediatric age group, nonsickness (well-baby and prophylactic procedures) being excluded, communicable diseases and accidents comprised 59.8 percent of the patient visits.

Demographic data for the first year of operation is seen in Table IX.

Discussion

In a retrospective analysis of American and British data, White has noted that 75 percent of an observed adult popu-

lation, age 16 and older, may perceive a disturbance in their health during a one-month period, but only 25 percent will consult a physician.¹ Of these, two percent will be referred to another physician, four percent will require hospitalization, and only 0.4 percent will require referral to a university center. Our results are comparable with these findings. Of 3,188 patients seen at the Family Health Center, 123 patients or four percent required hospitalization, and 241 patients or 7.5 percent were referred to another physician for consultation. The latter figure may be increased because of the educational value of a consultation. In terms of patient visits, one percent resulted in hospitalization and three percent led to consultation.

These data support the relevance of training in ambulatory medicine being provided in the model family practice unit. Moreover, it will be noted that the number and kinds of illnesses seen in an ambulatory family practice are at marked variance with the amount of physician training in those areas provided in traditional medical school, internship, and many residency programs. For example, out of the total population of 3,188 patients who experienced a total of 8,997 patient visits during the initial 12-month period, 559 patient visits or approximately six percent were made in the office for an illness of the circulatory system. Of these, only 26 patients were hospitalized; 10 had coronary artery disease, eight had congestive heart failure, five had cerebral vascular accidents, three had hypertension, and two were hospitalized twice for the same condition. There were 1,440 patient visits for accidents and 659 patient visits for disorders of skin and cellular tissue.

The implications of such findings seem to be clear. If we are to adequately train family physicians, it appears imperative that they be exposed to the care of the ambulatory patient, and this exposure must be supplemented with training relevant to the kinds of illnesses seen in such a practice. As a result of the findings of this study, our conferences and our teaching have been altered to provide more education in those areas which are seen more frequently in the family physician's office.

One major discrepancy of our results compared with other studies is our low incidence of respiratory problems, which have usually ranged from 20 to 25 percent of patient visits in other reports.² This discrepancy is due to our inclusion of upper respiratory illness in the category "Infectious and Parasitic Diseases" instead of "Diseases of the Respiratory System." This points out the need for uniformity in coding, and this has been changed in our expanded, computerized system. The incidence of accidents is also greater in our report, probably due to the community use of our facility for emergencies.

The high incidence of patient visits in children for injuries and communicable diseases is demonstrated. These findings have led us to increase our emphasis on these areas in pediatric teaching.

Computerized collection of information will also permit us to define the number of patient visits per resident physician, as well as disease categories of the patients whom he is treating. Information is retrievable regarding the revenue

TABLE IX

Demographic Data

Township	Population Distribution	1st Year Patient Distribution
Quarryville	9%	20%
Bart Township	10%	7%
Colerain Township	9%	8%
Drumore Township	7%	10%
East Drumore Township	9%	10%
Eden Township	5%	4%
Fulton Township	10%	10%
Little Britain Township	9%	10%
Martic Township	16%	10%
Providence Township	16%	11%
	100%	100%

Distribution of Patients Seen at Southern Lancaster County Family Health Center From 10-1-71 thru 9-30-72

Marital Status		Sex		Race	
Single	52%	Male	50%	White	99%
Married	42%	Female	50%	Negro	Less than 1%
Divorced	2%			Latin	Less than 1%
Widowed	3%			Other	Less than 1%
Remarried	0%				
Separated	1%				

Age Groups — in Years	Comparison of Age Groups with 1970 Census Population
0 — 1	6%
2 — 6	12%
7 — 12	13%
13 — 17	11%
18 — 25	20%
26 — 40	16%
41 — 64	16%
65 +	6%
	Center 0 — 17 42%
	Census 0 — 19 39%
	Center 18 — 64 52%
	Census 20 — 64 51%
	Center 65 + 6%
	Census 65 + 10%

Religion	Birthplace
Amish	3%
Other Protestant	72%
Catholic	8%
Jewish	0%
Other	13%
None	4%
	Lancaster County 64%
	Other Pa. County 16%
	Other State 18%
	Outside U.S.A. 2%

generated by each resident physician, which can give us a more accurate idea of his productivity and efficiency.

Our first efforts in primary care research have resulted in the formation of a new type of health care facility in rural Lancaster County. We are gratified by the results of our first nine months pilot operation, which resulted in our subsequent three months of expanded operation. In this computerized study of primary care, we are planning further collection and analysis of data based on a longer experience and including additional parameters.

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